



SILENCED VOICES: ANALYSIS OF PUBLIC HEARINGS ON THE ZERO FISH TRANSPORTATION LAW IN THE PANTANAL OF MATO GROSSO

VOZES SILENCIADAS: ANÁLISE DAS AUDIÊNCIAS PÚBLICAS SOBRE A LEI DO TRANSPORTE ZERO DE PEIXE NO PANTANAL MATO-GROSSENSE

VOCES SILENCIADAS: ANÁLISIS DE LAS AUDIENCIAS PÚBLICAS SOBRE LA LEY DE TRANSPORTE CERO DE PECES EN EL PANTANAL MATO-GROSSENSE

Marcelo Caetano Vacchiano¹, Josué Ribeiro da Silva Nunes², Luciana Ferraz³, Jerry Penha⁴,
Carlos Teodoro José Hugueneir Irigaray⁵, Agostinho Carlos Catella⁶, Carolina Joana da Silva⁷

DOI: 10.54899/dcs.v22i80.3015

Recibido: 23/5/2025 | Aceptado: 13/6/2025 | Publicación en línea: 24/6/2025.

ABSTRACT

The Zero Fish Transportation Law (Laws No. 12,197/2023 and No. 12,434/2024) in Mato Grosso, which restricted fishing in the state's three river basins — Pantanal, Amazon, and Tocantins-Araguaia —, generated significant social controversy. This study analyzed public hearings held in Cuiabá and Barão de Melgaço on this legislation, identifying the participation of different social groups and their arguments. The statements of 123 participants were recorded and analyzed with NVivo and Excel, revealing that 90% of the speakers were against the changes in fishing policy, including all researchers linked to state and federal agencies and entities dealing with environmental research and conservation. These researchers highlighted the lack of scientific basis for the restrictions and manifested data-based concerns about socioeconomic impacts on traditional communities. The most compelling criticisms were directed at the state government (the author of the bill) and the parliamentarians who approved the measure, claiming that the

¹ PhD in Environmental Sciences, Universidade do Estado de Mato Grosso (UNEMAT), Cáceres, Mato Grosso, Brasil. E-mail: marcelo.vacchiano@hotmail.com

² PhD in Ecology, Universidade Federal de São Carlos (UFSCar), São Carlos, São Paulo, Brazil. E-mail: josue@unemat.br
Orcid: 0000-0003-3927-5063

³ PhD in Ecology, Universidade Federal de São Carlos (UFSCar), São Carlos, São Paulo, Brazil.
E-mail: ferrazlcb@gmail.com Orcid: 0009-0004-5129-7921

⁴ PhD in Ecology, Universidade Federal de São Carlos (UFSCar), São Carlos, São Paulo, Brazil.
E-mail: jpenha.bio@gmail.com Orcid: 0000-0003-4437-092X

⁵ PhD in Laws, Universidade Federal de Santa Catarina (UFSC), Florianópolis, Santa Catarina, Brasil.
E-mail: teodoro.irigaray@gmail.com Orcid: 0000-0002-7276-6289

⁶ PhD in Freshwater Biology, Instituto Nacional de Pesquisas da Amazônia (INPA), Manaus, Amazonas, Brasil.
E-mail: agostinho.catella@embrapa.br Orcid: 0009-0007-9348-8197

⁷ PhD in Ecology, Universidade Federal de São Carlos (UFSCar), São Carlos, São Paulo, Brazil. E-mail: ecopanta@terra.br
Orcid: 0000-0003-0517-1661

proposal was imposed without public consultation and disagreed with the demands of fishing communities. Participants highlighted that the law directly threatens food sovereignty and the economic security of fishermen, whose livelihoods depend on fishing activities. Moreover, they pointed to the omission of factors such as agricultural pollution, hydroelectric plants, and tourism as the real causes of damage to fish fauna, besides the lack of effective social participation in the decision-making process. The practice of recreational fishing as "catch and release" has also been criticized, with allegations that it increases fish mortality and damages the aquatic ecosystem. The study concludes that the new fishing policy conflicts with the 2030 Sustainable Global Goals and recommends adopting more balanced measures based on scientific evidence and constructed in a participatory manner. The study highlights the need for rigorous scientific research on fish stocks and the reformulation of fishery policies on a participatory basis that integrates scientific and traditional knowledge.

Keywords: Pantanal. Public Hearings. Traditional Communities. Food Safety.

RESUMO

A Lei do Transporte Zero de Pescado (Leis nº 12.197/2023 e nº 12.434/2024) em Mato Grosso, que restringiu a pesca nas três bacias hidrográficas do estado - Pantanal, Amazônica e Tocantins-Araguaia -, gerou significativa controvérsia social. Este estudo analisou as audiências públicas realizadas em Cuiabá e Barão de Melgaço sobre essa legislação, identificando a participação de diferentes grupos sociais e seus argumentos. Os depoimentos de 123 participantes foram gravados e analisados com NVivo e Excel, revelando que 90% dos oradores eram contrários às mudanças na política pesqueira, incluindo todos os pesquisadores ligados a órgãos e entidades estaduais e federais que lidam com pesquisa e conservação ambiental. Esses pesquisadores destacaram a falta de base científica para as restrições e manifestaram preocupações baseadas em dados sobre os impactos socioeconômicos nas comunidades tradicionais. As críticas mais contundentes foram dirigidas ao governo do estado (autor do projeto de lei) e aos parlamentares que aprovaram a medida, alegando que a proposta foi imposta sem consulta pública e estava em desacordo com as demandas das comunidades pesqueiras. Os participantes destacaram que a lei ameaça diretamente a soberania alimentar e a segurança econômica dos pescadores, cuja subsistência depende das atividades pesqueiras. Além disso, apontaram a omissão de fatores como poluição agrícola, usinas hidrelétricas e turismo como as verdadeiras causas dos danos à fauna de peixes, além da falta de participação social efetiva no processo decisório. A prática da pesca recreativa como "pescue e solte" também foi criticada, com alegações de que ela aumenta a mortalidade dos peixes e prejudica o ecossistema aquático. O estudo conclui que a nova política de pesca entra em conflito com os Objetivos Globais Sustentáveis de 2030 e recomenda a adoção de medidas mais equilibradas, baseadas em evidências científicas e construídas de forma participativa. O estudo destaca a necessidade de pesquisas científicas rigorosas sobre os estoques de peixes e a reformulação das políticas de pesca em uma base participativa que integre o conhecimento científico e tradicional.

Palavras-chave: Pantanal. Audiências Públicas. Comunidades Tradicionais. Segurança Alimentar.

RESUMEN

La ley de transporte cero de pescado (leyes nº 12.197/2023 y nº 12.434/2024) en mato grosso, que restringió la pesca en las tres cuencas fluviales del estado - pantanal, amazonas y tocantins-araguaia - generó una importante controversia social. Este estudio analizó las audiencias públicas celebradas en cuiabá y barão de melgaço sobre esta legislación, identificando la participación de diferentes grupos sociales y sus argumentos. Los testimonios de 123 participantes fueron grabados y analizados utilizando nvivo y excel, revelando que el 90% de los oradores se oponían a los cambios en la política pesquera, incluidos todos los investigadores vinculados a organismos estatales y federales y entidades que se ocupan de la investigación y conservación del medio ambiente. Estos investigadores destacaron la falta de base científica de las restricciones y expresaron su preocupación, basada en datos, por los impactos socioeconómicos en las comunidades tradicionales. Las críticas más duras se dirigieron al gobierno estatal (autor del proyecto de ley) y a los diputados que aprobaron la medida, alegando que la propuesta se impuso sin consulta pública y en contradicción con las demandas de las comunidades pesqueras. Los participantes subrayaron que la ley amenaza directamente la soberanía alimentaria y la seguridad económica de los pescadores, cuyo sustento depende de las actividades pesqueras. Además, señalaron la omisión de factores como la contaminación agrícola, las centrales hidroeléctricas y el turismo como causas reales de los daños a la fauna piscícola, así como la falta de participación social efectiva en el proceso de toma de decisiones. También se criticó la práctica de la pesca recreativa, como la "captura y suelta", alegando que aumenta la mortalidad de los peces y perjudica al ecosistema acuático. El estudio concluye que la nueva política pesquera entra en conflicto con los Objetivos Mundiales Sostenibles 2030 y recomienda la adopción de medidas más equilibradas, basadas en pruebas científicas y elaboradas de forma participativa. El estudio subraya la necesidad de realizar investigaciones científicas rigurosas sobre las poblaciones de peces y de reformular las políticas pesqueras sobre una base participativa que integre los conocimientos científicos y tradicionales.

Palabras clave: Pantanal. Audiencias Públicas. Comunidades Tradicionales. Seguridad Alimentaria.



Esta obra está bajo una [Licencia Creative Commons Atribución- NoComercial 4.0 Internacional](https://creativecommons.org/licenses/by-nc/4.0/)

INTRODUCTION

The Pantanal, the largest wetland in the world, is located in the heart of South America and is a biome shared by Brazil (80%), Bolivia (15%), and Paraguay (5%). The Brazilian portion is located in the states of Mato Grosso and Mato Grosso do Sul. Today, this biome is also considered a cultural landscape, as it has been used and managed by various cultures since the beginning of its occupation, around 8,000 years ago (Da Silva *et al.* 2016, Alho 2011).

