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Abstract

This dissertation explores the interplay between conservation agendas, land tenure security, and environmental challenges in the Pantanal region of Brazil, and how they impact rural livelihoods. The study's analytical framework is grounded in poststructuralist theories of access, examining how traditional communities and governmental bodies negotiate access to and control over natural resources. Cross-sectional semi-structured interviews and participatory resource mapping are used to capture local knowledge and insights, revealing complex power dynamics which influence the perceptions and experiences of the residents of the sustainable use protected area, Baía Negra. The findings confirm that traditional livelihoods are threatened by insecure land tenure from lack of recognition of customary land practices, inflexible and bureaucratic regulatory restrictions, and loss of traditional ecological knowledge. These are all exacerbated by increasingly precarious seasonal changes caused by climate change. The findings contribute to a more comprehensive understanding of the challenges faced by rural communities in protected areas, suggesting the importance of adaptive governance, customary common pool management systems, and increasing the presence of traditional knowledge and perspectives in conservation agendas.

Abbreviations

APA – Environnemental Protection Area

ECOA – Ecology in Action

EMBRAPA – Brazilian Agricultural Research Company

EWE – Extreme weather event

IBAMA – The Brazilian Institute of the Environment and Renewable Resources

INCRA – National Institute of Colonization and Agrarian Reform

LTS – Land tenure security

NDC – Nationally determined contributions

PREVFOGO – The National Centre to Prevent and Combat Forest Fires

PRODAESTE – program for the development for the central west

TA – Theory of access

TAUS – Terms of authorisation for sustainable use

Translations

Baía Negra – Black Bay

Riberinho – River dweller

Contents

1. Introduction

In 1988, Brazil introduced a new constitution to mark a definitive end to the military regime. It was the first constitution to specifically address environmental protection in its own chapter, and to introduce the concerns of marginalised groups into Brazilian policymaking (Constitution of Brazil, Title 9, 1988). Despite this legislation, forests continue to be degraded by loggers, ranchers, and farmers at alarming rates, rivers continue to be polluted from mining, agriculture, and urbanisation, and land conflicts have intensified, leaving indigenous and traditional communities vulnerable to displacement and violence (see Conrado da Cruz *et al*., 2020, Machado *et al*., 2017, Ternus *et al*., 2011, Laschefski & Zhouri, 2019).

Since the colonial era, Brazil has had tumultuous power shifts and uncertain governance structures. The changing regime trajectory created an uneven and fragmented strategy for overseeing Brazilian territories and establishing land ownership rights (CPI, 2017). Brazil still lacks an integrated database for the registration of public and private land, as it has both rural cadastres and land registry which remain disconnected, increasing vulnerability to illegal appropriation of land (CPI, 2016). The system is fragmented across different government agencies and levels, leading to inconsistent and often outdated information. Consequently, the system's ability to provide a comprehensive and accurate representation of individuals and assets across the country is compromised. This is particularly the case in the Pantanal, where the floodplains expand and contract from wet season to dry season, and therefore the boundaries of ownership also change seasonally, rendering land protection and tenure security precarious.

Furthermore, Brazil is increasingly vulnerable to extreme weather events as climate change intensifies. Both excessive and insufficient rainfall stand as the prevailing climatic threats in Brazil, contributing to approximately 70% of weather-related disasters, including flooding, droughts, and landslides (Met Office, 2020). Wildfires are also a concerning trend tied to climate change and deforestation. The longest drought in 60 years caused devastating wildfires in the Pantanal in 2020, occurring at a frequency 508% higher than average, ravaging

biodiversity and rural livelihoods (Pletsch *et al*., 2021). The Pantanal's ecosystems are directly reliant on the Amazon rainforest: the water vapour in the Amazon's 'flying river' of moisture-laden air contributes to the wetland's own rainy season, and water flow from the Amazon Basin into the wetland contributes to the annual flooding of the region. Thus, weather events that impact the Amazon's rainfall devastate the Pantanal (Alho, 2012). Additionally, Amazon deforestation caused by human activity also impacts water security in the Pantanal's floodplains (Bergier *et al*. 2018).

In response to these conditions and the mounting pressures to fulfil the nationally determined contributions (NDCs) of the Paris Agreement, protected areas have been implemented across Brazil. The Pantanal Conservation Area comprises a group of four protected zones, covering a combined expanse of 187,818 hectares. This area represents approximately 1.3% of the expansive Pantanal region in Brazil (UNESCO, 2021). Protected areas are designed to conserve biodiversity, manage natural resources sustainably, and mitigate the impacts of climate change. While these goals are crucial for the long-term health of the Pantanal, they can come into conflict with the land use practices of traditional communities.

The designation of protected areas can limit or prohibit certain land uses, such as fishing or agriculture, that are essential for the livelihoods of rural residents, and this overlap of interests creates challenges related to land rights and tenure security (Coad, L *et al*., 2008). Many traditional communities in the Pantanal, including indigenous peoples and riverine populations, have a long history of inhabiting and using these lands sustainably. Conceptually, traditional identity can be understood as having the characteristics of 'regimes of common ownership, the sense of belonging to a place, the search for cultural autonomy, and the sustainable adaptive practices that the various studied social groups demonstrate in the present' (Little, Paul, 2003, p. 253). However, according to Brazilian law, groups can self-identify as traditional and indigenous (ISA, 2018). These groups often lack formal land titles or tenure rights recognised by the government. The creation of protected areas can further complicate land tenure issues,

as it introduces additional layers of regulation and oversight. The tension arises from the need to reconcile conservation objectives with the rights and needs of traditional inhabitants.

Brazil's legal framework includes provisions for recognising and formalising the land rights of traditional communities. However, the implementation of these rights can be slow and complex. Efforts are ongoing to provide legal recognition and secure land tenure for these communities within and around protected areas. Finding a balance between conservation goals and the livelihoods of traditional communities is a central challenge in the Pantanal (Chiaravalloti, 2017).

This study seeks to address these complexities by investigating the impact of protected areas on traditional communities in the Pantanal, examining the challenges and opportunities they present. The research concludes that the interplay between formal regulations, customary practices, and evolving environmental conditions in the Pantanal presents challenges for livelihoods, calling for context-specific and adaptable policy approaches that balance conservation with the livelihood needs and ecological knowledge of traditional communities.

2. Literature Review

This section provides a review of the literature regarding how livelihoods interact with land tenure and conservation practices in rural areas of the global south.

2.1. Land Tenure Security in the Context of Rural Development

A consensus has been reached in the literature surrounding land tenure: strengthening its security will improve rural livelihoods and environmental conservation. This is seen through the promotion of ‘poverty alleviation… food security, better health, gender empowerment, and natural resource conservation and restoration’ (Jones, Kelly W. *et al*., 2022, p. 291). Weak land tenure security (LTS) increases ‘displacement, inequalities, conflict, and natural resource destruction, thus resulting in increased social vulnerability and impeded climate adaptation for rural populations’ (Castro & Kuntz, 2022, p. 178).

Hernando de Soto argues that formalisation of property rights which are well-defined, secure, and easily transferable is the key to understanding the success of capitalism in the 'west'. This is because 'every parcel of land, every building, every piece of equipment, or store of inventories is represented in a property document that is the visible sign of a vast hidden process that connects all these assets to the rest of the economy' (De Soto, 2000, p. 6). This facilitates individuals using their property as collateral for credit, invest in businesses, and engage in economic activities. In the many developing countries and transition economies found across Latin America, property rights are not formally recognised or documented. Michael Heller coins this the 'tragedy of the anticommons', in which 'multiple owners are each endowed with the right to exclude others from a scarce resource, and no one has an effective privilege of use' (Heller, 1998, p. 624). Due to the complex web of ownership, resources may remain underutilised or locked away, even though there may be potential value in its productive use.

However, Peluso *et al.* (2013) argue that formalisation without regard for the socio-geographical setting can lead to expropriation, land grabbing, and land tenure insecurity for the rural poor. When formalisation takes place in a country which lacks a coherent cadastre system, the poor become criminalised for not having legal land titles and are 'thus harmed by the neoliberal era's push for formalisation' (Peluso *et al*., 2013, p. 39). The undervaluation of land and lack of sufficient regulatory system results in the often-volatile coexistence of customary tenure systems and formal legal frameworks (Adger & Luttrell, 2000). As such, traditional and indigenous rights to land give way to the vested interests of governments and NGOs to use land 'productively'.

Chiaravalloti *et al*. (2017) discuss how different layers of rights can overlap and create conflicting agendas. They explain that in the Pantanal wetland, local people, ranchers and NGOs all have legal rights to access and protect the same plot of land according to different legislation in the country that refers to use and access of floodplain. Furthermore, these groups' right to access their territory constantly changes according to the seasonal changes in the region.

Consequently, a formalised property right for one group may mean the displacement of another, and these rights may change according to the time of the year. In the Pantanal, formalisation of land has, in fact, increased conflict. Furthermore, Haller (2019) argues that inappropriate formalisation and land titling as a panacea solution to land tenure insecurity has led to land grabbing by foreign investors looking to take advantage of lucrative resources, resulting in intensive exploitation of common pool resources. As such, formalisation in the context of global neoliberalism often results in both poverty exacerbation and environmental degradation.

More nuanced understandings of LTS which look beyond formalisation of property rights place more importance on challenging existing power structures, collective action, and customary land rights. Ostrom's work underscores the transformative potential of collective action in common property resource management. She defines self-governed common-pool resources as having 'actors, who are major appropriators of the resource, involved over time in making and adapting rules within collective-choice arenas regarding the inclusion or exclusion of participants, appropriation strategies, obligations of participants, monitoring and sanctioning, and conflict resolution' (Ostrom, 2002, p. 1317). She argues that effective communication and negotiation between participants using common property resources can help to create a set of working rules and enforcement mechanisms that allow them to avoid over-harvesting and to foster long-term sustainable resource use. This highlights the capacity of communities to self-organise and develop rules that promote sustainable resource use, even in the absence of external authorities (Ostrom, 1990). Such an understanding challenges the conventional wisdom of policy analysts who have argued that centralised management is the only means to avoid resource destruction which leads to the tragedy of the commons. Indeed, Ostrom argues that common pool management provides fairer and more equitable access to resources than privatisation or state ownership.

Many studies evaluating LTS in Latin America have focused their attention on the economic outcomes of formalisation. However, there are gaps in the literature when it comes to other

areas of human development impacted by ability to access the land. Studies also tend to measure land rights without exploring the subjective perceptions of land users and landholders regarding the design and outcomes of land rights interventions (Masuda, 2022). Furthermore, despite the growing body of literature on land tenure and resource access in various global contexts, there remain notable gaps in understanding these dynamics in the unique context of the Pantanal wetlands in Brazil. Existing literature lacks a comprehensive exploration of how local communities in this region perceive and navigate issues related to LTS, conservation restrictions, and their implications for livelihoods.

