


## THROUGH THE MEANDERS OF THE PANTANAL: TERRITORIAL CONFLICTS AND SOCIO-ENVIRONMENTAL IMPACTS FACED BY ARTISANAL FISHERWOMEN AND FISHERMEN IN SANTO ANTÔNIO DE LEVERGER

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### ABSTRACT

Fishing is one of the oldest activities practiced by humanity, transcending time. Santo Antônio de Leverger is home to a few hundred of the 7,633 professional artisanal fishermen and women in Mato Grosso. Under the river even before sunrise, these guardians of fishing traditions notice with each hook thrown into the river the decrease in their daily catches. In view of this, the present research sought to investigate the socio-environmental impacts that plague the daily life of these subjects. For this, quantitative methodologies were adopted, with data collection, and qualitative through semi-structured interviews with fishermen and fisherwomen from the Z8 colony. One of the main socio-environmental impacts identified is the sad desire that the new generation does not continue in the trade due to the difficult conditions of maintaining the art of artisanal professional fishing. A knowledge transmitted and resisted for generations is at the forefront of its epilogue.

**Keywords:** Artisanal Professional Fishing. Swamp. Socio-Environmental Impacts. Conflicts.

## INTRODUCTION

The first civilizations, with a systematized political system, settled on the banks of rivers, even those that did not have such systematization, such as groups of nomads in their temporary stays in some place, settled in regions with water availability. This is because from water comes life and maintains lives, in its authoritarian administration, it controls lives.

It maintains lives because from the rivers you drink, eat and irrigate what will be consumed. From it arises fishing, one of the main activities practiced by the first ancestors of humanity. Loaded with transgenerational knowledge that resists in the perseverance and hope of professional fishermen, until the present day.

Fishing in the rivers of Mato Grosso has always been a traditional activity with great influence on the economic, social and cultural life of the population. Over the years and following national requirements, this activity has also been disciplined with its own legislation that establishes both the category of professional fisherman and the amount of fish, how and when to fish. This legislation became much more comprehensive from the 2000s onwards, specifically after the so-called State Fisheries Law Law No. 9,096 of January 16, 2009. Another point highlighted by this law is subsistence fishing, which is carried out by fishermen from traditional communities or riverside fishermen, on a non-profit basis, with the purpose of complementing the food supply.

According to data from the Ministry of Fisheries and Aquaculture (MPA), in Brazil there are 1,331,425 Fishing Activity Records (RGP), with those named by artisanal fisherwomen corresponding to a total of 99.76% of these active records (MPA, 2024). The State of Mato Grosso holds approximately 0.58% of this amount, with 7,663 certified RGP (MPA, 2024).

In the Municipality of Santo Antônio de Leverger, 34 km from Cuiabá, artisanal professional fishing, although not the most profitable branch of the local economy, continues to be a deeply rooted activity and essential for the survival of the few communities and individuals who have it as a trade. The practice retains its social and cultural relevance, reflecting the traditions and ways of life that have been passed down from generation to generation.

However, artisanal professional fishing in the state of Mato Grosso has suffered a series of socio-environmental impacts resulting from human actions and public policies that are inadequate to protect the environment and vulnerable groups. The changes observed in

fish, fish size, changes in river levels, as well as availability of fish stocks are some of the factors pointed out by both Tocantins *et al.* (2013) and also felt by fishermen and fisherwomen. Thus, this research deals with the socio-environmental impacts that affect artisanal fishing in the municipality of Santo Antônio de Leverger.

## **METHODOLOGY**

The methodology and development of the research is anchored in two strands: quantitative and qualitative. In the quantitative aspect, the number of members in the Z8 fishermen's colony was surveyed, through the website of the Ministry of Fisheries and Aquaculture. It also sought to analyze the participation of the sector, and others, in the municipality's economy with data from the last agricultural census carried out by the IBGE in 2017.