In this context, throughout the years of occupation, the main subsistence activity practiced

by these peoples was fishing, which stood out as the most resilient and permanent activity since the path of the river waters remained unaltered, guaranteeing an abundance of fish, mammals, and birds, which still today provides food security for traditional peoples. Agriculture was introduced only in 1619 with the arrival and occupation of the area by the Portuguese and Spanish, and it stands out due to the proportion of the area occupied. 90% of the Pantanal area is considered livestock farming, occupied by traditional farmers who adopt livestock management adapted to flooding (Bittencourt et al. 2024; Guerra et al. 2020; Harris, Rumsey 2012; Nunes Da Cunha, Junk 2009; Alho 2005).

The most recent occupations are related to mining and ecotourism, often associated with recreational fishing, bird watching and jaguar sighting. The greatest economic impact, however, is tourism focused on jaguar observation (Guerra et al. 2020; Tortato et al. 2017; Cavalcanti, Gese 2010; Zimmermann, Walpole 2005; Scognamillo et al 2003).

Nowadays, some studies show that the Waterway project act as the main drive force on the Paraguay river, the more important river that cross the Pantanal biome affecting the water dynamics, flooding pulse, ecological process, biodiversity and social resilience of the fishing woman (Tomas et al 2024)

In Mato Grosso, State Law 9,096, of January 16, 2009 (Mato Grosso, 2009), provides for the State Fishing Policy and considers the following types of fishing: scientific, recreational (amateur fishing), sporting (catch and release fishing), small scale (artisanal fishing), subsistence, and, implicitly, for management purposes. Small fishing in the Pantanal began to expand in the 1980s when it was market-introduced. Before that, fishing had only a use value, with fish being stored in freezers, mainly in Santo Antônio do Leverger. Subsequently, the organization of fishing began, based on the Fishermen's Federation, which groups together fishing colonies spread throughout Brazil. Each state has a representation in the national sphere, and the fishing colonies are civil societies that bring together fishermen, constituting the intermediary dialogue between the state and the fishermen.

The state of Mato Grosso has 22 fishing colonies, and about 50% of them are located in the Pantanal area, in the Upper Paraguay River basin. Among the three basins of MT, the Amazon Basin, the Araguaia Basin and the Upper Paraguay River Basin, the ichthyofauna and fishing are most studied in the latter. According to ANA (2020), a total of 5,079 active artisanal fishermen were estimated in the Upper Paraguay basin in 2018, catching 2,890 tons of fish, consisting of 89.3% by "piracema fish", that is, long-distance migrants, medium to large in size and regionally

considered "noble species".

In 2023, the parliament discussed and approved by a large majority, with only 20% of votes against, Bill No. 1363/2023, culminating in the enactment of Law No. 12,197, of July 20, 2023. The new legislation established a five-year ban on the transportation, storage, and sale of fish, with the exception of exotic species, limiting fishing to "catch and release", capture for consumption on site, and subsistence fishing. These legal changes, justified by the need for environmental conservation and preservation of fishing resources, generated varied reactions in society, especially among the Pantanal communities, which historically depend on fishing as a source of subsistence and cultural identity.

Afterward, the state of Mato Grosso (MT) forwarded Bill 27/2024 to the Legislative Assembly, which limited the species that could be fished, again without any scientific basis to justify such restrictions.

The law's approval generated significant controversies and led to public hearings in Cuiabá and Barão de Melgaço, promoted by several state deputies. These hearings sought to analyze the main challenges related to the law's implementation, with discussions focused on the new policy's ecological, sociocultural, and economic impacts. Furthermore, they mobilized a broad spectrum of society, including fishermen, environmentalists, legislative representatives, members of civil society, research institutions and universities, who actively participated before and during the law-approving process.

In this context of social inequalities and challenges to democratic participation, public hearings stood out as spaces for debate and expression of the interests of different social groups. However, these forums often lack effective repercussions for the segments most impacted by the decisions. Based in this cenary, the suty aims to analyze the public hearings held, with an emphasis on the participating social groups, the alliances, and conflicts mong them, as well as the interests and arguments defended during the debates on the so-called "Fishing Law of MT".

METHODOLOGY AND STUDY AREA

The Law known as "Zero Transportation" (in truth, Laws No. 12,197/2023 and No. 12,434/2024) covers the entire territory of the river basins of Mato Grosso. Brazil is divided into 12 Hydrographic Regions, as defined by Resolution No. 32, of October 15, 2003, of the National Water Resources Council (CNRH). Three of the largest hydrographic regions occur in Mato

Grosso: Amazon, Tocantins-Araguaia, and Paraguay, classified as Hydrological Units by the National Water Agency – ANA (Brazil, 2003). Although the laws were proposed to cover all rivers in Mato Grosso, the four public hearings held – three in Cuiabá and one in Barão de Melgaço – focused on discussions related to the Pantanal rivers. For this reason, the analysis focused on the Pantanal and the participation of stakeholders present at the hearings. During these events, all participants who spoke were identified according to the social group and the social function they represented.

The public hearings were recorded with the support of the Legislative Assembly of MT, accessed and used under Law No. 12,527, of November 18, 2011, which regulates access to governmental information (Brazil, 2011). We transcribed these hearings and, after reading the transcriptions, selected themes and keywords mentioned, conducted identification of the interlocutors, social groups, political positioning — i.e., for or against the law —, as well as the arguments. Additionally, for each interlocutor's speech under direct analysis, we probed references to speeches and narratives before the speech under direct analysis to determine the potential for construction. The minutes of the State Fisheries Council's (CEPESCA) meetings were also analyzed.

The data were analyzed focusing on the perspective of the social groups involved, without emphasis on individual positions. NVivo (version 15.1.1, under license NVT15-IZ000-MHA20-MR68F) and Microsoft Excel were used for this analysis. NVivo was used to identify and categorize themes and social groups, as well as their manifestations during public hearings, while Excel was used to organize and systematize quantitative data, ensuring greater precision in the analysis and visualization of results. NVivo, widely recognized as an effective tool in qualitative research, enables the efficient management of textual data and structured analyses (Lage, 2011). Recent studies highlight that software such as NVivo promotes methodological accuracy, confirmability, and transparency in the analytical process (Souza Neto et al., 2019). We also performed the analysis by social groups after distributing the participants into government (deputies, councilors, researchers, state secretaries, and mayors), market (mainly traders and fishermen), and civil society (representatives and NGOs, residents, and self-employed), and the results can be seen in Figure 2a, b, and c.

RESULTS AND DISCUSSIONS

Legal Overview

Law No. 9,096 of January 16, 2009 (Mato Grosso, 2009), which institutes the State Fisheries Policy, establishes guidelines for the sustainable exploitation of fishing resources, regulating fishing methods, and establishing control, protection, and inspection mechanisms. The law provides for the regulation of small scale, recreational, subsistence and scientific fishing, in addition to the creation of CEPESCA/MT (State Fisheries Council of MT), a consultative and deliberative collegiate body, responsible for advising the public authorities in formulating policies for the sector (art. 5). However, the research revealed that, in practice, CEPESCA has not been properly consulted on key regulatory decisions, especially on recent legislative changes, as demonstrated by the absence of discussions on regulatory changes in its meeting minutes.

Analyzing the legislation in comparison with the Sustainable Development Goals (SDGs) of the United Nations (UN) 2030 Agenda, one can see an alignment especially with SDG 14 (Life Below Water) and SDG 15 (Life on Land), by establishing measures such as closed seasons (art. 27), catch quotas (art. 18, §1º), and use prohibition of unregulated gear (art. 25). These rules aim to prevent overexploitation of fish stocks and ensure the sustainability of the activity, contributing to the protection of biodiversity and the ecological balance of aquatic ecosystems. They also align with SDG 8 (Decent Work and Economic Growth) by recognizing fishing as an essential activity for the subsistence and income generation of traditional communities. However, although it provides for social participation in the governance of fisheries policies, through CEPESCA, SDG 16 (Peace, Justice, and Effective Institutions) has not been fully observed in the implementation of the norm, since the most recent decisions on the sector did not go through the due participatory process. We verified in the research that there was no democratic discussion on the legislative changes, a point that will be widely discussed during the analysis of the public hearings (FAO 2015).

The fact is that more severe restrictions on artisanal fishing were included by State Law No. 12,197, of July 21, 2023, which substantially modified its regime in the State by including articles 19-A and 10-B, instituting the prohibition of the transportation, storage, and commercialization of fish from state rivers for five years. This prohibition only excludes local consumption, subsistence fishing by traditional Indigenous and traditional communities, and the

capture of exotic species with a negative environmental impact.

During the period in which the restriction is in force, only the "catch and release" modality is permitted, while for artisanal fishermen, a financial aid equivalent to a monthly minimum wage for three years is provided, as established in art. 46-B. The declared objective of the rule would be to ensure the recovery of fish stocks, justifying the need for restrictive measures to balance environmental conservation and sustainable fishing exploitation.

As highlighted elsewhere, this prohibition was challenged in the Supreme Federal Court (STF) because there was no prior consultation with traditional communities, contrary to Convention No. 169 of the International Labor Organization (ILO, 1989), in addition to alleged violations of fundamental rights provided for in the Federal Constitution of 1988, such as human dignity (art. 1, item III), the right to culture (arts. 215 and 216), and professional freedom (art. 5, item XIII). In the proposed Direct Actions of Unconstitutionality (ADIs), the insufficiency of compensatory measures to mitigate the socioeconomic impacts of the ban was also questioned, as well as the absence of solid technical justifications for restricting small scale fishing.