2.2. Conservation Practices in Rural Communities

Conservation agendas have evolved significantly over the years, reflecting changing paradigms and approaches to environmental protection. Historically, conservation was understood as using principles from biological science to tackle the challenges associated human disrupted species and ecosystems (Kareiva & Marvier, 2012). This justified state authorities having total decision-making power regarding land use and resource management, as centralised control was necessary to prevent resource depletion. Contemporary scholarship on conservation, however, argues that the idea of nature as pristine has led to exclusion and displacement of traditional and indigenous groups. For example, through studying the developing tropics, Lele *et al.* found that implementation of exclusionary protected areas resulted in 'the alienation of local communities', turning them from 'potential conservation allies into adversaries' (Lele *et al*., 2010, p. 94). In some cases, they even had negative consequences for biodiversity, calling into question the meaningfulness of pristineness as a conservation goal.

Central to understanding conservation is the concept of governmentality. Foucault argues that the goal of sovereignty is to maintain its own authority and control over a population. This exercise of power is manifested through the establishment and enforcement of laws and regulations. He explains that 'the good is obedience to the law, hence the good for sovereignty is that people should obey it' (Foucault, 1991, p. 95). In essence, the purpose of sovereignty is

to ensure that people adhere to its rules, and this adherence, or obedience to the law, is what validates and perpetuates sovereignty itself. This circularity underscores the self-reinforcing nature of power and authority in governance systems, where the very act of governing is aimed at maintaining and strengthening the governing authority.

Applying Foucault's insights on governmentality and power to conservation practice reveals the intricate dynamics that underlie environmental governance. Conservation efforts, often seen as benevolent, are not exempt from power relations and governmentality. Through his study of conservation practices in the Ecuadorian Amazon, Cepek conceptualises 'environmentality', as 'the idea that environmentalist logics, projects, and movements are forms of governmentality in the Foucauldian sense' (Cepek, 2011, p. 502). He highlights two forms of control - restriction, e.g., through taxation, enforcement of property rights etc., and productivity, e.g., through knowledge and management. As Foucault explains, 'the instruments of government, instead of being laws, now come to be a range of multiform tactics' (Foucault, 1991, p. 94). Conservation initiatives involve defining access to natural resources, protected areas, and ecological benefits, all of which are subject to governance mechanisms which ensure obedience and security.

NGOs have played a significant role in shaping conservation agendas. While many NGOs are driven by genuine environmental concerns, their actions sometimes intersect with broader political and economic interests. This intersection can lead to conflicts between the conservation goals and the livelihoods of rural communities. For example, Martin *et al*.'s study on the Bwindi Impenetrable National Park in Uganda found that restrictions imposed by the government alongside NGO projects which target Bwindi people threatened local livelihoods and identity. Indeed, residents perceived the park as preventing 'their being able to pass on traditions to their children', resulting in a 'decline of certain livelihood practices and skills, such as hunting and mat-making' (Martin *et al*., 2015, p. 172).

Even projects aimed at improving livelihoods can result in unintended negative consequences when communities are not adequately involved in decision-making. West's research in Papa

New Guinea found that a project to encourage women to make bilum bags to help generate income resulted in increasing women's already large workload: 'On top of their household work, garden work, cooking and cleaning, child rearing, and other duties, all women were now expected to make bilum bags for sale in the artifact shop' (West, 2006, p. 206). The process of commodification, where natural resources and local practices are assigned monetary value within conservation projects, can have complex effects on communities. While these projects aim to enhance rural livelihoods, they can inadvertently disengage people and their social institutions from their environment. This shift in values and exchange relations can disrupt traditional roles and increase workloads, particularly for women.

It is increasingly recognised that grass-roots conservation, which actively engages with and involves local communities, is essential for achieving sustainable and effective conservation outcomes. Woodhouse *et al.* argue that understandings of community member's priorities and motivations must 'go beyond material dimensions to account for aspects of people's lives that they value, and extend to ideas of justice, culturally specific relations with nature, customary tenure regimes and livelihoods' (Woodhouse *et al.*, 2022, p.16). There has therefore been a growing shift towards incorporating social sciences into conservation practice. Massarella *et al.* explain that we exist 'in a "post-wild" world where nature no longer exists separately from humans, so biodiversity conservation must align with this reality' (Massarella *et al*., 2021, p. 80). This requires an interdisciplinary approach which acknowledges that conservation is not just about protecting nature in isolation but also about understanding the complex interactions between people and their environments, such as the cultural significance of landscapes, the economic needs of local communities, and the social dynamics that influence conservation outcomes.

Incorporating social sciences into conservation practices is not merely a matter of diversifying the academic disciplines involved but has profound implications for the recognition and integration of different forms of knowledge. Indeed, Hunne argues that while 'modern science

is less than ten generations old; the modern science of ecology no more than two', some forms of traditional ecological knowledge (TEK) have been gathered for over one hundred generations (Hunne, 1993, p. 14). This knowledge has been central to the adaptation and evolution of communities, and many scholars argue it holds the key to adapting to and addressing climate change (Hosen *et al*., 2020). Yet hierarchies of knowledge continue to privilege scientific expertise over local knowledge.

Elk explains that TEK is not confined to empirical observation alone; it necessitates 'participation with the nature world. We do not separate ourselves from the earth's processes' (Elk, 2016, p. 4). Indigenous and traditional ontologies therefore challenge the Western nature-culture dichotomy within conservation which entrenches the narrative of human dominance over nature. Indigenous scholars theorise a more integrated 'cultural model', in which 'humans are one aspect of the complexity of life' (Salmón, Enrique, 2000, p. 1332). This model has the potential to facilitate a more equitable and collaborative dialogue between scientists, policymakers, and local communities, allowing for more effective and sustainable conservation strategies that genuinely address the complex interplay of environmental, social, and cultural factors.

While existing research has explored the general challenges associated with conservation and the displacement of indigenous and traditional communities, there remains a dearth of in-depth, place-specific investigations that consider the multifaceted nature of these impacts. According to Ryand and Brandon, further research on sustainable use protected areas must analyse how well these areas are defined and regulated, including 'what can be used, who can use it, and how much use is sustainable' (Ryland & Brandon, 2022, p. 617). The complexity of interactions between protected area management, evolving governance structures, and the traditional practices of local populations calls for more comprehensive studies that delve into the lived experiences and perceptions of those directly affected.

3. Constructing a Theoretical Framework and Defining Aims

This section uses scholarly input on the concept of access to construct a theoretical framework. I then define the aims, objectives, and research questions.

3.1. A Theory of Access

This study's theoretical framework is centred on a poststructuralist theory of access (TA) that I develop in the following section. Building upon the foundational concepts introduced by Peluso and Ribot (2003), my framework draws from a wider range of scholarly work to develop a more robust theoretical approach.

Analysis of the mechanisms by which people acquire and maintain access to land and resources offers an insight into rural livelihood improvement and environmental protection. Peluso and Ribot define access as 'the ability to benefit from things—including material objects, persons, institutions, and symbols' (Peluso & Ribot, 2003, p 153). They propose that ability to access, rather than right to own, is more important for understanding the complex social relationships that 'constrain or enable people to benefit from resources without focusing on property relations alone' (Peluso & Ribot, 2003, p. 154). They conceptualise five mechanisms—access through law, access to technology, access through market, access through social identity, and access through social networks—through which people maintain access to land and resources. This theory goes beyond property and rights-based theories, but they are not mutually exclusive; as Myers and Hansen explain, there are 'a broader range of structural and relational mechanisms, including but not limited to property, that determine how access is gained' (Myers & Hansen, 2018, p. 6).

Access can also be understood as the inverse of exclusion. Hall *et al*. (2011) underscore the dual nature of inclusion, emphasising that for some actors to derive sustained benefits from land, exclusion of other potential users is often a prerequisite. They define exclusion as 'the ways in which people are prevented from benefiting from things' (Hall *et al*., 2011, p. 7). Their categorisation of three main types of exclusions, namely maintaining existing access, losing access, and preventing access for those who lack it, echoes understandings of gaining,

maintaining, and controlling access as outlined in Peluso and Ribot's work. This perspective underscores that access is not solely about the presence of opportunities but also about the absence of barriers, such as legal, economic, or social constraints, that prevent individuals or communities from utilising resources.

Foucault's insights suggest that access is not merely a matter of rights or permissions but is tied to the exercise of power and knowledge. He explains, 'All knowledge, once applied in the real world, has effects, and in that sense at least, "becomes true." Knowledge, once used to regulate the conduct of others, entails constraint, regulation and the disciplining of practice' (Foucault, 1977, p. 27). In this sense, when certain knowledge is applied to control or regulate the conduct of individuals or communities, it becomes an instrument of power. For example, knowledge around land tenure regulations and conservation policies is wielded by government agencies, NGOs, and other external entities to shape resource access and land use practices in rural communities. Furthermore, Foucault posits that group distinctions are formed by the dominant knowledge system, thus identities such as race, gender and sexuality, are not formed by those that hold those identities but by the powers that discriminate against them.

Foucault's concept of governmentality explains how access to resources, services, or opportunities is shaped by control and surveillance mechanisms, and involves governing populations and their behaviours through strategies that seek obedience to established norms and regulations. He explains that 'the instruments of government, instead of being laws, now come to be a range of multiform tactics' aimed at managing and regulating society (Foucault, 1991, p. 95). It underscores the interconnectedness of access, power, and knowledge, highlighting the need to analyse the multifaceted ways in which access is shaped and controlled in society.

Similarly, Tania Murray Li (2007) imagines access as operating within the realm of development and governance. Li explores how the discourse of 'improvement' shapes power relations, social dynamics, and governance mechanisms. According to Li, 'practices of

government, calculated programs of intervention, have shaped landscapes, livelihoods, and identities' (Li, 2007, p. 270), and therefore access is shaped by improvement agendas. She analyses the ways in which local actors engage with these development interventions, negotiate power structures, and pursue their own agendas, underscoring the importance of considering the intersection of access with broader processes of power and change. Fairbairn (2013) also places importance on the concept of power for understanding the mechanisms of access. She introduces a categorisation of the powers which determine access control comprising traditional authority, bureaucratic influence, historical accumulation, locally based business knowledge and networks, and control over the development agenda. She asserts that 'examining these sources of power clarifies why peasant dispossession is occurring despite the fact that peasant land property rights are protected by law' (Fairbairn, 2013, p. 352).

Tsing's (2015) conceptualisation of access emphasises the complexities of access as negotiated and contested interactions within specific social and ecological contexts. In her exploration of the matsutake mushroom trade and its various dimensions, Tsing highlights the ways in which access is not solely about ownership or control over resources but also involves relationships, collaborations, and struggles that emerge in the process of engaging with resources (Tsing, 2015). Her analysis suggests that access is a multifaceted concept that extends beyond conventional definitions and is deeply intertwined with cultural, economic, and ecological dynamics.

Incorporating these perspectives and theories into a theoretical framework allows for a holistic understanding of access in the Pantanal. This framework recognises that access is influenced by legal, economic, and social factors, as well as by power dynamics, knowledge systems, and governance mechanisms. The impact of conservation policies and protected areas on livelihoods remains an understudied area within the context of resource access. Investigating how conservation restrictions and land tenure intersect with access mechanisms and influence rural communities is crucial, given the increasing importance of conservation efforts globally.