In the qualitative aspect, the methodological procedures that permeate the project are centered on action research, characterized as an eminently interactive process that considers fundamental the analysis of the quality of action among the subjects who participate in it, as well as the continuous exercise expressed by planning – action – reflection – research – resignification – replanning (BARBIER, 2007; THIOLENT, 1994). In this regard, semi-structured interviews were developed with four fishermen in the Z8 fishermen's colony, located in Santo Antônio de Leverger, for the purpose of knowing the reality studied. It should be noted that these interviews were conducted in 2022, however, the period in which they were carried out does not compromise the validity of the results, since the issues addressed maintain relevance and pertinence in the current context, reflecting structural and continuous aspects of fishing activity in the region.

In addition, other studies developed on the same theme were consulted in order to cross-reference information and identify patterns in the literature. This procedure allowed for a more robust comparative analysis, providing a solid basis for research.

## **NAMING THE OXEN, OPA! TO THE "FISH"**

Fishing is an intimate link that connected the first humans who inhabited this land to their survival instinct, opening margins for their cognitive development. In the cradle of humanity, Africa, there are traces of some species of fish along with fossils of *Homo habilis* and also of *Homo erectus* near a lake, dating back approximately 500 thousand years (Gartside; Kirkegaard, 2010). The activity was not restricted only to the feeding of the first

hominids, but to customs and rituals that reflected a comprehensive understanding of the world, from its capture, preparation and consumption; meet physical and spiritual needs, interpreted in different ways according to the cosmology of the communities studied, in which the understanding of society without these aspects, culturally enriching, is not justified (Gartside; Kirkegaard, 2010).

"Artisanal fishing is an activity that crosses time and historical-social transformations as a way of life, much more than just a professional activity" (Knox *et al.*, 2014. p. 27). In lakes, lagoons, lagoons, seas and oceans, rivers, streams, springs, estuaries, mangroves, in different water bodies, fishing exists and resists; the fish disposes the fisherman. The so-called Artisanal Professional Fishermen, in Mato Grosso, have fishing as the main, if not the only, source of income; they do not have employment ties; their activities are practiced autonomously or in a family nucleus with their own means of production (Mato Grosso, 2009). Their fishing instruments are not predator marks, but simple and respectful tools, limited to hand line, with or without a rod; cast net, sieve, jiqui and covo, all with specifications according to legislation (Mato Grosso, 2009).

The craft also has its pause during Piracema, a word of Tupi origin that unites "pirá", which means fish, and "sema", which translates to exit, therefore, exit of the fish (Navarro, 2013), a reproduction season where they go up to the headwaters of the rivers to multiply there. The process of swimming against the current and various obstacles in search of a peaceful refuge to procreate leads them to exhaustion, making them more vulnerable to predation (Resende, 2008). During the period, artisanal professional fishermen in the state who have their General Registry of Fishing Activity (RGP) duly regulated receive Seguro Defeso, a benefit paid by the National Institute of Social Security (INSS) to fishermen and fisherwomen who use fishing as their only source of income (Brasil, 2003). During the Spawning Season, they suspend their activities, not only by legal determination, but also because they are aware of the importance of protecting the life that springs from the waters.

Like all categories of professionals, most of them are also organized in associations that represent them. The fishermen's colonies, a representative entity of the class, are autonomous and sovereign, and it is up to them to defend the rights and interests of the category; represent, before government entities, against any actions of predatory fishing and environmental degradation; and to provide legal and accounting services to their members (Brasil, 1938; Brazil, 2008). It is from these colonies that fisherwomen and

fishermen have proven the exercise of their profession on an uninterrupted basis and will have their rights, such as closed insurance, ensured.

In their daily lives, even before dawn, the fishermen and fisherwomen are already under the slow waters of the rivers ready for another day of fishing, but this is no longer the same, the waiting time for the fish to catch the hook has increased, the catch at the end of the fishing has become negligible, in the weaving of their own expressions "the fish has decreased". A consequence of all anthropic activity carried out under and outside the river, unconcerned with its generative impacts.