In the social security sphere, the risk of losing the status of special insured for artisanal fishermen was highlighted, since replacing traditional income with financial assistance could prevent access to benefits such as closed season insurance, which is essential for subsistence during the period in which fishing is prohibited. The lack of clarity regarding the compatibility of state aid with the federal social security system has created legal uncertainty, leading many fishermen to avoid receiving the benefit for fear of losing their social security rights, as highlighted by a parliamentarian:

You are out. You will not be entitled to health care. You will not be entitled to that special retirement that fishermen have when they are treated by the INSS as extractivists. Women will retire at 55 years of age, provided they have contributed at least 15 years, and men will retire at 60, that is, fishermen, provided they have contributed 15 years. That is why you are in a special group. But, as the two INSS notes say, if you receive any type of financial assistance, you are excluded, you are out.

Given the objections, the STF held a conciliation hearing in January 2024, resulting in the issuance of State Decree No. 677/2024 and, subsequently, Law No. 12,434/2024, which adjusted the provisions of the previous rule. Among the main changes, the legislation now allows small scale fishing but maintaining the ban on 12 species of greatest commercial interest. This change was decisive for the Minister Rapporteur of the ADIs, André Mendonça, to reject the precautionary measures, under the argument that the legislation now guarantees greater

environmental protection without completely preventing the exercise of professional fishing.

However, fishermen and representatives of the category argue that, in practice, the ban affects species with the greatest economic value, making commercial fishing unfeasible and worsening socioeconomic impacts. Among the 12 banned species, five occur in the Upper Paraguay Basin, where they represented 35% of the catch by artisanal fishermen in 2018 (ANA, 2020). Furthermore, they claim that the normative hierarchy was disregarded, since the regulatory decree was issued before the law that should have supported it, characterizing a legislative oversight. This inconsistency reinforced the perception that the restrictive measures were maintained under a normative subterfuge, without meeting the needs of the category.

The STF decision considered that the financial compensation provided for in the legislation does not make it impossible to maintain the fishermen's social security rights, allowing for cumulation with unemployment insurance and other welfare benefits. However, in practice, the lack of specific regulation on this compatibility continues to generate uncertainty, leading fishermen to fear the loss of their special insured status. The risks of social and economic setbacks, directly affecting thousands of fishermen and their families, were repeatedly highlighted in public hearings, as we will demonstrate in the following section.

Another point that cannot go unnoticed is that fishing plays a strategic role in the cultural, environmental, social, and economic sustainability of MT, being a fundamental activity both for the subsistence of riverside communities and for the economic dynamics of the state. State government data indicate that sport fishing generates approximately R\$500 million annually, with projections of reaching up to R\$2 billion in the next five years (Mato Grosso, 2024). In the ecological context, fishing in the Pantanal is part of the balance of the ecosystem and is often blamed for the decline in fish stocks. However, studies such as those by Chiaravalloti et al. (2019) demonstrate that artisanal fishing, when carried out traditionally, has a relatively stable and sustainable impact, while the greatest threats to the ecosystem arise from anthropogenic factors, such as the construction of hydroelectric plants, climate change, and intensive land use. This perspective was widely corroborated by participants in the public hearings, who identified mining, deforestation, pollution, the use of pesticides, and hydroelectric projects as the main agents of environmental degradation.

We also found from the analysis of public hearings that criticisms of the "catch and release" model emerge from the empirical knowledge of fishermen and traditional communities. According to reports, fish that are caught and later released often present dysfunctions, such as

changes in swimming ability, internal bleeding, and lesions in the mouth, making them easy prey for predators, such as piranhas. One fisherman reported:

“This is what happens to people who don’t know how to release the fish. For those who don’t know, catch-and-release for the dorado; it was released, but is dying... How do you release a fish that’s injured like that? Then a guy brags about catching it and releasing it, but then he puts his finger in its gills and, look, he didn’t see where the hook got stuck... so, look, the fish is dying. Now what are you going to do? Board it? Board it? You can’t. But this is a warning for fishermen. Don’t hurt the fish, not before releasing it. It will die, unfortunately.”

According to fishermen and researchers who spoke at the hearings, piranhas consume the released fish after these fish suffered trauma from "catch and release", (attracted by blood of regular swimming), preventing the bodies from having time to decompose and float. One fisherman pointed out that "carcasses don't float", highlighting the efficiency of piranhas in completely devouring injured fish, including bones and other remains. Furthermore, inappropriate practices favor the introduction of exotic species and parasites, worsening environmental degradation, while ethical debates question the suffering of fish (Petrere Jr., 2014).

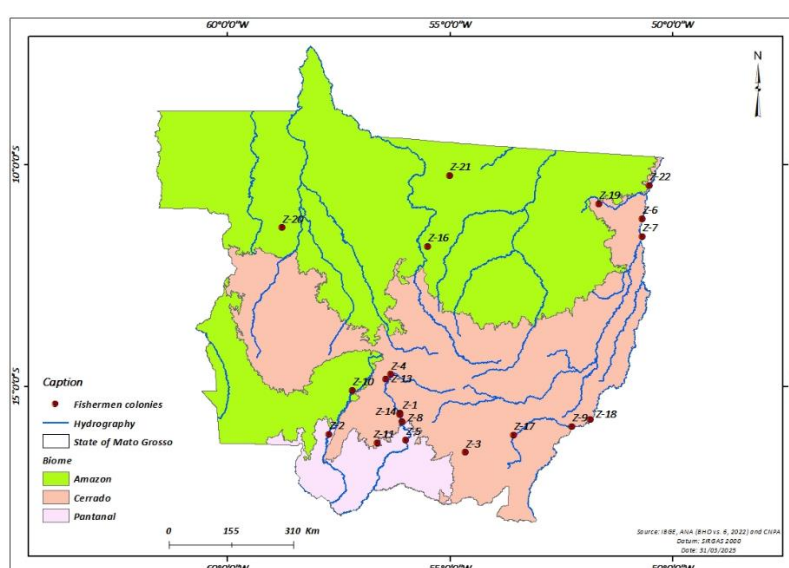
Another legal aspect to consider is that artisanal fishing in MT is regulated, including for the protection of aquatic biodiversity and sustainability. Diamond (2005) concluded that one of the crucial factors that contributed to the collapse of several societies throughout history was the unsustainable exploitation of natural resources, including overfishing. Perhaps this reason contributes to the fact that the exercise of this activity is subject to obtaining licenses and other requirements, as a way of avoiding the overexploitation of fish stocks, as provided for in Art. 10 of State Law No. 9,096, of January 16, 2009 (Mato Grosso, 2009). Additionally, a closed season is established (art. 19), during which fishing is prohibited to ensure the reproduction of species, which is essential for the responsible management of aquatic populations and for maintaining the integrity of ecosystems (Ximenes; Gobara; Radford, 2019).

Hydrological Units Covered

The legislative changes affected three of the largest hydrographic regions in Brazil, covering the Amazon, Tocantins-Araguaia, and Paraguay Hydrological Units. In this context, the state of MT is home to 22 fishing colonies, associative entities that represent and organize artisanal fishing activities in each of its regions. These colonies play a fundamental role in

organizing and defending the interests of the category and in seeking dialogue with government bodies, including having representation in CEPESCA. In total, these colonies bring together approximately 4,935 fishermen, with 4,423 fishermen in the Pantanal and Paraguay River Basin, representing 90% of the total; 419 fishermen in the Tocantis/Araguaia River Basin, located in the Cerrado biome, corresponding to 8%; and 93 fishermen registered in the Amazon River Basin in the Amazon Forest biome, corresponding to 2% of the total, as shown in the cartographic representation shown in Figure 1.

Figure 1: *Distribution of fishermen colonies by river basin in Mato Grosso.*



Source: Authors

Analysis of Public Hearings

The legislative changes were proposed and approved under the argument that it was necessary to modernize Law No. 9,096/2009. We analyzed each legislative procedure in full. The first, embodied in message no. 80, indicated that the main objective of Bill 1363-2023 was to improve current environmental norms due to what it called “the notable reduction in fish stocks in rivers in the State of Mato Grosso and neighboring states, with predatory fishing as the main cause, which puts several native species at risk”.

However, research results presented at a public hearing and mentioned in Embrapa (2023) point in another direction. Based on small scale fishing data collected from 2004 to 2016 in the Upper Paraguay Basin in Mato Grosso do Sul, Araujo et al. (2019) found that fishing yields remained stable at around 8 kg per fisherman per day; and that medium to large species (piracema

fish) accounted for between 88% and 94% of the category's catch over the period evaluated. According to the authors, these facts indicate that current fisheries management measures that define closed seasons, minimum catch sizes, catching devices, and catch quotas are contributing to the conservation of fish stocks and, consequently, to the sustainable use of these resources by fisheries.

The message nº 80 highlights that, since 2020, ongoing discussions have been held at the CEPESCA, ensuring broad participation from society, which would have led to the need to implement a “temporary restriction on fishing to control predatory fishing, ordering, and managing fish stocks in the rivers of the State of Mato Grosso”.

The case was taken to the STF through three ADIs, with a request for precautionary measures, filed by the Brazilian Democratic Movement (MDB) party, in ADI No. 7,471; by the Social Democratic Party (PSD), in ADI No. 7,514; and by the National Confederation of Fishermen and Aquaculturists (CNPA), in ADI No. 7,590. These actions aim to annul the restrictions on fishing imposed by the State, under the allegation that such measures do not adequately promote environmental protection nor guarantee the rights of fishermen, demonstrating the lack of solid scientific and cultural bases.