3.2. Aims and Case Study

The primary goal of this research is to understand how traditional people in the sustainable use protected area Baía Negra in the Pantanal, perceive their access to the land – especially within the complex interplay of LTS, conservation restrictions, and the challenges posed by climate change – and its impact on their livelihoods. The aims of this dissertation are: 1. To understand how rural people perceive their livelihoods in the APA Baía Negra to be impacted by resource and land access; 2. To examine the multifaceted interplay of LTS, sustainable use conservation restrictions, and climate change within this context. My objectives are therefore to 1. Explore and map the various resources accessible to local communities, including land parcels, work locations, tourism sites, and cultivation areas; 2. To assess the impact conservation objectives on livelihood practices and ability to access resources. I will be answering the following research questions: 1. How do people in the APA perceive access to land and resources in their community? 2. What do local people perceive as benefits and barriers to their livelihoods? 3. How well has the formalisation of the protected area defined who can use the land, what can be used, and what level of use is sustainable?

I have chosen the environmental protection area (APA) Baía Negra in the Pantanal, as my case study. The area highlights the ongoing efforts to balance environmental preservation with the needs of traditional communities, making it a relevant context for exploring the challenges and opportunities in this delicate balance. The complex interplay of various state, federal, and civil actors in the APA are crucial factors in understanding resource access and land. For example, the APA legislation itself is relatively flexible and does not impose strict prohibitions (Presidency of the Republic Civil House, 2000). However, the management plan for the area plays a pivotal role in shaping the actual regulations of the APA and is significantly more restrictive than the legislation.

The TAUS (terms of authorisation for sustainable use) is another layer of land legislation pertaining to the recognition of traditional sustainable livelihood uses of natural resources in

the Pantanal. The determination of what constitutes ‘sustainable use’, and the allocation of TAUS rights, are controlled by the SPU (agency of government tenure rights). This introduces a complex layer of power dynamics, where the state has a substantial role in defining and regulating resource access. The criteria and decision-making processes employed by SPU can greatly influence who gains access to resources and how they are used.

These overlapping regulations, management plans, and legislations creates a dynamic environment in which access to and use of resources are subject to the evolving priorities and interpretations of various actors. It also underscores the importance of understanding these power dynamics and governance structures when examining resource access and LTS within the APA Baía Negra.

4. Methods

This chapter will describe the chosen case study. It will then explain my methods and their significance for addressing my research questions.

4.1. Research Setting

As the world's largest tropical wetland, the Pantanal covers an area of nearly 200,000 square kilometres, extending across Brazil, Bolivia, and Paraguay (WWF, 2023). It is fed by several rivers, including the Paraguay River, which determines the formation and functioning of the wetland. Annual and multi-annual flooding cycles cause water to be retained by the Pantanal’s vast plains during the wet season, and gradually released to the lower sections of the river, effectively moderating its flood amplitudes (Junk & Nunes de Cunha, 2005). This hydrological phenomenon shapes the ecological landscape; 80% of the plains are flooded during the wet season, and most of this water evaporates or returns to the riverbeds during the dry season (Alho & Silva, 2012). Such a dynamic mosaic of ecosystems has rendered the Pantanal Brazil’s lesser-known biodiversity hotspot. The entire basin contains 3,650 different flora species, including aquatic plants, grasses, and various types of trees, sustaining an impressive diversity of fauna,

with nearly 500 bird species, 132 mammal species, 177 reptile species, and 263 fish species (Alho, 2008). These include iconic and culturally significant animals such as the jaguar, giant otter, capybara, and hyacinth macaw.

The APA Baía Negra is found on the banks of the Paraguay River, in the municipality of Ladário in the Pantanal. The area is nearly 6,000 hectares and is home to 25 families. The conservation unit was established in 2010 as a collaboration between the Federal Public Ministry (MPF) and the Secretary of Union Heritage (SPU) (ECOA, 2021). It was designed to 'meet the urgent need to regulate the use and occupation of the territory of APA Baía Negra, in addition to standardising and guiding its management, in order to avoid its environmental degradation... enabling sustainable activities capable of increasing the generation of wealth and income for society in general' (ECOA, 2016).

Ladário initially came into development in 1778, shortly after colonisation, and became a municipality in 1953. The government development program PRODOESTE (program for the development for the central west) was created in the 1970s, with the aim of making agriculture and livestock usable an area of 5,000 ha, which corresponds to the flooding area of the Lagoa Negra sub-basin. This reflected Brazil's political climate at the time, which was focused on increasing the economic productivity of the land (Cunningham, 1976). In 1979, the project was halted due to lack of resources, and because the Codrasa road that runs through the municipality was occupied by squatters, generating several conflicts over land ownership. By the turn of the century, SDGs became more of a priority for the Brazilian government in terms of land management, and thus the Pantanal conservation area was established in 2001 'to foster sustainable development in the Upper Paraguay River Basin, the long-term goal being to employ the area's natural resources in sustainable economic development, human, economic and ecological' (UNEP-WCMC, 2011).

Nine years later, the area in Ladário was targeted as it is part of the transition zone of the Pantanal Biosphere Reserve, leading to the establishment of the APA Baía Negra. These

transition zones are key areas for biodiversity conservation, since they constitute 'ecological corridors' and connect important habitats as strongholds of biodiversity (ECOA, 2016). The APA is under the administration of the Foundation for Environmental and Rural Development of Ladário-MS and stands as the first protected area for sustainable use in the Pantanal, harmonising environmental preservation with the continuity of traditional communities. Currently, it operates with an autonomous deliberative management council, made up of representatives from government, research institutions, community representatives, and NGOs including ECOA (Ecology in Action) – my host organisation. ECOA was established in 1989 with the goal of merging scientific and traditional knowledge to benefit both biodiversity and cultural diversity (ECOA, 2021).

The APA is under the restrictions of another layer of protection: national ownership of the floodplains of the Pantanal, enforced by the federal government (Chiaravalloti *et al*., 2017). However, calls for consideration of the traditional subsistence fishing practices of rural communities in the area resulted in the concession of the TAUS (Term of Authorisation for Sustainable Use). The intended result was to resolve land conflicts and ensure that the communities can continue drawing their livelihoods from the land in a sustainable way. As a result, over 30 Pantanal families which 'maintain a strong link with artisanal fishing' received the concession in 2015 (Ministry of Economy, 2015). There are now around 90 TAUS in the Pantanal, some inside the APA Baía Negra and some outside.

The cultural background of the *riberinhos* (local fishing communities) is diverse and reflects a rich blend of historical, indigenous, and regional influences. Indigenous communities have inhabited the Pantanal region for centuries. Their cultural practices, traditions, and languages have contributed to the region's diversity. The Portuguese colonisation of Brazil introduced European customs, language, and religion to the region, and the history of African slavery in Brazil has also left its mark on the culture of the Pantanal (Silva and Silva 1995). These influences are intertwined with local customs and traditions, creating a unique cultural fusion.

Satellite map depicting the APA Baía Negra's location in Ladário. (ECOA, 2021)

4.2. Data Collection Methods

PRA Mapping: PRA resource mapping acknowledges the local community's intimate knowledge of their surroundings. Collaborative mapping sessions were conducted; participants created sketch maps depicting their area of land, what area of land was covered by their TAUS (if they had one), work locations, tourism activities, and cultivation areas. This method aligns with the objective of understanding resource access. After the mapping sessions, follow-up interviews were conducted to gain deeper insights into the changes over time and the factors impacting resource access. These interviews provided context and narratives to complement the spatial data. The study created seven using groups of 2-3 people. By involving participants in mapping their environment, the method enables a visual representation of the distribution of resources, work sites, tourism spots, and cultivation areas. Furthermore, this method helped to provide a visual representation of spatial relationships. The maps facilitate the identification of

proximities, distances, and patterns, which contribute to a precise understanding of resource access dynamics.

Semi-Structured Interviews: Over the course of two months in the dry season, I visited the community via car with a guide and a translator. I used a voluntary response sampling design to select willing members of the community. As the community is home to only 25 families, my process for sample selection was to approach anyone over the age of 18 who has been living in the APA for more than 6 months. The result was 16 recorded interviews, ranging from thirty minutes to an hour and a half, depending on the length of answers given. Of those interviewed, 9 were male and 7 were female, owing to Questions were administered by my translator, who understood the research questions and objectives and was able to clarify answers. He asked further questions based on information given that was relevant to my research questions. Participants were encouraged to provide their own opinions and experiences to address my research questions regarding local perceptions of resource access and benefits and barriers to rural livelihoods. Through my host organisation, ECOA, I also spoke to a federal prosecutor whom I interviewed in English. This was to gain insight from a national perspective into the protected area's governance and its impact on traditional livelihoods, as well as to better understand the political context of the current tenure system in the APA.

4.3. Data Analysis

I am using thematic analysis for my data to uncover intricate patterns and relationships, allowing me to explore the power dynamics involved in resource access, land tenure, and conservation. This aligns with the poststructuralist ontology of my theoretical framework, drawing from scholarship on access, power, and governmentality. My project encompasses multiple dimensions, including social, economic, ecological, and cultural aspects; thematic analysis can accommodate diverse perspectives, making it conducive to interdisciplinary exploration. The aim of using thematic analysis is to help me identify potential solutions, interventions and policy improvements based on the participant's perspectives and experiences.

Data segments, such as quotes from interviews and specific spatial features from the PRA maps, have been coded. These codes represent meaningful units of data related to land access, factors influencing access, and their impacts on rural livelihoods. Codes have been grouped into preliminary themes based on their shared content and meanings. These themes reflect aspects related to LTS, sustainable use conservation restrictions, and environmental impacts on land access and livelihoods. The identified themes will be discussed through the lens of my theoretical framework, their significance explored, and connections drawn to the factors influencing land access and livelihoods.

4.5. Ethical Considerations and Researcher Role

To ensure that my research methods were ethical, all participants were fully informed of the research objectives, procedures, and right to withdraw their data without consequence. Furthermore, participants' confidentiality has been safeguarded by nondisclosure of identities and personal information to ensure total anonymity, as well as using encryption to store data. I recognise the complex power dynamics, particularly in the context of historically contingent colonialism, poverty, and conflict in Brazil, and strived to create a collaborative and mindful environment that respects local customs by engaging with the local community, its leaders, and associated organisations. My role as the researcher was to capture the perspectives of the local people and this could only be achieved through rapport building, mutual trust, and transparency. Any interview answers that were unclear to me were followed up with the participants to ensure that I was not projecting my own biases or assumptions on the research.

4.6. Limitations

There is potential for sampling bias as those who agreed to participate may not fully represent the entire spectrum of community perspectives. Furthermore, there may be bias from the participants who did agree, as many initially believed that I might provide them with resources they wanted or speak to organisations and leaders who could. Therefore, they may have misrepresented some information. To mitigate these biases, I visited all houses multiple times

at different times of day if I initially was unable to contact a person who was at work. By building rapport in the community, some people who initially had no interest in speaking to me then approached me to be involved. I did this by spending time at the communal centre to engage with people outside of the context of my study and share coffee and cold drinks with community residents. An extended stay within the community also made my intentions clear over time and allowed people to understand my objectives.