Conceptualized as Environmental Impacts, these are the "alteration of environmental quality that results from the modification of natural or social processes caused by human action" (Sánchez, 1998 *apud* Sánchez, 2008. p. 32). In the legal scope, a resolution of the National Council for the Environment (CONAMA) delimits by Environmental Impacts

"Any alteration of the physical, chemical and biological properties of the environment, caused by any form of matter or energy resulting from human activities that, directly or indirectly, affect: I - the health, safety and well-being of the population; II - social and economic activities; III - the biota; IV – the aesthetic and sanitary conditions of the environment; V - the quality of environmental resources" (Brasil, 1986, art. 1, p. 636).

Thus, as nothing on the planet lives or functions independently, all changes in biota resonate not only with nature but with society, its culture and economy. In this way, Socio-Environmental Impacts seeks to understand how changes in the environment reflect on a certain segment of the social whole. In line with Kenox *et al.* (2014), artisanal fisherwomen and fishermen who have their experiences delicately woven in harmony with the biophysical elements and natural cycles are directly impacted by the changes made in them, altering their routine and their craft rites, mostly transgenerational.

## FROM LAND TO WATER: THE LEGITIMATION OF THE RESTRICTION OF RIVERS THROUGH PRIVATE PROPERTY

Adjacent to the meandering waters of the Cuiabá River, Santo Antônio de Leverger, located in the Center-South of Mato Grosso, is part of the Metropolitan Region of the Cuiabá River Valley along with the municipalities of Acorizal, Chapada dos Guimarães, Cuiabá, Nossa Senhora do Livramento and Várzea Grande. With 11,735,752 km<sup>2</sup> and more

than 16 thousand inhabitants (IBGE, 2022), Santo Antônio de Leverger is partially immersed in the Pantanal, privileging the fact that 61% of its territory is facing the core of this biome.

Its economic activity revolves around agriculture, livestock, and related services, followed by public administration, defense and social security, and retail trade (Sebrae, 2022). Artisanal professional fishing, as addressed in the context of the research, is not limited only to the use of fish for the daily food of these workers. Most of it is focused on commerce, transforming the activity into a craft that generates income for those involved. This also characterizes the fishermen, according to state legislation, as artisanal professional fishermen, positioning them in the trade sector. According to the last agricultural census carried out in 2017, the participation of the craft in the economy is concentrated around 0.2%, with currently, according to the Ministry of Fisheries and Aquaculture (MPA), 402 artisanal fishermen, approximately 5.2% of the professionals in the entire state. The largest economic activity practiced in the municipality is agriculture, structuring approximately 68% of the economy of Santo Antônio de Leverger.

Located in the Pantanal, the dynamics of fishermen and fisherwomen are intrinsic to the seasonality of the floods and drought of the Pantanal waters and these, in turn, of the local rains and precipitation under the surrounding plateaus that will supply the rivers of the plain (Filho, 2021). During floods, the waters overflow the riverbed, leaving its banks submerged, creating a feeding habitat and refuge for various fauna species; in their retreat this soil, previously immersed, becomes extremely fertile (Junk *et al.*, 2006) conducive to agropastoral activities, which are pervasively in conflict with the riverside and traditional communities of the region.

With the agrarian and productive transformations of Brazilian agriculture since the 1970s, cattle ranching in the Pantanal has undergone significant changes, becoming increasingly impactful for the biome (Rossetto and Girard, 2012). Its relatively flat relief and covered with native grasses, in the acceptable criteria for feeding beef cattle, makes it suitable for agricultural activities (Filho, 2021), only in the municipality of Santo Antônio de Leverger the use of land for pasture occupies more than half of its territory, 56% (IBGE, 2017). The municipalities of the Pantanal of Mato Grosso, together, have more than 3 million head of cattle, 522,351 in Santo Antônio de Leverger alone (Filho, 2021). According to Prado (2015) it is the largest, among those in the metropolitan region of the Cuiabá River valley, with a land concentration index, where establishments with more than 100 hectares

represent 99.23% of the territory. In several circumstances, the path of the rivers cuts through these properties, triggering conflicts in relation to their common use by some social groups.