During the discussions, conciliation hearings were held, and the MT government realized that Law No. 9,096/2009, amended by Law 12,197/2023, had a weakness related to social security rights. To overcome this obstacle, a proposal for a new amendment was presented, namely Bill 25 of 2024, with the justification of “guaranteeing social security to professional fishermen and food security to vulnerable populations that use subsistence fishing”, while reinforcing the protection of fishing resources in the state's rivers.

The main change was to restrict the fishing ban to 12 species of fish, and, as reaffirmed in § 1º of art. 19-B of the approved Law nº 12.434/2024 that, except for the 12 prohibited species, for “all the more than 100 species of fish originating from rivers in the State of Mato Grosso, fishing is authorized” (Brazil, 2024).

In the period between the approval of the first round of Bill No. 80, in June 2023, later converted into State Law No. 12,197/2023, and the final approval of Bill No. 25, in March 2024, sanctioned as Law No. 12,434/2024, seven public hearings were held, totaling approximately 1,500 participants. These hearings took place in different locations: 3 hearings were held in Cuiabá (Plenary of the Legislative Assembly), while the other hearings, in a total of four, were held in Santo Antônio de Leverger, Cáceres, Barão de Melgaço, and Barra do Bugres. Among

these, we analyzed four hearings, representing 57% of the hearings held. In the hearings analyzed, which constituted a space for broad debate, speeches were given by 123 participants, whose statements provided valuable support for understanding the perceptions, as well as the social and environmental impacts associated with changes in fishing legislation in Mato Grosso. These Public Hearings were held just over a year ago.

During the public hearings on the Fishing Law, the State Government presented its arguments through a consultant from the State Parliament, who had extensive speaking time, generating opposing demonstrations. Seeking to justify restrictive fishing measures, the presented analysis combined official data, interviews, and industry analyses, but lacked clear methodology and bibliographical references, which raised criticisms regarding its scientific validity. One speaker questioned the lack of ethical approval for the research, raising doubts about the study's credibility. The consultant claimed illegal fishing has decreased fish size and stocks based on seizure data and interviews with fishermen. He pointed to the growing fishing activities as tourism activities as evidence of the sector's transition, although without detailing the methodology used. In economic terms, he highlighted fishing tourism as the main destination in Mato Grosso, with a great financial impact. The government's argument, based on its non-systematized surveys, defended a novel approach to fisheries management, treating fish as a "commodity".

It turns out that the other participants, approximately 90% of the speakers, presented diametrically opposite views, i.e., contrary to changes in fishing policy in MT (Figure 1). This extremely high proportion indicates widespread dissatisfaction among sectors of society present there, especially the communities directly affected, concerning the proposed changes. We observed that almost 70% (n=82) of the participants declared themselves fishers and traders when they made their statements. This data attracted attention because they rely on fishing as their source of livelihood. From this universe, only 1.22% (n=1) agreed with the legislative change, which suggests that there was no effective dialogue and social inclusion in formulating and implementing the aforementioned public policy.

Otherwise, conducting an analysis based on a large sample of participants is essential to ensure scientific validity and statistical representativeness in studies that analyze public demonstrations. According to Israel (1992) and Singh and Masuku (2014), the definition of the appropriate sample size must consider the desired level of accuracy, the variability of the population, and the level of statistical confidence established. Scientific studies recommend that, to ensure robustness and accuracy in the results, the sample analyzed represents at least 30% to

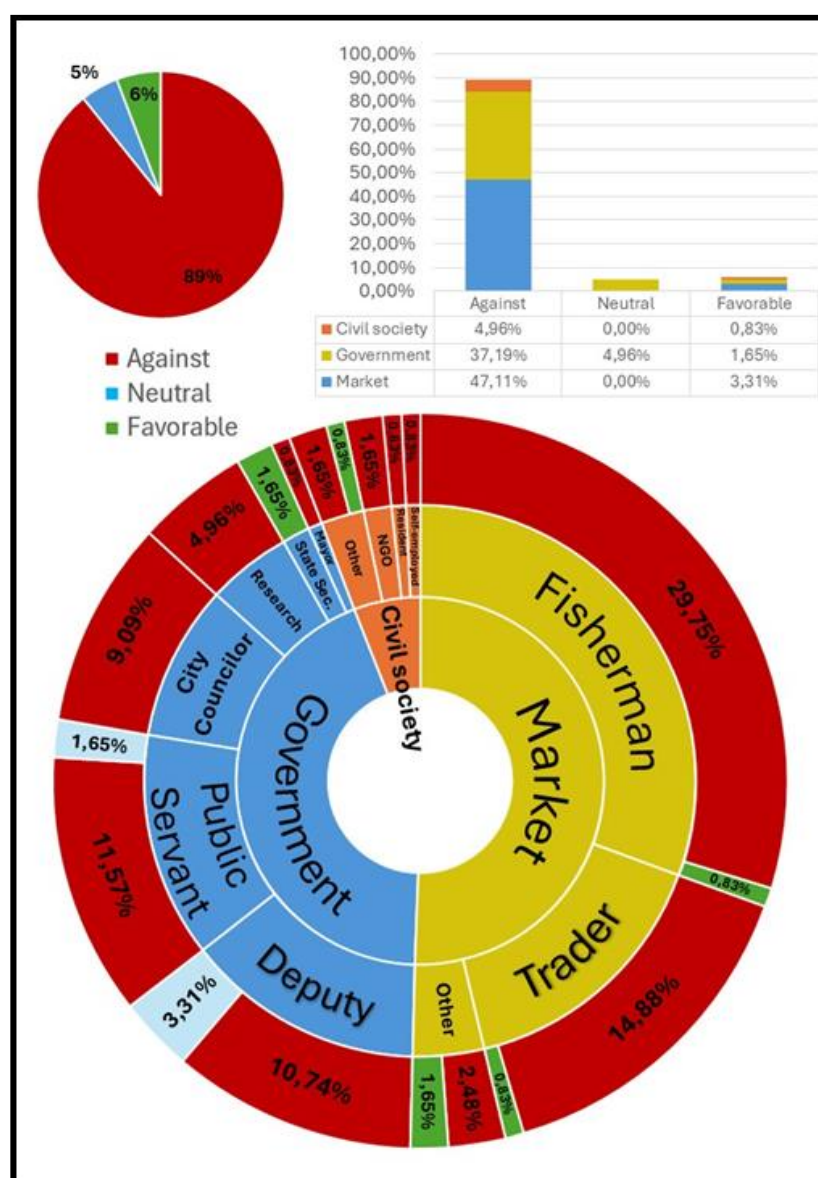
50% of the total number of participants, especially in social and behavioral research.

In the present study, the analysis covered 4 of the 7 public hearings held, which corresponds to 57% of the total number of events, and included the statements of 123 of the 150 participants who spoke during these sessions, which is equivalent to 82% of this universe. This sample meets the statistical criteria recommended by Israel (1992) and Singh and Masuku (2014) for scientific studies, ensuring a 95% confidence level with a margin of error of less than 5%, as calculated by the formula $n = N/(1+N(e)^2)$, where n is the sample size, N is the population size and e is the margin of error. Such sampling provides methodological robustness to the analyses and confers statistical validity to the results presented, ensuring that the conclusions significantly reflect the perceptions and positions of most participants involved in the debate on the Zero Transportation Law.

It is interesting to note that all researchers interviewed ($n=7$), linked to UNEMAT, UFMT, IBAMA, and EMBRAPA, were against the legislative changes, drawing attention to the social, economic, and environmental impacts, as one of the researchers highlighted: “[I]t puts Mato Grosso society at risk, by suspending fishing and causing social and ecosystem exclusion of vulnerable groups”. She mentioned that the law affects sovereignty and food and nutritional security, and even has a political perspective on sustainability. Another scholar argued that “*there is no study that demonstrates that a certain species of fish should not be fished and that decisions should be based on technical studies*”. Furthermore, a third researcher criticized the lack of scientific data and fishery management, pointing out that “*the project criminalizes fishing activity without the proper basis*”.

Furthermore, we also noticed a consensus among the scientists who participated in the hearings, who are critical of the bill due to the lack of solid scientific studies, besides the significant negative impacts on fishing communities in particular. People who spoke out against the legislative innovation pointed out some issues repeated throughout all the speeches. The most discussed topic revolved around the issue of food sovereignty, followed by river pollution, lack of scientific and technical basis, and social and institutional discussion and participation.

Figure 2: Result of public hearings on the fishing law.



Source: Authors

Much has also been said about activities related to environmental impacts that are not the subject of consistent public policies, such as river pollution, including that resulting from monocultures such as soy, which are responsible for releasing large quantities of pesticides into the environment. Additionally, fishers and researchers have made severe criticisms to the impacts on ichthyofauna due to tourism, the lack of public preservation and inspection policies, as well as impacts caused by hydroelectric plants. The content of the speeches conveys a feeling of revolt as the government seemed to blame the alleged decrease in fish stocks on the fishermen, and there was much talk that those who defend the river and the fish are precisely the artisanal fishermen.