The PRA sketch and resource mapping also posed some limitations, as many members of the community were not familiar with cartography and felt unconfident in drawing accurate maps. Some people simply drew pictures of their house and not a map of the whole area, and others refused altogether, opting to just answer the question section of the PRA exercise. However, reassurance that their maps did not need to be accurate and were based on perception alone did help in some cases, as well as presenting a printed satellite map to inspire their drawings. The result was fewer maps than interviews, but the data collected from them has nonetheless contributed to my thematic analysis.

5. The Diversity of Livelihood Strategies and Challenges Faced

The implementation of the protected area management plan in APA Baía Negra has brought about notable changes in people's access rights and land use practices. These restrictions, which include measures like fencing, limitations on non-traditional fishing, control of tourism activities, and regulations against littering and fires, were primarily designed to conserve the rich ecological diversity of the region. While they serve important conservation objectives, they have also introduced new limitations on activities that have been integral to the livelihoods for generations.

5.1. Resource Mapping

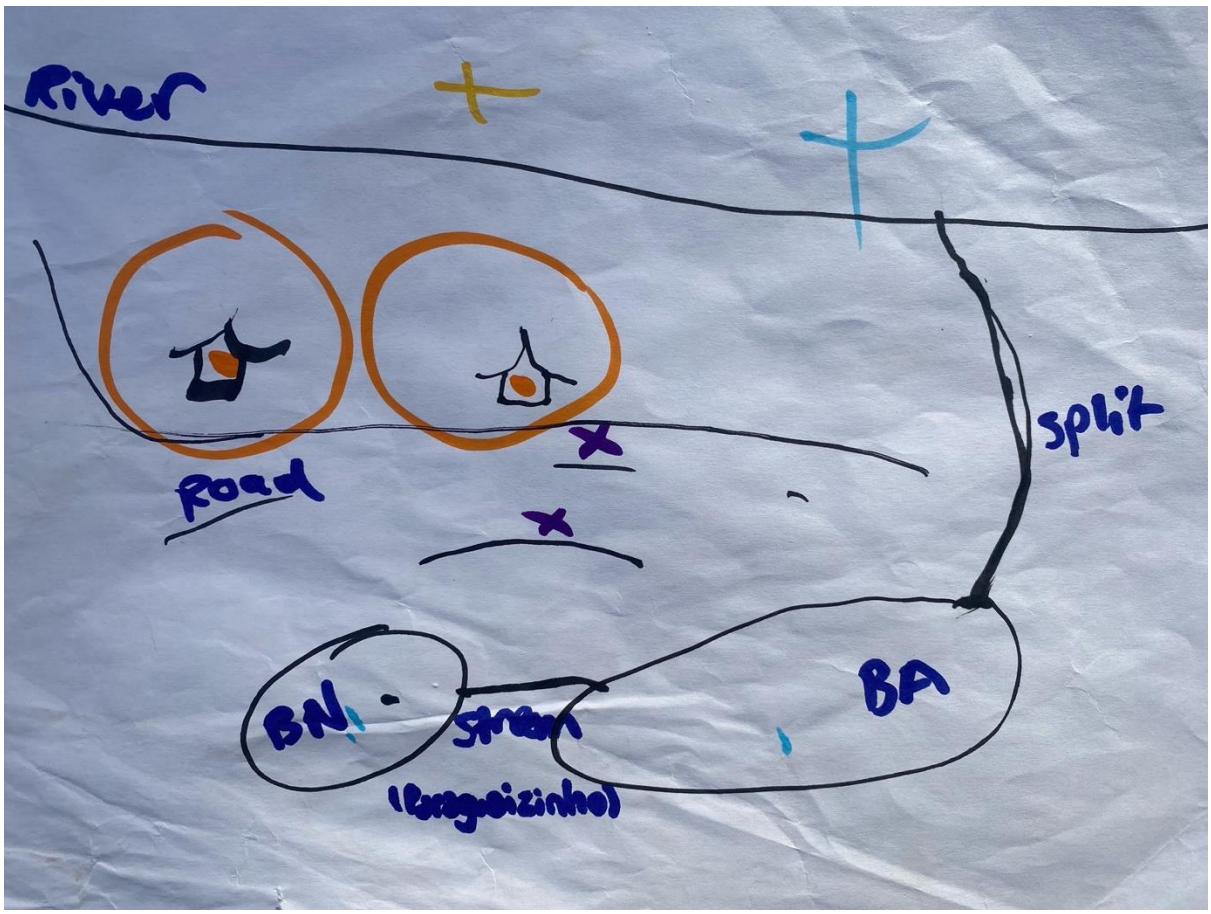
This section explains which resources are important, how they are used, and the restrictions which prevent access, as depicted through the mapping process.

River and Bays: Participants acknowledged two traditional fishing practices specific to the area: artisanal subsistence fishing to gather mainly pintado, pacu, and piranhas in the river Paraguay, and bait fishing in the two main bays: Negra and Arrozal. The river is on one side of the road which extends through the middle of the APA community, behind residential housing, whereas the bays are behind the housing on the other side of the road. The river and bays were mostly depicted as proportionally large and as the focal points of the maps, suggesting they are perceived to be the most significant areas of the community. The river was also marked as a resource for tourism, as boats are hired out by residents to tourists who fish and enjoy the natural surroundings.

Road: The road which runs all the way through the protected area was depicted in the centre of the maps, separating two rows of houses with the river on one side of the road and the bays on the other side. This road is the only method of transportation in and out of the APA and is therefore also important for livelihoods which take place in the city, accessing resources which are not available in the community, and for tourists visiting the area.

Ownership: The maps showed the houses of the residents and their area of ownership. Some depicted the TAUS as encompassing a section of the river where they are permitted to fish, whilst others encircled their own house and an area of land around it. This showed different perceptions about the area of legal access that participants had and suggested that land rights are unclear. Participants indicate on the map that regardless of proximity and property, residents can access any area of the river and bays. This is because there are communal agreements that permit fishing along the rivers and bays, irrespective of individual property boundaries.

Vegetation: Participants marked areas on which they have access to crops which they cultivate. They showed the areas where they grew lemon (many variations), graviola, acerola, orange, cashew (three species), onions, coriander, peppers, chives, parsley, cabbage, lettuce, spices, cassava, pumpkins, and squashes.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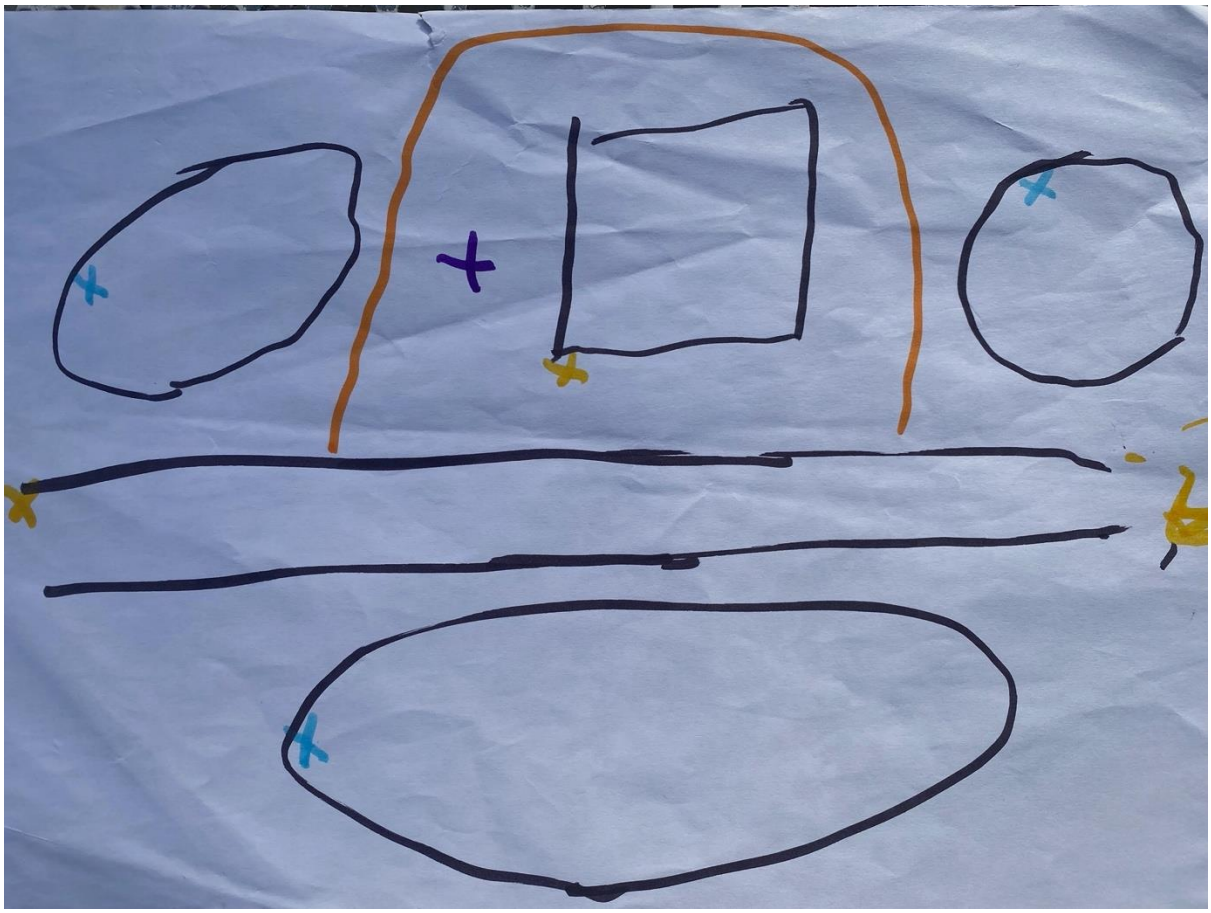