In his dissertation, Prado (2015) discusses private property as a mediator of the legitimization of the restriction and commodification of the river and the emergence of conflicts, reconfiguration of space and relations, especially with artisanal fishermen and women who made common use of the river.

"The appropriation and private use of the river find the necessary support to be carried out in the private ownership of the land, having as the main subjects of this process the owners of farms, farms, inns and fishing grounds." (Prado, 2015. p. 12)

In the context of his dissertation, the researcher analyzes these relationships in the communities of Engenho Velho, Santo Antônio da Alegria and Barra do Aricá, located in Santo Antônio de Leverger. According to the author, few localities on the river, where the subjects of these communities practice fishing, remain outside private properties. According to the analysis, the construction of platforms by the owners materializes the legitimization of the private property of the river, together with the SEVAS arranged in its adjacencies, where the use of these places is only allowed upon payment of a use fee.

However, in a contradictory way, fishermen and fisherwomen, professional or not, find refuge on the banks of the river, in areas of private properties, to continue resisting their way of life (Prado, 2015), not only that, but they are conditioned, with no options, to be inserted in these activities, or properties, to sustain themselves, since, for the most part, they have artisanal professional fishing as their only specialty.

In fishing tourism, such as sport fishing, catch and release and catch and pay, an activity practiced in most of the properties where it runs along the river, most artisanal professional fishermen develop the trades of guides or boat pilots.

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"It helps a lot, because the fisherman can work as a guide."

(Roselin, Interviewee, 2022)

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The economic dynamics of fishing tourism is manifested in the communities of Barra do Aricá, as reported by one of the interviewees, and also in the communities of Engenho Velho and Santo Antônio da Alegria, described by Prado (2015), in this way the economic movement of fishing tourism is not located exactly in the urban area of Santo Antônio de Leverger but in its surroundings.

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"Here the tourists don't even stop, they just stop from Barra do Aricá down."

(Edgar, Interviewee, 2022)

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#### "THE FISH HAD A LOT": ENVIRONMENTAL AND SOCIO-ENVIRONMENTAL IMPACTS ON ARTISANAL PROFESSIONAL FISHING

The growth in the number of beef cattle requires the expansion of pasture areas for feeding these animals, not only pasture but also the expansion of areas for soybean cultivation, the main ingredient in the preparation of feed for these cattle (Leonel, 2020).

According to the Annual Report on Deforestation in Brazil (RAD), prepared by Mapbiomas, about 91.79% of the 153,021 hectares of deforested vegetation in the Pantanal, between 2019 and 2023, are within private properties registered with the National Institute of Colonization and Agrarian Reform (INCRA). In 2023 alone, 49,673 hectares were deforested, of which 52.4% occurred in the Pantanal of Mato Grosso do Sul and 4% in Mato Grosso, representing the longest period of deforestation in the biome since 2019 (RAD, 2023).

These actions exert a significant negative impact on the hydrological cycle, resulting in a devastating domino effect. In the absence of native vegetation, in a simplified and didactic way, precipitation is reduced, leading to the extinction of local fauna and flora. Water bodies dry up, fish die, and, as a consequence, not only artisanal fishermen, but also traditional and riverine communities that depend on these resources face serious difficulties.

In dialogue with the artisanal professional fishermen and women of the Z8 fishermen's colony, the reports on the situation of fishing activity revealed a problem common to all: the decrease in fish.



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Yes, at the time we thought, fish had a lot. Nowadays, there is not the amount that we fish, right?

(Josinete, Interviewee, 2022)

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"Yes, decrease in fish. Last year there were no fish, now this year there was a little."