Combining 21 years of fish size spectrum data and fishery potential (fishery monetary value in the Upper Paraná River Floodplain, Brazil), we demonstrate that the size spectrum exponent of native species has become more negative over time, indicating a relative decrease in the biomass of large versus small individuals. Conversely, the size spectrum exponent of non-native species has become less negative over time owing to the increased abundance of large species. Overall, fishery potential declined by more than 50% over time. Human land use replaced the coverage of natural environments, indirectly reducing native richness" (Moi et al 2025).

In this sense, Welcomme (2001) warns that factors external to inland fishing, whether natural or anthropogenic, produce such marked effects on fish stocks that managers do not have control over the resources they manage. Among the negative anthropogenic factors, damming for hydroelectric projects stands out (Agostinho et al., 1999). They necessarily imply changes in the composition and abundance of species, favoring those best adapted to lakes, and reducing or even eliminating others such as long-distance migratory fish, the most targeted by fishing.

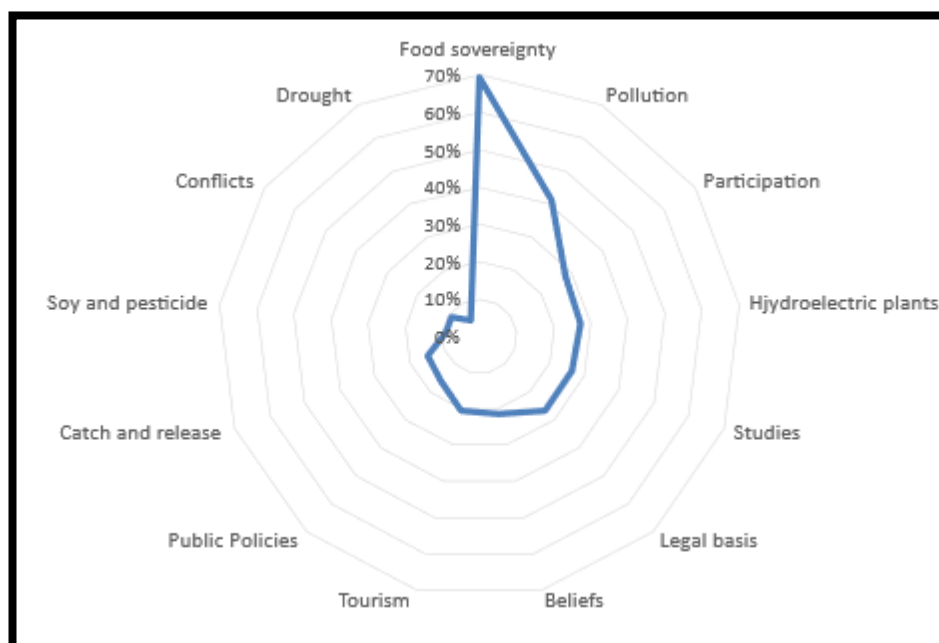
Food Sovereignty

Figure 3 is representative of the main issues brought up for discussion by the public who attended and discussed the topic. Food sovereignty is an essential right of traditional fishing communities, who see artisanal fishing not just as a means of subsistence, but as a way of life. As stated by one of the participants in the public hearing, *"We live off fishing and of the fish that feed our families"*. The impossibility of transporting and selling fish compromises the food security and economic autonomy of these populations, as another fisher pointed out: *"We don't need a minimum wage, we need work"*. In this context, Ávila, Silva, and Ferraz (2018) highlight that artisanal fishing in the Cuiabá River plays a significant role in maintaining food security and the social organization of riverside communities. In addition to guaranteeing access to fish as an essential source of protein, this activity is directly connected to the cultural identity and traditional ecological knowledge of fishermen and is fundamental to the socio-economic sustainability of these populations. However, environmental impacts and fishing regulation policies have imposed increasing challenges, requiring strategies that integrate local knowledge into the management of fisheries resources (Ávila; Silva; Ferraz, 2018).

Food insecurity is highlighted as one of the main effects of climate change and public policies disconnected from the needs of Traditional Communities, which are subjected to social

invisibility (Vacchiano et al. 2024).

Figure 3: Main topics addressed in public hearings.



Source: Authors

Indeed, the impact on food sovereignty of these fishing restrictions was the most discussed issue, with at least 84 of the 121 interlocutors expressly referring to the topic. There is a widespread perception that the public policies implemented, far from ensuring the preservation of fish stocks, disrupt the local economy and increase social vulnerability. One of the interlocutors illustrates this situation by stating that *“this law not only brought hunger, despair, unemployment, and misery but also took the lives of fishermen”*.

The restrictions imposed on traditional fishing have had a potentially severe impact on the local economy. Small traders report that their sales have plummeted, and there is a domino effect on the region's income. *“The way it is, our city is going to go bankrupt... It's at a standstill; the gas station we bought is at a standstill. So, the city is bankrupt,”* describes a businessman. The ban affects not only fishermen but the entire production chain, deepening social exclusion by affecting the economic and social dynamics of riverside and fishing territories.

For the fishermen participating in the public hearing, traditional fishing represents an ancestral right, which cannot simply be replaced by financial compensation policies or professional requalification. As one of the participants summarized, *“We don't need a minimum wage, we need work. Any citizen has the right to practice their profession with dignity”*. This

point of view is in line with international guidelines on food sovereignty, notably articles 7 and 8 of ILO Convention 169 (1989), which recognize the right of traditional peoples to maintain and strengthen their production systems, without external impositions that disregard their ecological knowledge and forms of social organization.

Finally, the food sovereignty of fishing communities cannot be separated from environmental policies. Speakers expressed great concern about how natural resources have been managed, questioning the effectiveness of fishing restrictions in the face of other significant environmental impacts. One of the interlocutors emphasized that *“if the government had a real concern for fish stocks, it would think about the impact of large projects on it and not simply punish the weakest link”*. Food sovereignty, therefore, requires a governance model that considers traditional knowledge and involves local populations in the formulation of environmental policies.

The statements of the interlocutors show that restrictions on artisanal fishing go beyond simply limiting access to fish, profoundly impacting the economic and social structure of riverside communities. The impossibility of carrying out this activity compromises not only food security but also the economic autonomy and cultural identity of these groups. Food sovereignty, in this context, is not restricted to obtaining fish for one's consumption. It is also directly linked to the right one has to maintain one's way of life as well as to the recognition of one's role in the sustainable management of natural resources (Figure 2).

Hydroelectric Plants, Pollution, Soybeans and Pesticides, and Tourism

We chose to group the themes of hydroelectric power, pollution, soybean cultivation and use of pesticides, and tourism (figure 2), which represented 50% of the demonstrations, as they were identified by participants as the main causes of the environmental impacts that the new legislation seeks to mitigate. The consultant hired by the State Parliament asserted that *“studies indicate, and one of them was this one, that the current levels of exploitation are not sustainable, implying future losses [will be] greater than the momentary gains”*.

However, the statements show that the restriction on artisanal fishing represents an inadequate response, diverting the focus from the true causes of the degradation of aquatic ecosystems indicated by the government. Instead of measures aimed at effectively controlling these factors, the legislation imposes restrictions on communities that historically depend on

fishing without offering concrete solutions to address this from the communities' perspective.

Hydroelectric plants were widely mentioned as the main cause of the reduction in fish stocks and the drying up of rivers, with the construction of the Manso hydroelectric plant in the 1980s being one of the most mentioned causes of the decline in fish stocks: *“Since this plant was built, congressman, there has been no more water. Today he says there are no fish in the Cuiabá River. He doesn’t know, our researcher here knows that’s not the case. The fish haven’t disappeared because the water shortage is ending”*, said one of the participants in the public hearing. Another participant added: *“The Manso plant changed the entire course of our river. I have never seen the Cuiabá River reach May as dry as it is, never, ever”*. For many, the government avoids confronting those truly responsible for the degradation. *“This governor doesn’t dare to confront the owners of hydroelectric plants. It is the hydroelectric plants that have caused the decrease in fish”*, complained one participant.

River pollution was also mentioned as one of the main causes of the decline in fish catches. Many participants at the public hearing emphasized that sewage discharged into rivers, industrial waste and the impacts of mining directly affect aquatic fauna. *“Throwing it there in the port, there, throwing that sewage pipe 24 hours a day. It kills the fish. The chemicals kill the fish”*, said one of the fishermen. Another added: *“The problem is the sewage that flows into the Cuiabá River, the garbage of the Cuiabá River, and not traditional fishing”*. The lack of public policies for basic sanitation and waste control was also the target of criticism: *“The governor is looking at the fishermen, but he is not looking at the dredges that destroy the river and the sewage that kills the fish”*.

The expansion of soybean monoculture and the intensive use of pesticides have been denounced as having a major impact on rivers and the environment. A businessman stated: *“The Pantanal is being poisoned, and no one is talking about it. Soybean crops are leaking poison into the river, killing not only the fish but everything in the water”*. Another fisherman expressed indignation at the lack of oversight of agribusiness: *“The farmers throw poison onto the crops, the rain washes it into the river, and then they want to say that it was the fishermen who wiped out the fish”*. Siltation was also mentioned as a consequence of deforestation for planting: *“It is silted up because of soybeans, soybean planting, agricultural pesticides, the landslides that go down into the rivers”*.

Tourism and catch-and-release fishing divided opinions among participants in the public hearing. Some pointed out that tourism does not benefit traditional fishermen: *“They say that*

tourism will bring money, but only for those who have lodges. Fishermen do not work in lodges, fishermen want to fish". Others said that tourism only benefits a small group: *"The hotel boats come here, catch our fish, and take the money away. And we, who have been fishing since we were kids, are left with nothing"*.