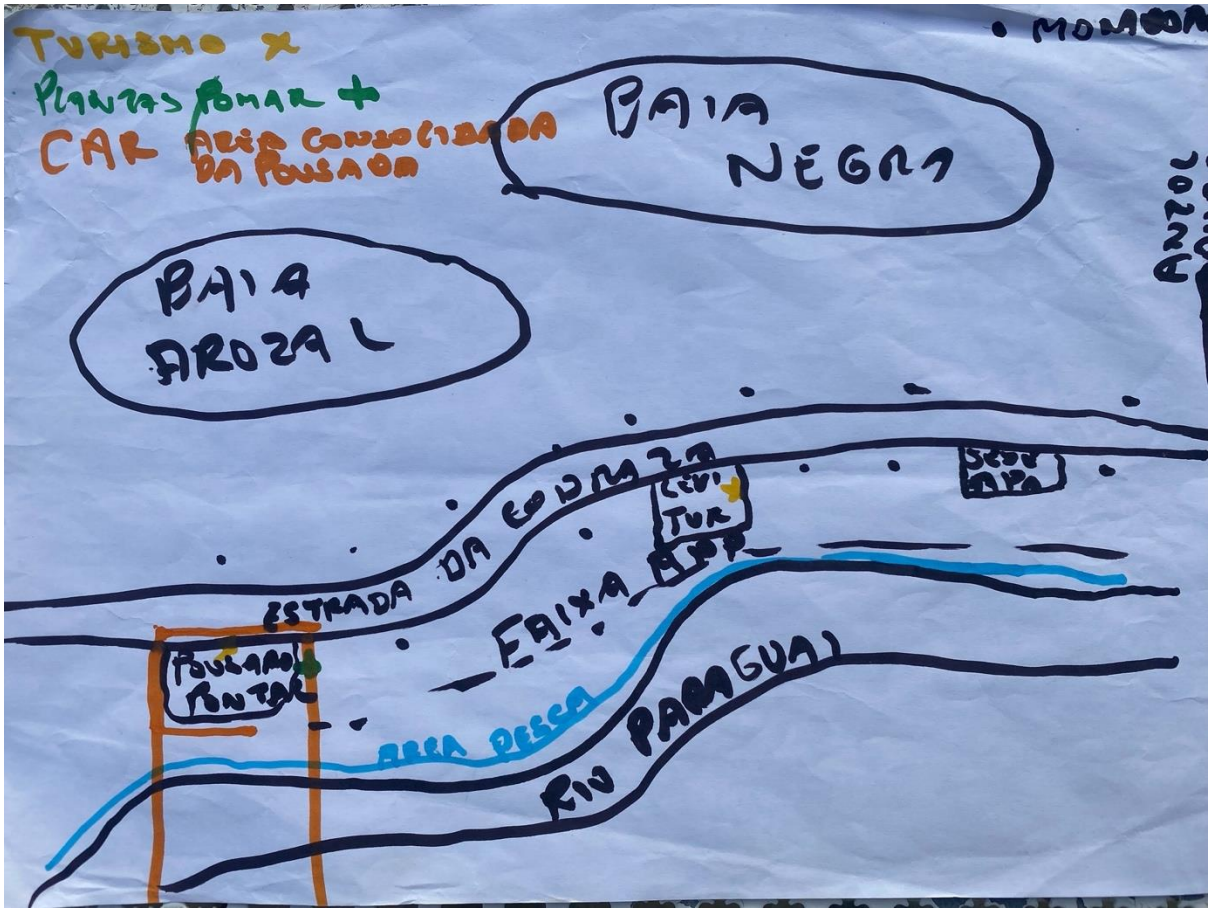
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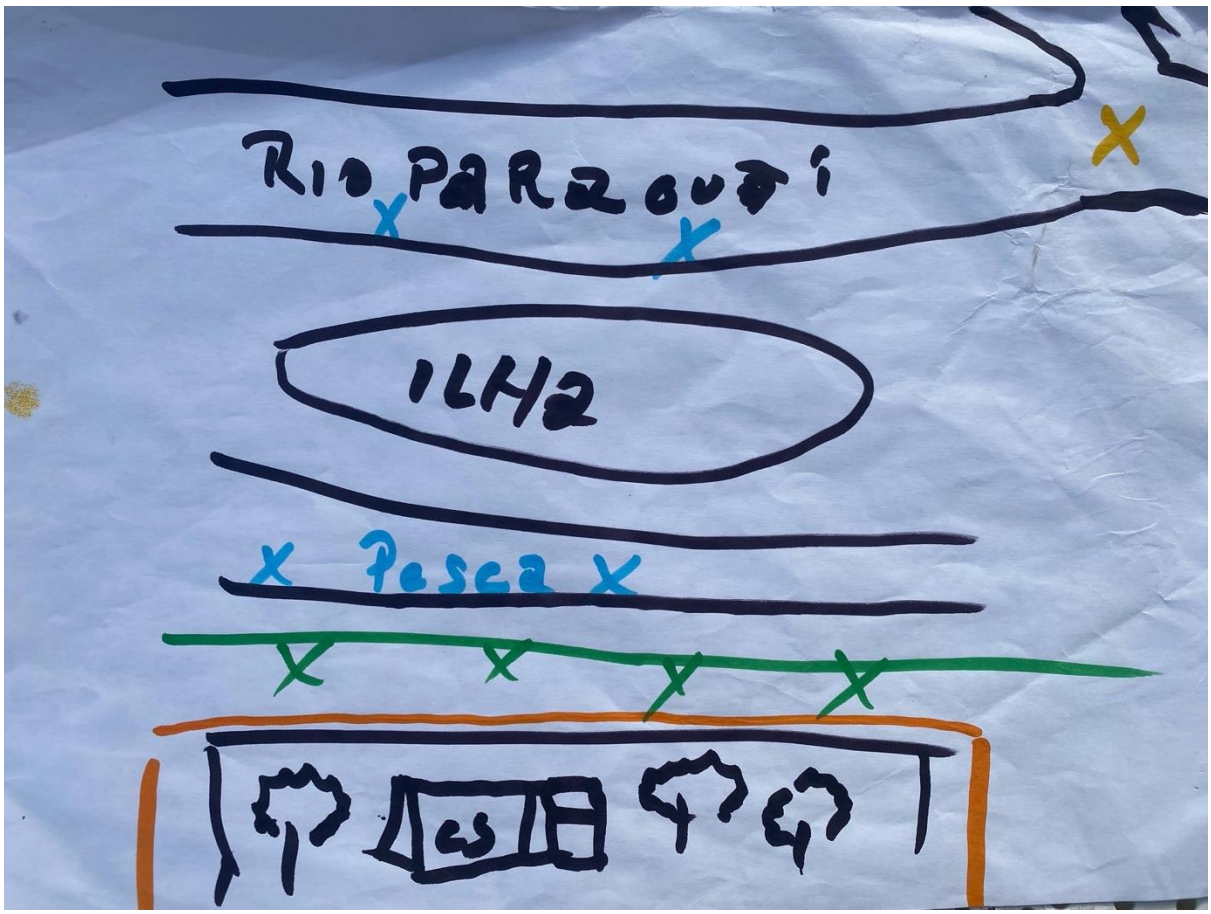

Key:

Blue = fishing areas

Green = Agricultural areas

Orange = Ownership

Yellow = Tourism

5.2. Semi Structured Interviews

The interviews revealed diverse livelihood strategies which extend beyond fishing and suggested that livelihood practices have changed considerably over time. The results are structured into the five main livelihood strategies (fishing, small-scale agriculture, homemade products, tourism, and wage labour), which are presented through the participants perceptions of their associated disruptions, struggles, and desires.

5.2.1. Fishing

The river dweller's perception of fishing in the sustainable use protected area presents a paradoxical narrative. On one hand, they acknowledge fishing as the primary livelihood activity, deeply intertwined with their cultural heritage and identity. For example, one participant states: 'There are a lot of old fishermen like me, who have lived their whole lives by the river; I will never leave this place'. Another explains, 'the river gives us small catches to make casserole, sometimes we have bigger catches which we sell in the city'.

The community's perception of fishing as the main livelihood is counterbalanced by a realisation that the economic feasibility of fishing has dwindled over time. The participants point out that making a living solely from fishing is increasingly challenging. They note a decline in fish populations: 'There were days when people used to go to Bracinho [a Paraguay River split] and quickly caught fish. A hundred piranhas. Now you spend the whole day there, catching four, that's a lot', meaning that they can no longer afford to sustain themselves from fishing alone: 'Here I don't even get a minimum wage a month with fish. There are no more fish'. They also express the younger generation's decreasing interest in pursuing this occupation: 'Nowadays you don't see fishermen anymore. The children of the old [fishermen] are already dropping out'.

Extreme weather has disrupted the long-standing fishing traditions of the community, creating a barrier for livelihoods. Following the wildfires in 2020, droughts and flood-related phenomena have reduced fish populations, eroding the financial stability that fishing once provided to residents. Participants acknowledge a negative change in access to resources over time, resulting in increased poverty: 'before the fires, fishing helped us a lot. It was good money for us. It was enough to make some investments in our houses'.

Participants explained that fish loss was caused by the occurrence of a 'dequada' after the fires – a drought which resulted in water quality issues, as organic matter from the newly flooded areas enters the river, depleting oxygen levels and causing high rates of fish mortality. The environmental disruptions have also altered the timing and availability of fish. Fishermen

describe changes in the timing of fishing activities and the need to wait longer to catch fish due to altered river conditions: ‘At this time the river was supposed to be receding. And in a few days, it will still be filling up. Nowadays everything has changed’. As a result, traditional fishing grounds have been lost, such as bays and river entrances, which have been affected by the altered flow of water, forcing fishermen to explore new areas or adapt their traditional fishing techniques.

The community’s connection to the protected area and therefore their land tenure security (LTS) relies on the continuation of their traditional fishing practices. Only those with possession of the TAUS document can make full use of the land; it is granted based on the recognition of their sustainable livelihoods in the area, allowing residents to build and maintain their homes. With the drop in fish stocks, this traditional connection to the land is rendered precarious. As such, residents within the protected area perceive their land rights to be insecure.

This unease stems from the reality that the land they inhabit doesn't belong to them; rather, it is the property of the federal government, specifically the Union: ‘Land tenure is actually a use of.... it's not even possession... “occupation use”, or something like that. You live there, but you don't own it. If the Union decides, they ask for the land you are on. So you don't feel like you own what you have here’. This uncertain land tenure arrangement means that residents, despite having authorisation to live and engage in certain activities within the area, are essentially occupants rather than owners of the land: ‘If they come to say: "get out of here", I have to leave. Because it is their land, it belongs to the Union. You can't touch it. Do you wanna go against "these guys"? I doubt it! It is the law’.

5.2.2. Small-Scale Agriculture

In response to the diminishing reliability of fishing as a primary livelihood, people in the APA have increasingly turned to small-scale agriculture as a means of subsistence. While residents may have traditional and customary practices of farming certain areas, formal land tenure documents often do not reflect these rights. For example, the TAUS concession primarily

focuses on fishing as the main form of resource extraction, and may not adequately address agricultural activities.

One participant explains that ‘Now we are experiencing a dequada, so we don't have fish. Because of the lack of oxygen in the water. So people are living from agriculture’. This shift reflects a pragmatic adaptation to the challenges posed by fluctuating fish populations and environmental variations, and a change in the type of resources residents are extracting for their livelihoods. Community members are diversifying their sources of sustenance to ensure they can feed themselves: ‘we plant many different crops so that we can cover everything to eat’, but also for greater income stability: ‘when I planted a lot of cassava around here, I take it to the city and sell it by the kilo, from house to house, and then to the grocery store by bike’. While residents have the right to stay, cultivate, and safeguard their immediate surroundings, they acknowledge that the land ultimately belongs to the Union. This nuanced land tenure arrangement presents both opportunities and challenges. Residents can cultivate their designated areas, but any alterations or expansions require official licenses, adding complexity to land use.