(Carlita, Interviewee, 2022)

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"Yes, the fish are decreasing a lot, and the appearance of a lot of piranha."

(Edgar, Interviewee, 2022)

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The problem mentioned by the fishermen currently does not differ from those reported by Catella (2001) in relation to the overfishing of fish stocks, whose capture of the species exceeds its capacity and time to reproduce. In his considerations, the author ponders that "fishing resources are, in general, little exploited in the region and, possibly, in the entire Pantanal" (Catella, 2001. p. 326) except for the pacu (*Piaractus mesopotamicus*) and, probably, the jaú (*Paulicea luetkeni*) (Catella, 2001).

However, this perception is related to the way that, if fishing effort increases, such as the increase in amateur fishermen coming from fishing tourism, there is a decrease in catches made during the day (Catella 2003). Over the years, external factors, such as the increase in this fishing pressure and the environmental change itself, can contribute significantly to overfishing, which, considering the time that has elapsed since Catella's research, may explain the decrease in fish currently reported by the fishermen and fisherwomen of Santo Antônio de Leverger. Allan *et al.* (2005) succinctly suggests that external factors, when negative, such as habitat degradation, pollution and the introduction

of exotic species, can imitate, or even aggravate, the effects of overfishing, reducing fish populations.

These external problems are mentioned by artisanal fishermen, according to which they report the presence of raw sewage dumped directly into the river, dirt and contamination of the water due to the capture cevas, in addition to the action of dredges in the rivers.

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"Pollution of the river because of the cevas, which is soybean, which rots the bellies of the fish."

(Edgar, Interviewee, 2022)

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"They release a lot of dirt into the water, which ends up reducing the fish a lot."

(Carlita, Interviewee, 2022)

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"Here there isn't, but up there it's a lot, right? sewage network that falls directly into the river."

(Josinete, Interviewee, 2022)

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"Yes, oil in the river being thrown by the dredgers. Oil in the fish"

(Roselin, Interviewee, 2022)

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De Paula (2018) points out that urbanization is one of the main causes of environmental impacts on the territoriality of artisanal fishermen because

"The conditions of environmental health are compromised by the rapid growth of cities that causes changes in the characteristics of the environment... and the lack of infrastructure that makes it possible to reduce environmental impacts such as sewage collection systems, garbage collection and recycling, rainwater drainage system, and so on." (De Paula, 2018, p. 94).

Along with urban growth, the demand for natural resources for civil construction also increases. Mato Grosso, in 2022, ranked 6th in the ranking of the largest ore producers in

the country, with revenues of R\$ 6.8 billion (SEDEC, 2023). According to the mining coordination of the State Department of the Environment (SEMA), 200 Operating Licenses were issued for these activities and that three-phase licensing had a 60% reduction in its response time to the entrepreneur, which currently represents about 93 days (INDEA, 2023).

However, although this agility can be seen as an administrative advance, it is important to consider that it cannot compromise the analysis of the potential environmental and socio-environmental impacts of these activities, as highlighted by Silva *et al.* (1996) and Araújo *et al.* (2014) on the impacts of mining on neighboring communities. A longer analysis time could even indicate a greater depth in the assessment of these impacts, which is essential to ensure sustainable development.

The changes in the landscape, in the day-to-day life of these fishermen, do not go unnoticed, as observed by the Sarã (*Sapium obovatum*), as it is popularly known, is decreasing in the region.

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"The sarã on the banks of the river is drying up a lot. It is proper to water and is drying up on the edge of the ravine."

(Edgar, Interviewee, 2022)

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Dominant in the floodable riparian forest, on islands, stretches of riverbanks and streams of the Pantanal (Pott and Pott, 1994), its death causes serious problems to the rivers, since, among many other factors, the entire balance of aquatic ecosystems depends directly on the protection of riparian vegetation, which functions as a regulator of the physicochemical characteristics of the water, maintaining favorable conditions for the survival and development of the ichthyofauna (Sigaud *et al.*, 2007).