The practice of "catch and release", in turn, has been heavily criticized by fishermen who believe that it causes more harm than good: *"This 'catch and release' is the biggest disgrace there is. The tourist fishes, takes pictures, releases the fish all injured, it can't handle it, it dies"*. Another fisherman complained: *"The tourist fishes, plays with the fish, hurts it, releases it, and says he's helping. The fish bleeds and the piranha eats"*. Fishermen, with their traditional knowledge about fish behavior and river dynamics, confirm what was pointed out by several researchers linked to UNEMAT and UFMT, who warned about the physiological and behavioral impacts of sport fishing based on scientific studies mentioned elsewhere.

The legislation was widely criticized for not considering the reality of traditional fishermen, referred to by one of the participants in the public hearing as "traditionalists", a term that expresses those who inherited fishing as a way of life: *"We, the traditionalists, learned to fish from our parents and grandparents. Now some guy who has never set foot in a river comes along and wants to say that we can't fish anymore"*. The general perception among fishermen, traders, and researchers who participated in the public hearings is that the law does not fight the true causes of environmental impacts and only criminalizes those who historically make a living from fishing.

Legal Basis and Scientific Studies

82% of participants in the public hearings argued that the changes to the State Fishing Law were not preceded by scientific technical studies nor did they have a legal basis.

The debate based on the changes revealed a striking alignment between fishermen's perceptions and scientific evidence. As one of the fishermen put it, *"There is no scientific study, no technical study to support this project to end fishing"*. Another was even more incisive when he stated: *"It was spoken here about a bill that did not ask the agencies, the environmentalists, for studies. There is no environmental study, it is the truth"*.

This concern was also expressed by public managers, with one politician stating the following about the bill: *"It has no technical study... A project of this magnitude was not*

accompanied by a technical study. And this Junior project, 4 years ago, in 2019, had already reached parliament, without a technical study. We helped convince the governor, who withdrew the matter, he had four years to do the studies, and he didn't do it".

In fact, in June 2019, the government of the state of Mato Grosso, through Message No. 107/2019, presented a Bill to the Legislative Assembly that proposed, in a similar way, the prohibition of the transportation, storage, and commercialization of fish obtained through professional fishing in rivers in the state for five years. The measure would directly affect professional fishermen, allowing only amateur fishing in the "catch and release" mode, in addition to restricting fishing activity to traditional and riverside communities for subsistence purposes. The stated objective of the project was to preserve fish stocks and combat predatory fishing. Having met with considerable resistance, the project was shelved on March 4, 2020, at the request of the author himself (Mato Grosso, 2019).

The lack of scientific basis was also criticized by researchers, who categorically stated: "We, as fishery researchers, are unaware of any scientific study that supports this statement". Another researcher asked: *"Does the law have a basis in a study? No, it does not. The first law that banned all species did not, and the second law that also banned 12 species, did not and does not have this basis".*

The legal dimension of the issue also emerged strongly in the arguments, especially concerning the rights of traditional communities. One of the most sensitive points was the failure to comply with ILO Convention 169, as evidenced in the speech of a Public Defender present: *"Convention 169 must be respected. It is necessary to consult in the Katós language, it is necessary to consult in the Bororós language to find out if they want the zero quota".* The legal challenge to the measure gained significant institutional support, as highlighted by another participant: *"All legal institutions have already supported us. They issued an official note saying that the law is unconstitutional".*

Among the institutions that took a stand against it, it is worth noting that the Ministry of Fisheries and Aquaculture (MPA) argued that the measure would violate the Fishery Law (Law No. 11,959/2009) by favoring amateur and sport fishing over traditional fishing. The MPA highlighted that such a ban could jeopardize the livelihood of thousands of traditional fishermen in the state⁸.

⁸ https://www.gov.br/mpa/pt-br/assuntos/noticias/mpa-e-contra-o-projeto-transporte-zero-no-mt?utm_source7
Accessed on 20 Feb 2024.

Another report highlighted that *"IBAMA has already spoken out, both about the unconstitutionality of this law, the new fishing law, which was approved... And the issue of... human rights, which were violated"*. This institutional opposition was systematically documented in another statement: *"The PGR has already made three statements against the law, the INSS has already made two statements against the law, IBAMA against the law, the Ministry of Fisheries, which is present here, has already made a technical note against the law, the Ministry of the Environment has already made a technical note against the law"*. These opposing statements can be accessed in the three Direct Actions of Unconstitutionality indicated in this article.

The process of drafting the law was also criticized, especially regarding the role of the State Fishing Council (CEPESCA). One participant reported frustration with the process: *"We spent 3 years sitting on the CEPESCA bench, drafting the fishing bill, and none of it helped. The CEPESCA council was created so that everything related to fishing that was discussed there would be resolved. There is another point I would also like to make. It is such a stupid, poorly written law that no, it did not consult the biologists"*. We analyzed the minutes of the CEPESCA meetings, available on the SEMA website, and did not find any deliberation on the topic, although there are scattered statements by councilors on general matters criticizing the Bills and the lack of consultation with the aforementioned Council.

The issue of the social impacts of the law also emerged strongly in the participants' speeches. As one of them, from the legal field, highlighted, *"causing what we call in law existential damage. It is more than moral damage, because the existence, heard the speech of the Fisherman for generations: a profession that was sometimes learned from his father, his father learned from his grandfather, and great-grandfather. How is it that now you are going to get there and simply end it?"*

Regarding the state government's ban, which stated that it was restricted to just 12 species, a parliamentarian highlighted the need for a broader scientific approach: *"It's simply without any technical study: we take 12 fish that are fundamental to you, to your lives, and we're going to remove them. What is the technical basis?"*

The participants' statements revealed not only the lack of technical studies but also their deep dissatisfaction with the legislative process as a whole. As one of those present summarized: *"However, there is no evidence, no scientific study to support what the governor of Mato Grosso did. Furthermore, in addition to there being no scientific study and the fact that these prohibited species are not on the list of endangered species here in Mato Grosso, there is no basis for*

prohibiting these species, unless the objective is to obstruct professional artisanal fishing in Mato Grosso".

Lack of Participation

The imposition of public policies restricting fishing and limiting the way of life of traditional communities in the Pantanal, especially fishermen and riverside dwellers, reflects a pattern already identified by Buco, Zadra, and Vandresen (2013). In this pattern, the social invisibility of these groups is reinforced by the lack of recognition of their rights and the absence of participation in decision-making processes.

The analyzed speeches of participants in the public hearings reveal that this same reality was the subject of debates when they denounced the exclusionary and unilateral nature of the new restrictions.

Reports indicate that the legislation was imposed without prior dialogue. *"There is none, right? There is none. There was no discussion, no dialogue in the elaboration of the project with the families that live from fishing. Did you meet with them beforehand? I'm going to draw up a project. Did you meet with them beforehand? You didn't meet with them"*. As already highlighted, members of councils that should have been consulted before the imposition of public fishing policies also highlighted the lack of consultations: *"I am, I am part of the State Fishing Council. It was not discussed within the state fishing council"*. This exclusion creates a feeling of abandonment and frustration, as evidenced by another statement: *"A law that was forced down our throats. Because no one asked for our opinion. Did anyone here ask for your opinion?"*

It is clear from their statements that social invisibility was verified due to the silencing of their voices in decision-making processes, consolidated by the lack of dialogue with those directly impacted and with the Council especially created to assist in the formulation of public policies related to fishing, transforming some and others into mere spectators and recipients of decisions that change their ways of life. There was express non-compliance with Law No. 12,371, of December 26, 2023, which recognizes, in its article 2, item II, that one of the guiding principles for traditional peoples and communities must be visibility, *"which must be expressed through the full and effective exercise of citizenship"* (Mato Grosso, 2023). Failure to listen to CEPESCA also constituted a violation of the state's regulatory structure since, as provided for in article 6, item II, of Law No. 9,096, of January 16, 2009 (Mato Grosso, 2009), it has the authority to *"deliberate*

on matters relating to fishing” (Mato Grosso, 2009).

General Perceptions

The word cloud analysis reveals social mobilization around public policy related to fishing in Mato Grosso. The highlighted words reflect the main actors, perceptions, and feelings expressed during the public hearings (Figure 4).

The words “fishing” and “fishermen” refer to the idea of food sovereignty and economic security. These terms highlight that fishing is not just a professional activity, but an essential element for the subsistence and food culture of riverside and traditional communities. The new legislation was perceived as a direct threat to this fundamental right, which generated a reaction from participants.

Figure 4: Word cloud analysis of interventions that occurred in public hearings.



Source: Authors

The term "government" appears prominently, but is associated with criticism, as the public policy introduced was rejected by participants, who considered it harmful to the fishing industry and the communities that depend on it.

In the context of public hearings, the word "deputies" should be understood concerning the fact that only one parliamentarian stood out in the explicit defense of the interests of fishermen since the majority of deputies voted in favor of the project.

Finally, the term "project" refers directly to the new fishing law and its restrictions, which were interpreted as a detrimental imposition on fishermen, generating concerns about the sustainability of fishing activity and the socioeconomic impact on traditional communities (Figure 4).

CONCLUSION

The intersection between scientific, legal, and social issues discussed in the public hearings highlights the complexity of the topic, which needs a more comprehensive and participatory approach.