The protected area imposes restrictions on land access: residents are prohibited from cutting down trees, fencing in certain places, starting fires, leaving rubbish, and killing pests. The participants' accounts illustrate the negative impact of pests, such as agoutis, capybaras, geese, and queixadas (white-lipped peccaries), on their agricultural livelihoods, and there is a clear desire for support or supplies to safeguard their crops. These animals are described as voracious consumers, posing a threat to crops like cassava, pumpkins, and any vegetation close to the ground: ‘The only thing they couldn't save are the mandioca plants that I plant here, because of the agoutis. Here we a lot of them. Just a few minutes and they tear off everything. Even the stalk’. The presence of these pests has discouraged some residents from planting certain crops due to the perceived futility of their efforts: ‘I can't plant pumpkin because it's wasted work, so

here I plant sugar cane because this kind of tall plants they could not make it. I sell the cane: to the city, to make juice...then I sell it'.

5.2.3. Homemade Products

Women in the protected area use the crops they grow and some products from the city to create various homemade products, particularly rapadura (a type of solid, unrefined cane sugar), sweets, jams, and chipa (baked rolls made with cheese). These products are sold in the community and in Corumbá, serving as an additional source of income for their households. However, sellers explain that although they sell more in the city, they spend more to get there: 'I have a place to sell them in Corumbá, but it's 50 reais for the car to transport. And there are other things to add, so... it's very expensive. I prefer to sell to our own people, who want to try it. Then they tell everyone'. The participants made it clear that residents cannot subsist on the products they sell alone, but they increase this activity when there is reduced fish availability: 'I go to the city, sell products, and bring things that my kids need. So I don't keep waiting. Is the fish bad? I go for the candy. Do I have cane? I can make sugarcane juice, or molasses.'

The wildfires were also discussed in relation to these homemade products. The ability to make certain products using native species, such as laranjinha and papaya, was impacted when these crops were destroyed by the burning. The absence of these resources made it necessary for residents to travel to areas unaffected by the fires: 'to get laranjinhas, my brother bought four litres of gasoline to go where there are some. But they were very damaged. You have to go far away, to places that still have them. The burning was very impactful for the environment and for us, it was terrible. It affected my livelihood'. The loss of access to native species residents to explore different forms of labour, such as house cleaning or manual labour when opportunities arose: 'The burning affected the fruit plantation, so there is no way for us to harvest. So I have to manage in another way: forget about the candy. Then you either have to clean other people's houses, or do men's work [manual labour], when it's available'. As such,

the fires forced women to adapt their livelihood strategies in the face of extreme weather which created numerous challenges for their ability to access resources within the community.

5.2.4. Tourism

Tourism has emerged as a key source of income within the community, albeit in an informal and sometimes contentious manner. The participants express a desire for formal regularisation and government licensing to legitimise their tourism activities. They are aware of the need to diversify livelihoods in the face of increasingly precarious seasonal changes, but their uncertain land rights restrict their ability to adapt.

Residents have independently ventured into community-based tourism, recognising the potential of their surroundings to attract visitors: ‘people come from the city, bring a grill, bring chairs, make a fire, have a barbecue, gather everything and leave’. In return, some residents charge a fee to use the land and to clean up after the tourists. Despite their entrepreneurial efforts, the lack of formal recognition and support from authorities has created challenges for these community tourism endeavours. People wanting to engage in tourism as a livelihood are faced with regulatory hurdles. For example, residents are ‘prohibited from creating fires within the reserve’, as one participant explains, ‘when it's fire season, with even a little smoke, PREVFOGO [National System for Preventing and Combating Forest Fires] goes mad. It is not very easy to work here’.

Even without fires, promoting tourism in the area is illegal. One participant explains, ‘they say that my activity is illegal, but nobody here helps me to straighten it up, to get a license from the government. It’s too complicated to do on my own.’ While meetings and discussions about community tourism have occurred, residents feel that concrete actions to facilitate and promote their initiatives are lacking: ‘Here there has been a lot of talk about community tourism. But I only see the meetings. We say we want help, and nothing happens.’ They contend that by allowing tourism to flourish, the protected area could harness a valuable and sustainable resource, aligning with the principles of eco-tourism to benefit both livelihoods and biodiversity

conservation. For example, one resident explains, ‘if they left this riverfront free, it would attract many people. Even people from the environmental area, who would leverage tourism. Because nothing is done without resources! And they simply forbid all the resources that could come to this area. Today the strongest resource that exists in a region is tourism. Sustainable tourism’. However, the gap between aspirations and regulatory realities continues to pose challenges for tourism as a livelihood practice in the APA.

Like many livelihood strategies in the Pantanal, tourism also relies on certain environmental factors to be viable. Participants complain of the increased number of mosquitos in recent years, with many claiming they have doubled in quantity. As a result, tourists are less likely to want to visit the APA, hindering local livelihoods. One resident explains that ‘during the rainy season, which lasts from October to June, when the weeds grow, a lot of mosquitoes start to swarm, because there are a lot of mosquitoes here. And then the movement [of visitors] around here already stops. Then it is very difficult’. When the mosquitoes are at their worst, people do not want to spend any time outdoors: ‘even us here, if we had the time, we would have to talk indoors, under the screens’.

5.2.5. Wage Labour

As fish sales no longer suffice to cover their expenses, individuals are increasingly migrating to the city to secure daily wage employment. This shift also represents a pragmatic adaptation to loss of access to resources. As one participant explains, ‘fish no longer pay the bills, so people who aren’t able to make enough from selling the fish go to the city to get a daily wage’. For many of the residents in the APA, their only profitable skill is from fishing, but they have seen a loss in fish stocks over the years and therefore must resort to unskilled labour: ‘when the fish gets bad, they have a hard time, because they don't have a monthly income. For many who are not retired, here is bad. Then they have to do a little work in the city’. The city offers alternative occupations such as bricklaying, hedge cutting, and taxi driving: ‘I worked as a bricklayer,

painter, and everything. I lived only in the woods. When I go to the city, it is just for two or three days, then I come back from there'.

However, residents explain that leaving for long periods of time results in loss of land rights in the area. This practice has led to the creation of a waiting list of individuals seeking recognition. They complain that filling out forms, obtaining documents, and engaging with the legal system are complex processes which many residents struggle to comprehend: 'My son left years ago for work in Campo Grande so he lost his document. It was very complicated to get another one. He's still waiting for the union to approve him.'

While the potential for higher wages in Corumbá may attract some, many still hold a deep attachment to the protected area and its natural surroundings. This distinction is age related: the older fishermen remain in the area, and their children leave for better prospects. Those who have lived in the APA for many years have no desire to leave: 'We are autonomous. We don't need the city; we are self-sustainable. We just need to go to the market'. Many participants expressed a preference for the tranquillity offered by their environment. For them, the protected area remains a haven, despite increasing pressures on livelihood strategies and the economic pressures pushing them toward urban employment. For example, one resident states, 'My thing is the woods: the woods! I don't care about the city! This is paradise for me'. Another explains, 'I don't like the city. The city has too much going on'. These statements express a deeply rooted connection to the protected area, the river, and their identity as fishermen.

5.3. A Federal Perspective

Through interviewing a federal prosecutor, I gained insight into the background of the APA Baía Negra. The discussion revealed the complexities of LTS and conservation objectives in the protected area, and their impact on livelihoods.

The federal prosecution has the power to prosecute to ensure the respect of federal Brazilian law, and agreements which Brazil instates. As the participant explains, 'the most important law

we have jurisdiction over is traditional and indigenous people, called 169' (C169 Indigenous and Tribal Peoples Convention, 1989). The participant explained that community needs must 'always be prioritised by the standard of the law, they have the right to be consulted', as according to the aforementioned convention. Any decision that is not previously consulted by traditional communities are completely null and void, 'but we know that this is not always what happens, they are not always consulted'. This is because 'environmental tendencies change with the government. Protecting environmental and community rights is a new agenda of the current government, so it is a hope to take advantage of the political moment to enact new social and environmental plans'.

They emphasise the need for a delicate balance between conservation and the well-being of the traditional community. While the term 'traditional' is used to describe these communities, it is elucidated that they share a deep connection with indigenous heritage, primarily descending from groups such as the Guató, Bororo, Kadiweu, Terena, and Kinikinau. The notion of 'traditional' in this context is not solely defined by the duration of residence in the area: 'we are talking about traditional people; they are not indigenous to that spot, but they are indigenous to the Pantanal's way of being'. This is characterised by an intricate understanding of the region's environmental dynamics, particularly the impact of the river's flooding. They explain that 'even with landowners, it's really rare that you see a farm being sold to someone who isn't from the area because it's complicated to understand the flood and how it impacts on the land'. The prosecutor places a significant focus on the relationship between traditional and indigenous communities and protected lands. They assert that federal environmental protection and the protection of traditional communities supersede constitutional considerations, emphasising the priority of human rights in this context.

The prosecutor explained that the TAUS has come to be an important symbol of security by the people. It offers them a sense of legitimacy and recognition within the legal framework to use federally owned floodplains. However, they stated that the TAUS would be better served as a

collective document rather than an individual one: ‘the TAUS needs to become collective to give more freedom so that the title can be related to the community, not people or houses individually. Then people in the community would decide who gets to live in the community, and therefore who is recognised as traditional’. Residents would still have to comply with the rules of the TAUS, but it would more closely resemble their customary arrangements which facilitate their traditional livelihoods.

The participant explained that there is a lot of bureaucracy involved in making changes to documentation, and the federal prosecution office lacks formal documents indicating the community's desire for a collective TAUS, ‘and therefore if someone takes them to court against the collective TAUS, they do not have a document proving they have consulted the community... We have lost the ability to understand if the decision is being made collectively or not’.

6. Analysing Livelihood Practices through the Theory of Access

The following section analyses four themes which emerged from the interviews and mapping: ‘restrictions and rules’, ‘right and arrangements’, and ‘identity, adaptability, and ecological knowledge’. These themes are analysed through the framework of the Theory of Access (TA) to answer the following questions: 1. How do people in the APA perceive their access to resources in their community? 2. What do local people perceive as benefits and barriers to their livelihoods? 3. How well has the formalisation of the protected area defined who can use the land, what can be used, and what level of use is sustainable?

6.1. Rights and Arrangements

Summary: In the APA Baía Negra, the perception of resource access is shaped by a multifaceted interplay of formal legal rights, customary practices, and evolving political dynamics. While the TAUS concession formalises land use rights, it has created some uncertainty regarding specific access areas and LTS. Community members, often with limited education, are learning

about their rights within this formalised system, which poses challenges to effective negotiation and participation in decision-making processes. The bureaucratic complexity of engaging with government institutions or legal processes further disadvantages rural communities from understanding their access and land use rights. This dynamic intersects with evolving conservation objectives and power dynamics, influencing residents' perceptions of LTS and livelihoods.

The TAUS Concession, as a formalised arrangement, presents both benefits and challenges to residents' livelihoods. On paper, the TAUS document provides a structured framework for resource access, ensuring that specific areas remain accessible for pre-determined traditional livelihood activities. The formalisation process has indeed delineated the boundaries and regulations for resource use within the protected area, which are designed to ensure the sustainability of their livelihoods (ECOA, 2016). Such clarity around land rights has the potential to empower residents to engage in sustainable resource management, enhancing their land tenure and economic security.