These activities, in addition to their potential aggravation of negative environmental impacts on the environment, end up generating socio-environmental impacts that go beyond the already worrying loss of income of artisanal professional fishermen. The activity moves a production chain established before and after the capture of the fish, since not all fishermen capture their own baits, manufacture their canoes, hooks, lines, rods. After the catch, the fish are sold to middlemen, who resell them, or are sold directly to restaurant owners.

The memory and art of artisanal fishing is exposed to the risk of being lost in history, since, because it is a transgenerational profession, that is, transmitted from father to son, in its traditional way of being or, as reported by Mrs. Josinete that the profession was bequeathed to her by her aunt, or as Mrs. Roselin, that I find life in fishing, having learned the trade, together with his sister, with his father.

sharing the same anxieties, the artisanal fishermen and women of Santo Antônio de Leverger do not want the next generation to follow the same profession, because according to the

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"Nowadays the river is being very badly treated and there are almost no fish. it would be a difficult life"

(Josinete, Interviewee, 2022)

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"I encourage them to study or get another job, because the fishing industry is different."

(Roselin, Interviewee, 2022)

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"The fish are running out and it's very difficult."

(Edgar, Interviewee, 2022)

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Tocantins *et al.* (2013) already discussed this issue, showing that 31.5% of the fishermen in the Upper Paraguay basin are in the age group between 41 and 50 years, and 24.8% were between 51 and 60 years. These data show a decrease in the age group considered young, between 18 and 30 years old, indicating that younger fishermen are looking for other income alternatives, while fishing, as a professional alternative, is being practiced by adults and older people who are already in the field (Tocantins *et al.*, 2013). In addition, when comparing the number of artisanal professional fishermen quantified by Tocantins *et al.* (2013), which was 519 professionals, with the current number of 402 professionals, according to MPA data, we observed a decrease of 22.6% of these workers in Santo Antônio de Leverger over almost 11 years.

Responsible for the rise of several civilizations, the rivers, manifested as guardians of Dona Josinete's "passion", of the "*life by the river*" expressed with charm and hope by Dona Roselim, find their days numbered under the current political system, where they are seen only as a source of extraction for monetary wealth, without their peculiarities, their dependence and their dependents being truly considered. These celestials, in their most diverse shapes and sizes, express magnitude if observed with tenderness, as Mr. Edgar says: "*without him, we are nothing*" — and this is not only true for artisanal fishermen and fisherwomen.

## **FINAL CONSIDERATIONS**

From the crossing of data collected by IBGE and Mapbiomas, together with the bibliography already produced, regarding the theme, with the reports of artisanal professional fisherwomen and fishermen from Santo Antônio de Leverger, it was possible to understand the socio-environmental impacts that affect these subjects. We observed that artisanal fishing, in addition to being a means of livelihood, is a rooted cultural expression, loaded with meanings that transcend simple economic activity. Through the interviews, it was possible to identify that the socio-environmental impacts generated by anthropic actions, such as the actions of dredgers in the extraction of minerals, and the lack of treatment of the urban sewage network directly affect the subsistence and identity of these communities.

Artisanal fishers have revealed a decline in the amount of fish available, which requires careful analysis by government institutions to take appropriate measures. The environmental degradation resulting from anthropogenic activities is generating a ripple effect that threatens not only fishing resources, but also the very cultural and economic survival of these communities.

It is essential to emphasize that the continuity of artisanal fishing depends on integrated actions that seek to mitigate the environmental impacts observed by fishermen and fisherwomen, and promote the sustainability of the trades that cause them. The discussions promoted by this research point to the urgent need for public policies that not only preserve the environment but also strengthen the role of fishing colonies as guardians of traditional knowledge.

Artisanal fishing is more than a profession; It is a manifestation of love and respect for the environment. Therefore, it is necessary for future actions to involve these

communities in the decision-making process, ensuring that their voices are heard and that their practices are protected and valued.

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