The changes introduced by Law No. 12,434, of March 1, 2024, and by Decree No. 677, of February 1, 2024, seem to go against the SDGs of the 2030 Agenda, especially the balance between environmental conservation and socioeconomic well-being. While SDG 14 (Life Below Water) emphasizes the conservation of aquatic resources and sustainable management, measures such as the temporary suspension of the transportation, storage, and marketing of fish (art. 19-A) may hinder traditional communities' access to the resources necessary for their subsistence, compromising the resilience of local ecosystems and generating doubts about their practical application.

Furthermore, the new legislation may violate SDG 1 (No Poverty) and SDG 8 (Decent Work and Economic Growth) by ignoring the socioeconomic impacts on fishing-dependent communities, worsening their economic and social vulnerability due to the absence of effective compensatory measures. Although it promotes catch-and-release and fish farming as alternatives (arts. 19-A and 19-C), this proposal faces technical and environmental challenges that may amplify existing inequalities, contradicting the principles of sustainability and inclusion advocated by the 2030 Agenda. Law No. 12,434/2024 and Decree No. 677/2024 demonstrated an approach that disregards the specificities and demands of fishing communities. Far from promoting harmonious integration between environmental conservation and socioeconomic development, these regulations present gaps and inconsistencies, which were in vain verified in the public hearings analyzed.

The replacement of fishing activities by catch-and-release and tourism, as responses to the alleged decrease in fish, also violates the traditional knowledge of fishermen and riverside communities and supported by scientific research, which highlight catch-and-release negative

impacts on ichthyofauna. Studies on ecology and ichthyology demonstrate, as discussed in this article, that this modality is not harmless since it generates high rates of post-release mortality, severe physiological stress, and internal and external injuries, besides compromising the reproduction and natural behavior of the species. Therefore, it is not a sustainable alternative.

Furthermore, the general perception among fishermen, traders, and researchers who participated in the hearings is that the law does not fight the true causes of environmental impacts (pollution, monoculture and pesticides, hydroelectric plants, and tourism); it only harms those who historically make a living from fishing.

The law was created and imposed without technical studies and with a weak legal basis, omitting democratic participation with evident harm to the food sovereignty of traditional fishermen and riverside populations.

Instead of tackling the structural problems of environmental degradation, the government has targeted measures against those who contribute least to the problem. Analysis of the testimonies suggests the urgency of fairer environmental policies that incorporate the knowledge of fishermen and address the real challenges of conservation.

In this context, Laws No. 12,197/2023 and No. 12,434/2024 must be reviewed, ensuring that their formulation and implementation are aligned with principles of participatory environmental governance. Therefore, we recommend that rigorous scientific research must be carried out to assess whether there has been a decrease in fish stocks, considering not only the dynamics of species over time, but also spatial and temporal variations. These studies must be conducted using integrated methodologies, combining knowledge from ichthyology, ecology, and traditional knowledge, to build a realistic diagnosis of the sustainability of fishing in Mato Grosso, considering the regional differences of the three Hydrographic Basins (Paraguay, Amazonas, and Tocantins-Araguaia). Only through this technical basis and dialogue with fishermen, riverside dwellers, and other local stakeholders, will it be possible to reformulate effective public policies that reconcile the conservation of fishing resources with the maintenance of traditional ways of life, promoting a socio-environmental governance model that is, in fact, participatory, inclusive, and socio-environmentally fair.

In synthesis, Laws No. 12,197/2023 and No. 12,434/2024, brought in the short term loss of food safety, lack of social and cultural participation, not being listened to and attended to, loss of the right to go and come fishing, trading, observing and monitoring fish and rivers and have seen the invasion of theirs sustainable territories, which, in the middle and long term, are going

excluded them from the ecosystem and social, loss of food sovereignty, since fishing is the only one activity that is provided from the cultural basis of the indigenous pueblos of the Pantanal ancestry and consequently the impossibility of maintaining ecological, cultural and social resilience.

ACKNOWLEDGEMENTS

We thank the Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) for the research productivity fellowship as part of the PELD/DARP – Long-Term Ecological Research Program/Dynamics of the Flood Pulse in the Sociocultural Ecological System of the Paraguay River within the Context of the Pantanal Biosphere Reserve, Mato Grosso, Brasil (contributions No. 52). We are grateful to the Universidade do Estado de Mato Grosso, the Graduate Program in Environmental Sciences, and the Pantanal Research Center in Limnology, Biodiversity, and Ethnobiology. Grant from CNPq Process nº 23034.022102/2021-27 and FAPEMAT nº 0152640/2021.

REFERENCES

- Agostinho, A. A.; Miranda, L. E.; Bini, L. M.; Gomes, L. C.; Thomaz, S. M.; Suzuki, H. I. Patterns of colonization in neotropical reservoirs, and prognoses on aging. In: Tundisi, J. G.; Straskraba, M. (Ed.). *Theoretical reservoir ecology and its applications*. São Carlos: International Institute of Ecology; Leiden, The Netherlands: Backhuys Publishers; Rio de Janeiro: Brazilian Academy of Sciences, 1999. p. 227-265.
- Alho, C. J. R.** Biodiversity of the Pantanal: Its magnitude, human occupation, environmental threats and challenges for conservation. *Brazilian Journal of Biology = Revista Brasileira de Biologia*, 71(1 Suppl.), 229-232. 2011.
- Alho, C. J. R. The Pantanal wetlands: ecology, conservation, and sustainable development. *Ecological Engineering*, v. 24, n. 4, p. 307–311, 2005.
- ANA (Agência Nacional de Águas e Saneamento Básico). 2020b. *Estatística pesqueira. Relatório de Andamento 06: Diagnóstico de Ictiofauna, Ictioplâncton e Pesca na RH Paraguai*. Elaboração de Estudos de Avaliação dos Efeitos da Implantação de Empreendimentos Hidrelétricos na Região. 110p. Disponível em: <https://www.gov.br/ana/pt-br/assuntos/gestao-das-aguas/planos-e-estudos-sobre-rec-hidricos/plano-de-recursos-hidricos-rio-paraguai/estudos-de-avaliacao-dos-efeitos-da-implantacao-de-empreendimentos-hidreletricos>. Acesso em 22 maio 2025.
- Araujo M de, Catella AC, Pellegrini AO, Fernandes FA, Avila F. Avaliação de impacto da contribuição da Embrapa na política. *Revista Política Agrícola* 3: 114–130, 2019.

- Ávila, Gabriela Rocha Priante Teles de; Silva, Carolina Joana Da; Ferraz, Luciana. Pesca e Comunidades Ribeirinhas. In: Figueiredo, Daniela Maimoni de; Dores, Eliana Freire Gaspar de Carvalho; Lima, Zoraidy Marques de (orgs.). *Bacia do Rio Cuiabá: uma abordagem socioambiental*. Cuiabá: EdUFMT, 2018. p. 25-42. Disponível em https://crbio01.gov.br/arquivos/Bacia%20do%20Rio%20Cuiab%C3%A1%20uma%20abordagem%20socioambiental.pdf?utm_source. Acesso em 21 fev. 2025.
- Bittencourt, T. D. A.; Facco, G. G.; Neto, J. F. Dos R.; Matias, R. *Pecuária sustentável no Pantanal: desafios e oportunidades para os produtores locais de ovinos*. Interações (Campo Grande), v. 25, n. 3, e2534339, 2024. Disponível em: <https://multitemas.ucdb.br/interacoes/article/view/4339>. Acesso em: 30 maio 2025.
- Brasil. Constituição (1988). *Constituição da República Federativa do Brasil*. Brasília, DF: Senado Federal, 1988. Disponível em: https://www.planalto.gov.br/ccivil_03/constituicao/constituicao.htm. Acesso em 02 jan. 2025.
- Brasil. *Objetivos de Desenvolvimento Sustentável* [Internet]. 2018. Disponível em: <https://odsbrasil.gov.br/>. Acesso em 02 jan. 2025.
- Brasil. Resolução nº 32, de 15 de outubro de 2003. *Dispõe sobre a instituição das Regiões Hidrográficas do Brasil e outras providências*. Conselho Nacional de Recursos Hídricos – CNRH. Disponível em: <https://www.gov.br/ana/pt-br/assuntos/gestao-das-aguas/panorama-das-aguas/regioes-hidrograficas>. Acesso em: 02 jan. 2025.
- Brasil. Supremo Tribunal Federal. *Ação Direta de Inconstitucionalidade* nº 7.471. Requerente: Partido do Movimento Democrático Brasileiro (MDB). Relator: Ministro André Mendonça. Disponível em: <https://portal.stf.jus.br/peticaoInicial/verPeticaoInicial.asp?base=ADI&numProcesso=7471>. Acesso em: 02 jan. 2025.
- . *Ação Direta de Inconstitucionalidade* nº 7.514. Requerente: Partido Social Democrático (PSD). Relator: Ministro André Mendonça. Disponível em: <https://portal.stf.jus.br/processos/detalhe.asp?incidente=6081367>. Acesso em: 02 jan. 2025.
- . *Ação Direta de Inconstitucionalidade* nº 7.590. Requerente: Confederação Nacional dos Pescadores e Aquicultores (CNPA). Relator: Ministro André Mendonça. Disponível em: <https://portal.stf.jus.br/processos/detalhe.asp?incidente=6082123>. Acesso em: 02 jan. 2025.
- Buco, Thalyta Forquim; Zadra, Marcelo; Vandresen, José Carlos. Rede Puxirão dos Povos e Comunidades Tradicionais: na construção da visibilidade social e na luta pelo reconhecimento dos territórios tradicionalmente ocupados. *Revista Capital Científico – Eletrônica (RCCe)*, v. 11, n. 3, p. 45-70, set./dez. 2013. Disponível em: <https://revistas.unicentro.br/index.php/capitalcientifico/article/view/1980>. Acesso em: 21 fev. 2025.
- Cavalcanti, S. M. C.; Gese, E. M. Does ecotourism affect jaguar (*Panthera onca*) ranging behavior in the Brazilian Pantanal?. *Journal of Mammalogy*, v. 91, n. 2, p. 431-439, 2010.