However, the interviews and mapping unexpectedly revealed a lack of clarity regarding the specific areas where the *riberinhos* have the right to use and access resources, and there persists a sense of uncertainty regarding their land tenure. The ultimate ownership structure and the potential for land reclamation by external authorities continue to influence the community's perception of their LTS. Community members do not possess legal ownership of the land upon which they reside; while they may have formal recognition to utilise and access certain areas within the protected zone, the ultimate ownership and control of the land is in the hands of state and federal entities.

Perceptions around LTS are thus shaped by the residents' efforts to comprehend their rights within a formalised context. Residents are in the process of learning about their rights and responsibilities within the formalised system, but, as Holland and Diop explain, they 'are doing so from a position of less familiarity with legal systems, lower levels of education, and limited

capacity to negotiate effectively' (Holland & Diop, 2022, p. 238). This presents numerous livelihood challenges; for example, most residents have limited education, expressed the difficulties in comprehending the intricacies of land tenure formalities and legal documents such as the TAUS. As posited by the TA framework, knowledge is an important mechanism for access. This lack of comprehension can result in unintentional violations of regulations, potentially leading to disputes and resource access issues (Patel, 2013).

Furthermore, when government agencies or NGOs organise community meetings and consultations related to resource management or conservation efforts, individuals with limited education may find it challenging to actively participate. The interviews revealed that participants struggle to express their concerns, which affects their ability to negotiate effectively for their rights, or provide input into decision-making processes. As a result, their perspectives and livelihood needs may not be adequately considered, impacting their access to resources. As Li (2007) explains, development agendas and governance mechanisms shape access dynamics. She contends that government-led interventions and calculated development programs have the power to influence not only landscapes and livelihoods but also the identities of local communities. This perspective underscores that access is intricately linked to broader processes of power and change. The difficulty in active participation can be seen as a manifestation of the power dynamics highlighted by Li, where government-led interventions shape access to resources. When individuals cannot effectively negotiate for their rights or provide input into decision-making processes due to their limited educational backgrounds, their perspectives and livelihood needs may not receive adequate consideration. As a result, their access to resources becomes compromised, demonstrating the tangible impact of broader development and governance agendas on local communities.

Engaging with government institutions or legal processes often requires the ability to navigate bureaucratic interventions. As Fairbairn explains, these processes mainly benefit bureaucratic administrators, who are 'able to manipulate the allocation of land in pursuit of private interests',

and the political elites who are ‘aided by a politicised land allocation process’ (Fairbairn, 2013, p. 346). Residents with lower levels of education expressed difficulty filling out forms, providing required documentation, or adhering to specific regulations. Misinterpretation of rights or failure to engage effectively within the formal legal system with which they struggle to engage may put community members at risk of legal challenges or displacement, disrupting their livelihoods. This dynamic not only hinders efficient decision-making but also adds unnecessary complexities and delays to the process, disadvantaging rural communities seeking access to land.

For example, the process to receive the TAUS concession involves considerable bureaucracy. When individuals move away from the community and later wish to return, they must navigate document-filling and a lengthy waiting list, creating uncertainty and hindering their ability to access and use the land that was once their home. Children wanting to move into their parents' houses also face these bureaucratic hurdles, intensifying livelihood challenges posed by unpredictable weather, as more people move away for periods of time to search for work. This underscores the link between climate change, LTS, and livelihood security; as the IPCC sixth assessment report states, ‘Climate change is likely to force economic transitions among the poorest groups, accelerating the switch from agriculture to other forms of wage labour, with implications for labour migration and urbanisation’, with the prediction that this would result in the number of people living in extreme poverty across the globe increasing by 22 million by 2030 (Birkmann *et al*. 2022, p. 1174).

These scenarios highlight the need for a comprehensive and inclusive approach to land tenure that addresses not only formal recognition but also communal property dynamics that shape the lived experiences of the *riberinhos* in the APA. Peluso and Ribot's (2003) understanding of law as a mechanism of access demonstrates that the legal framework governing resource access is more than just a set of rules; it also reflects complex social relationships and power dynamics.

It emphasises that while legal formalisation can provide a framework for resource management, it may not always align with the community's perceptions of access and LTS.

The interviews and mapping also revealed that the TAUS does not reflect the customary arrangements in the APA which allow residents to have communal access to resources. As Sauls explains, according to customary arrangements, ‘the ways in which people gain access are mediated through often unwritten protocols and practices that set criteria for membership and status in the territorial’ (Sauls, 2022, p. 60). These arrangements facilitate shared use and access to common pool resources, such as rivers and bays, even when they are situated on another resident's property. These long-standing practices not only facilitate shared access but also foster a sense of community and cooperation (Shlaeger, 2002). The ability to navigate customary systems for resource access can be a lifeline for residents, especially during seasonally challenging times.

As such, individualised approaches to formalisation within rural-poor communities creates challenges for livelihoods, inhibiting the fluidity of land use within the community, and failing to capture the web of interests between community members and conservation goals (Meinzen-Dick & Mwangi, 2009). It also restricts the community's ability to collectively manage and make decisions about land tenure. These challenges highlight a critical opportunity for improvement in the TAUS system. Shifting towards a more communal application would empower local people and enhance their LTS, thus benefiting their livelihoods.

Collective property rights have the potential to empower rural communities such as the APA, in which residents are deeply connected to the land and share a common way of life. The idea of shifting to communal models of land tenure and resource access for traditional communities reflects a broader trend seen in various indigenous and traditional communities worldwide. As Benda-Beckmann and Benda-Beckman note, ‘the concept of ethnicity as integral to natural political boundaries has resurfaced in current debates about aboriginal self-governance, often with collective property rights replacing territory as the foundation for group identities’ (von

Benda-Beckman, von Benda-Beckman & Wiber, 2006). In this sense, rather than territorial boundaries defining group identities, it is the collective property rights, the shared access and management of resources, that form the foundation for their identity.

This perspective aligns with the principles of common property, where resources are collectively owned and managed by a community, reflecting their shared identity and traditional way of life. Ostrom's theories on common pool resources and access arrangements offer valuable insights in this context. Ostrom's (1990) work emphasises the importance of *de jure* rights reflecting the communal *de facto* rules of the community. Applying this framework, transitioning to communal TAUS agreements would continue to apply the principles of sustainable resource management, while placing greater decision-making power into the hands of the local community, allowing them to collectively manage their traditional lands, securing their land tenure and therefore safeguarding their livelihoods.

The varying perceptions regarding the TAUS Concession reflect the complexity of structured rights in the context of changing political power dynamics and culture (Sjaastad & Cousins, 2009). The interviews demonstrated that residents' experiences and views are not static but shaped by broader shifts in government priorities and policies. As government administrations change, so do the goals and strategies for protected areas. What may have once been a primary focus on conservation could shift towards economic development, infrastructure projects, or social objectives. Such evolving conservation objectives result in changing land tenure regulations, resource management practices, and the level of community involvement in decision-making. For the residents, these shifts can create a sense of uncertainty and variability in how they perceive their LTS.

As top-down biodiversity conservation has been the prevailing agenda, residents have perceived more stringent regulations and restrictions as a threat to their livelihoods (Inogwabimi, 2020). However, with the increasing focus on SDGs (sustainable development goals) and community participation, residents view these changes as opportunities for improved

security and sustainable livelihoods. This dynamic relationship between evolving conservation objectives and residents' perceptions underscores the importance of recognising the historical context and power dynamics at play. Consequently, to foster more stable LTS and livelihoods, it is crucial for policies and regulations to be adaptive and responsive to changing circumstances while considering the perspectives and needs of the communities residing within protected areas (IUCN, 2020).

As such, an important consideration in this study is the inherent limitation of capturing a moment in time of evolving perceptions within APA Baia Negra. Residents' views and experiences are subject to changes in conservation objectives, governmental priorities, and broader societal shifts. This study provides valuable insights into the current perceptions and challenges faced by the community. However, conservation objectives and governmental priorities can shift over time, reflecting changing power dynamics within society and the state. Governmentality is not a fixed or unchanging framework but rather a dynamic concept that evolves in response to historical, political, economic, and social changes (Foucault, 2010). Different historical periods and contexts can give rise to distinct forms of governmentality as governments adapt to new challenges and circumstances.

As these dynamics evolve, the ways in which residents perceive their LTS and livelihoods are likely to change as well. Future research could consider longitudinal approaches to track changes in perceptions and livelihood strategies over time, providing a more nuanced understanding of the dynamics at play within protected areas like APA Baia Negra. Such research would contribute to a more comprehensive understanding of the complex interplay between conservation policies, power dynamics, and community livelihoods.

6.2. Restrictions and Rules

Summary: In the APA Baía Negra, a mosaic of rules and restrictions governs the access to and use of its rich natural resources. Designed primarily for environmental conservation, they pose both benefits and barriers to their livelihoods. Overall, the community's perceptions highlight

the need for an adjustable regulatory system that accommodates changing dynamics and empowers local communities in decision-making processes.

Beyond the TAUS, which grants resource access, there are additional regulatory layers which limit access, imposed and maintained by external actors such as federal and state agencies (for example, IBAMA, PREVFOGO, MMA etc.), and NGOs (ECOA). These restrictions aiming to preserve the Pantanal's ecosystems and biodiversity include rules prohibiting fires, cattle farming, tourism promotion, fencing off areas of property, and eliminating pests. Participants highlighted how regulations occasionally clash with their customary practices, underlining the challenge of reconciling conservation imperatives with the needs of the local population, as reflected in the present literature surrounding conservation (Woodhouse *et al*., 2022; Martin *et al*., 2015). Foucault's notion that 'action and intention often produce unintended consequences' (West, 2006, p. 186) finds resonance in the context of the protected area, where rules and restrictions designed for environmental conservation lead to unforeseen barriers to livelihoods. The interviews reveal that such restrictions, coupled with increasingly unpredictable weather, significantly narrow the ability of community members to access and make efficient use of resources, negatively impacting livelihoods.

As posited in my TA theoretical framework, there are those who control who has access to resources, and those who maintain access through those in control, and analysing this dynamic creates an understanding of 'why some people or institutions benefit from resources, whether or not they have rights to them' (Peluso & Ribot, 2003, p. 154). Control over the environmental narrative serves as a mechanism of access control, which can inadvertently prioritise conservation goals over community livelihoods. Such narratives of development and protection perpetuate biocentrism, having the potential to 'silence the voices of local populations, the very people who stand to gain or lose the most from current efforts to conserve the Pantanal and its natural resources. They are tools that powerful stakeholders employ to advance their own agendas' (Kauffman, 2015, p. 306).

This interplay between restricted access and livelihood aspirations is closely tied to the concept of environmentality. The governing of the APA is pluralised, involving numerous state and non-state actors overseeing environmental conduct (Cepek, 2011, p. 503) These actors have power over the discourse around sustainability, implementing restrictions which legitimise some practices and ban or overlook others, thus narrowing the scope for the community to engage in their traditional practices. As Arts *et al*. explain, this is because 'the Pantanal is primarily regarded and approached as a biodiverse ecosystem rather than a bioculturally diverse ecosystem' (Arts *et al*., 2018, p. 16). Such an understanding reinforces the dichotomy between nature and culture, presenting the needs of traditional communities in opposition to the needs of the Pantanal's ecosystem. They argue instead that traditional communities are central to overcoming environmental degradation, with community-led activities such as ecotourism being an essential conservation solution.