- Chiaravalloti, R. M., et al. (2022). Pesca no Pantanal Sul: História, Estratégias de Pesca, Nível de Exploração dos Estoques e Políticas de Pesca. *Biodiversidade Brasileira*, 2(2), 1-19. Disponível em <https://www.alice.cnptia.embrapa.br/alice/bitstream/doc/1142498/1/Chiaravalloti-et-al-2022-Pesca-Pantanal-Sul.pdf?>. Acesso em: 14 fev. 2025.
- 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.
- Diamond, Jared. *Colapso: como as sociedades escolhem o fracasso ou o sucesso*. Tradução de Regina Lyra. 5. ed. São Paulo: Editora Record, 2005.
- Embrapa Pantanal. *Nota Técnica sobre avaliação da estabilidade da pesca na Bacia do Alto Paraguai*, MS, e considerações sobre o Projeto de Lei MT n. 1363/2023 (Lei n. 12197/2023), Corumbá, MS, 10 p. 11 de junho de 2023. Disponível em: https://www.cpap.embrapa.br/pesca/online/NT_Eembrapa_Pantanal_PL1363_2023.pdf. Acesso em 22/05/2025.
- FAO. 2015. *Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication*. Rome.
- Guerra, A.; Marengo, J. A.; Nobre, C. A.; Seluchi, M. E.; Coelho, C. A. S.; Alvalá, R. C. S. **Drivers and projections of vegetation loss in the Pantanal and surrounding ecosystems**. *Land Use Policy*, v. 91, p. 104388, 2020. DOI: <https://doi.org/10.1016/j.landusepol.2019.104388>. Acesso em: 30 maio 2025.
- Harris, M.; Rumsey, D. The ecology of sustainable ranching in the Brazilian Pantanal. *Human Ecology*, v. 40, p. 741–752, 2012.
- Israel, G. D. Determining Sample Size. University of Florida *IFAS Extension*, PEOD6, 1992. Disponível em: <https://www.tarleton.edu/academicassessment/documents/samplesize.pdf>. Acesso em: 18/03/2025.
- Lage, M. C. *Utilização do software NVivo em pesquisa qualitativa: uma experiência em EaD*. ETD – Educação Temática Digital, v. 12, n. esp., p. 198-226, mar. 2011. Disponível em: <http://www3.mackenzie.br/editora/index.php/RAM/article/view/178/178>. Acesso em: 14 fev. 2025.
- Mato Grosso. *Lei nº 9.096, de 16 de janeiro de 2009*. Dispõe sobre a Política Estadual de Pesca no Estado de Mato Grosso. Disponível em: www.legisweb.com.br/legislacao/?id=133482#. Acesso em: 02 jan. 2025.
- _____. Projeto de Lei nº 107, de 19 de junho de 2019. *Dispõe sobre a Política Estadual de Desenvolvimento Sustentável da Pesca, regula as atividades pesqueiras e dá outras providências*. Cuiabá: Casa Civil, 2019. Disponível em: <https://www.al.mt.gov.br/storage/webdisco/cp/20190626100231221000.pdf>. Acesso em: 20 fev. 2025.

- _____. Lei nº 12.197, de 20 de julho de 2023. *Dispõe sobre a Política Estadual de Pesca no Estado de Mato Grosso*. Disponível em: <https://www.legisweb.com.br/legislacao/?id=447934#>. Acesso em: 02 jan. 2025.
- _____. Lei 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*. Diário Oficial do Estado de Mato Grosso, Cuiabá, 26 dez. 2023. Disponível em: <https://legislacao.mt.gov.br/>. Acesso em: 21 fev. 2025.
- _____. Decreto nº 677, de 1º de fevereiro de 2024. Regulamenta o Art. 19-A da Lei nº 9.096/2009 que *dispõe sobre a Política da Pesca no Estado de Mato Grosso e dá outras providências*. Disponível em: <https://www.legisweb.com.br/legislacao/?id=455466>. Acesso em: 02 jan. 2025.
- _____. Lei nº 12.434, de 1º de março de 2024. *Dispõe sobre a Política Estadual de Pesca no Estado de Mato Grosso*. Disponível em: <https://www.legisweb.com.br/legislacao/?id=456301>. Acesso em: 02 jan. 2025.
- _____. Secretaria de Estado de Desenvolvimento Econômico. *Turismo de pesca movimenta economia de municípios mato-grossenses*. Disponível em: https://www.sedec.mt.gov.br/-/turismo-de-pesca-movimenta-economia-de-munic%C3%ADpios-mato-grossenses?utm_source. Acesso em: 24 dez. 2024.
- Moi, D. A., Saito, V. S., Quirino, B. A. *et al.* Human land use and non-native fish species erode ecosystem services by changing community size structure. *Nat Ecol Evol* **9**, 801–809 (2025). <https://doi.org/10.1038/s41559-025-02696-6>
- Nunes Da Cunha, C.; Junk, W. J. Large Rivers: The Pantanal and the Amazon. *Aquatic Sciences*, v. 71, p. 49–60, 2009.
- OIT. *Convenção nº 169 sobre Povos Indígenas e Tribais*. Genebra: Organização Internacional do Trabalho, 1989. Disponível em: https://www.planalto.gov.br/ccivil_03/_Ato2019-2022/2019/Decreto/D10088.htm#art5. Acesso em 02 jan. 2025.
- Petrelle Jr., M. (2014). Pesque-e-solte: lazer ou crueldade?. *Ciência Hoje*, 317, 34-39.
- Scognamillo, D.; Maxit, I.; Sunkist, M.; Polisar, J. Hato Piñero: a case study of jaguar (*Panthera onca*) ecology in a protected area. *Journal of Mammalogy*, v. 84, n. 2, p. 616-628, 2003.
- Singh, A. S.; Masuku, M. B. Sampling techniques & determination of sample size in applied statistics research: An overview. *International Journal of Economics, Commerce and Management*, v. 2, n. 11, p. 1-22, 2014. Disponível em: <http://ijecm.co.uk/wp-content/uploads/2014/11/21131.pdf> Acesso em: 18/03/2025
- Souza Neto, R. A., Dias, G. F., Silva, R. R., & Ramos, A. S. M. (2019). Efeitos dos Softwares de Análise de Dados Qualitativos na Qualidade de Pesquisas. *Revista de Administração Contemporânea*, 23(3), 373-394. <https://doi.org/10.1590/1982-7849rac2019170357>. Disponível em <https://www.scielo.br/j/rac/a/wsD3CYLhp4HSfcFL6dHRpmw/?format=pdf&lang=pt>.

Acesso em 02 jan. 2025.

- Tomas, W. M.; Andrade, M. H.; Berlinck, C. N.; Urbanetz, C. *Oito princípios básicos para a elaboração de políticas públicas e projetos de desenvolvimento para o Pantanal*. 2024. Disponível em:
https://www.researchgate.net/publication/286187568_Aquatic_habitats_of_the_Upper_Paraguay_river-floodplain-system_and_parts_of_the_Pantanal_Brazil. Acesso em: 30 maio 2025.
- Tortato, F. R.; Izzo, T. J.; Hoogesteijn, R.; Peres, C. A. *The numbers of the beast: valuation of jaguar (Panthera onca) tourism and cattle depredation in the Brazilian Pantanal*. *Global Ecology and Conservation*, v. 11, p. 106–114, 2017. DOI:
<https://doi.org/10.1016/j.gecco.2017.07.002>. Acesso em: 30 maio 2025.
- Vacchiano, Marcelo Caetano; Nunes, Josué Ribeiro Da Silva; Da Silva, Carolina Joana. 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. *Aracê, [S. l.]*, v. 6, n. 4, p. 18652–18670, 2024. DOI: [10.56238/arev6n4-446](https://doi.org/10.56238/arev6n4-446). Disponível em:
<https://periodicos.newsciencepubl.com/arace/article/view/2576>. Acesso em: 31 mar. 2025.
- Welcomme, R. L. *Inland fisheries: ecology and management*. Oxford: FAO, Blackwell Science, 2001. 358p.
- Ximenes, F. A., Gobara, S. T., & Radford, L. (2019). O estudo da temática piracema na perspectiva da teoria da objetivação. *Revista Electrónica de Enseñanza de las Ciencias*, 19(1), 110-131. Disponível em
https://www.researchgate.net/publication/338987544_O_estudo_da_tematica_piracema_na_perspectiva_da_teorica_da_objetivacao. Acesso em: 14 fev. 2025.
- Zimmermann, A.; Walpole, M. J. Paying for wildlife: visitor expenditure in the Madidi National Park, Bolivia. *Oryx*, v. 39, n. 3, p. 296-304, 2005.