Indeed, the interviews and mapping revealed the potential for an alternative, community-led conservation paradigm. Community members perceived ecotourism as not only a means of expanding and diversifying their livelihoods but also a way of showcasing the beauty and ecological significance of the Pantanal. They view themselves environmentally responsible, cleaning up after tourists and advocating for sustainable practices. In this sense, tourism presents an empowering opportunity for community members to reaffirm their identity as *riberinhos,* because it allows them to share their traditional practices with outsiders. It is the consensus of contemporary social scientists that ecotourism can have positive impacts for community development and for conservation goals. Examples across Latin America, Ghana, and Indonesia have demonstrated the importance of involving traditional rural communities and prioritising their culture and practices in tourism activities to achieve greater biodiversity protection and ensure secure livelihoods (Adon, 2019; Mader, 2010; Nugroho *et al*., 2016).

Yet aspirations for diversifying livelihoods are met with bureaucratic hurdles and regulatory constraints. Meetings and discussions regarding the formalisation of community tourism do

occur, yet concrete actions to support these initiatives remain elusive. As it stands, community-based tourism ventures in the Pantanal operate in a somewhat informal and unregulated manner, which can lead to challenges such as uncontrolled fires, over-fishing and littering (Alho, 2011). With official recognition, there could be established support and standards for responsible and sustainable tourism practices. This would not only mitigate environmental risks like fires but also ensure that tourism aligns with community-led principles of conservation and sustainability (Maikhuri *et al*. 2000). Moreover, the legitimisation of tourism could open the door to much-needed support and resources from public authorities. Government agencies and NGOs, which currently hesitate to provide assistance due to the informal status of these activities, might be more willing to offer support once the ventures are officially recognised. This support could range from financial assistance and capacity-building programs to help with marketing and infrastructure development.

Formalisation of tourism in the protected area has the potential to transform it from an informal and occasionally contentious livelihood strategy into a regulated, sustainable, and supported sector. This would serve to broaden the definition of sustainability to greater encompass *riberinho* perspectives and knowledge. As Sillitoe (2004) acknowledges, emerging definitions of sustainability respect and integrate local knowledge, which in turn legitimises the presence of local communities protected areas. This expanded understanding of sustainability not only benefits the community in terms of livelihoods and LTS but also has the potential to contribute to more holistic and effective conservation efforts in the Pantanal.

Rules regarding fencing and pest control also served as points of contention for the community. The prohibition against fencing around properties and using guns or traps restricts agricultural activities, as residents are unable to protect their crops from wildlife. This limitation poses challenges for those who rely on agriculture as a livelihood strategy, as their crops are susceptible to damage and destruction. Perspectives regarding these rules vary, however, as some residents acknowledge that killing pests is unsustainable and can disrupt the ecological

balance, while others are driven by the practical needs to protect their agricultural livelihoods from pest-related damage.

The rigid nature rules within the APA presents barriers to livelihoods particularly in the face of changing weather patterns. The region's traditional livelihoods, primarily dependent on fishing, are increasingly vulnerable due to extreme weather events such as flooding and droughts (Lapola *et al*., 2019). Residents have had to adapt by diversifying their livelihood strategies, increasing their reliance on agriculture when fish stocks are low. As Chiaravalloti points out, 'local people's needs are dynamic and flexible, and fixed solutions are unlikely to be feasible in floodplains with high level of unpredictability' (Chiaravalloti, 2016, p. 17). Rules against pest control and restrictions on fencing around properties, designed for biodiversity protection, can inadvertently exacerbate economic insecurity during periods of precarious weather.

To address this challenge, there is a compelling argument for an adjustable regulatory system that can accommodate the changing dynamics within the APA. Such flexibility reflects the inherent changeability and adaptability of the Pantanal and its inhabitants and would enable the community to adopt diversified livelihood strategies while still adhering to conservation principles. This adaptability in regulations should consider the ecological and economic contexts of the region and the vulnerabilities brought about by climate change. As du Plessis and Cole explain, 'the broader framing of the decision-making processes... within the sustainability debate [must be] explored in the context of a paradigm shift that acknowledges the world as a complex, dynamic system' (du Plessis & Cole, 2011, p. 436). Accommodating evolving dynamics would empower local communities to actively participate in decision-making processes and redefine what is considered sustainable within the shifting environmental context. This approach recognises the interconnectedness of access, power, and environmental governance, ultimately allowing for a more inclusive and effective conservation strategy which benefits local livelihoods.

6.3. Identity, Adaptation, and Ecological Knowledge

Summary: The results demonstrated that identity is not a passive cultural attribute but an active mechanism for resource access. They revealed the intricate ways in which legal recognition of identity, cultural heritage, and ecological knowledge are intertwined in the lives of the community members in the APA Baía Negra. Legal recognition of traditional practices through documents like the TAUS positions the community favourably within the power dynamics governing resource allocation. Moreover, TEK plays a crucial role in developing adaptive strategies in the face of climate change, allowing residents to diversify livelihoods in response to environmental fluctuations. At the same time, extreme weather threatens the long-term security of their traditional identity and poses challenges for their livelihoods in the protected area.

Residents demonstrated a clear understanding of the importance of their traditional ecological knowledge (TEK) to access the Pantanal's resources and therefore maintain their livelihoods. As Kauffman explains, seasonal flooding plays a powerful role in 'structuring the lives of rural populations' (Kauffman, 2015, p. 12). As such, the Pantanal's wetland ecosystem demands a profound understanding of seasonal changes, migratory patterns, and aquatic life. Local fishing practices have been honed over generations and are intertwined with cultural identity. This ecological knowledge, then, becomes a multifaceted mechanism of access. Firstly, it empowers residents to navigate and utilise the land effectively, ensuring livelihood benefits and ecological preservation. Secondly, this knowledge is ontologically tied to traditional identity, further reinforcing their cultural connection to the land.

The legal recognition of their traditional livelihood practices carries rights to the land and privileges to extract sustainably, manifesting in the TAUS legal document. Peluso and Ribot explain that access to livelihoods often depend on 'having a certain kind of knowledge and the certification of that knowledge or education by a professional organisation or the state' (Peluso & Ribot, 2003, p. 160). For the *riberinhos*, knowledge is not just tied to their livelihoods, but also to their legitimacy in the protected area. In this sense, their legally recognised traditional

identity serves as certification for their continued access to the natural resources in the protected area, as social identity influences who has priority over resource access (Blaikie, 1985). The act of officially acknowledging traditional knowledge and practices by the state enhances *riberinho* agency and positions them favourably within the power dynamics governing resource allocation. This recognition becomes a tactic through which individuals and communities gain access to essential resources over which governments delegate power, aligning with the broader strategy of governmentality (Foucault, 1991). The recognition of traditional knowledge is therefore not just a matter of cultural preservation; it empowers the *riberinhos* as active agents within a framework where identity and power converge to shape access and livelihoods in the Pantanal.

Furthermore, the interviews and mapping confirmed that traditional knowledge is essential for the development of adaptation strategies in the face of climate change, but at the same its continuation and transference is threatened by climate change (see Silva & Andrade, 2006; Harrison, 2011; Hosen *et al*., 2020). They also revealed that this duality of resilience and vulnerability is profoundly understood by the community.

Firstly, residents have developed adaptive strategies to extreme weather events such as diversifying livelihoods during droughts, adjusting agricultural planting times in response to changing rainfall patterns, and sourcing native species outside of the community following wildfires. Increasingly, residents are engaging in a combination of activities such as fishing, agriculture, selling homemade products, and ecotourism. This diversified approach not only serves as a means of risk mitigation but also reflects their intimate knowledge of the Pantanal's ecology and its seasonal variations. Such strategies underscore the dynamic nature of access, where communities must continually adapt to evolving environmental conditions to maintain their livelihoods. These findings were consistent with a wealth of research demonstrating that ‘TEK is vital for adaptation to environmental change... for subsistence-based, indigenous, rural communities’ (McMillen *et al*., 2016, p. 579).

Secondly, participants expressed vulnerability in the face of extreme weather. Traditional livelihood strategies in the Pantanal have historically demonstrated remarkable adaptability to the Pantanal's natural seasonal fluctuations and its inherently changeable environment (Chiaravalloti, 2019). But increasing extreme weather events, including prolonged droughts and floods, disrupt not only the delicate ecological balance of the region but also the traditional knowledge systems deeply rooted in the community. Although it was expected that extreme weather would impact livelihood practices, I did not anticipate the extent to which such unpredictability would threaten the knowledge and therefore identities of the *riberinhros*. As Haq *et al*. explain, 'the integrity of TEK is often in jeopardy due to changes in... traditional ways of subsistence, and disruption of traditional social–ecological systems' (Haq *et al*., 2023, p. 1). As residents grapple with more frequent and severe weather anomalies, the transmission and continuity of TEK are at risk. Such unpredictability poses a significant threat to epistemology of the *riberinhros*.

The interviews revealed that many in the APA no longer see traditional practices as a secure source of income, causing them to search for better economic prospects in the city. While there are 24 families in the APA now, an analysis in 2015 recorded 52 families in the area (Silva Melo *et al*., 2019). This is because young people are increasingly relocating away from the community altogether, opting to live in Corumbá or Campo Grande to undertake unskilled wage labour. This movement disrupts the continuity of traditional knowledge and practices and is thus a fundamental threat to the continuation of *riberinhros*. As younger generations distance themselves from traditional livelihoods, the transmission of ecological wisdom and cultural heritage becomes endangered. This also jeopardises the long-term security of the legal recognition of their traditional identity, which, in turn, poses challenges for their LTS in the protected area. Thus, the interplay between changing livelihoods, the erosion of traditional knowledge, and insecure land tenure highlights the complex dynamics of access caused by climatic uncertainties in the Pantanal.

7. Conclusion

In the APA Baía Negra, perceptions of land and resources within the community are shaped by evolving environmental and political dynamics. This study has used local perspectives in this region to answer the following questions: 1. How do people in the APA perceive access to land and resources in their community? 2. What do local people perceive as benefits and barriers to their livelihoods? 3. How well has the formalisation of the protected area defined who can use the land, what can be used, and what level of use is sustainable?

The research concludes that the formalisation of land use rights within the protected area, while providing a structured framework, has introduced uncertainties regarding land access and use due to its incongruence with customary systems and the difficulty of navigating bureaucratic legal processes. This challenge is exacerbated by the limited formal education of residents trying to navigate their rights within a complex legal system. Knowledge, therefore, is a key mechanism of access within the context of the APA Baía Negra, and the hegemonic knowledge system of top-down conservation dictates who holds power over resource access.

TEK plays a pivotal role in developing adaptive strategies in response to climate change, enabling residents to diversify their livelihoods amid environmental fluctuations. Traditional ecological knowledge must be more effectively incorporated into the conservation management plan for the protected area, which also means formalising the customary land arrangements that facilitate traditional livelihood practices. As such, this study recommends a collective TAUS concession which allows the community to have a more active role in resource management, aligning with Ostrom's ideas around common pool resources.

Furthermore, the study finds that the sustainable use restrictions of the protected area reflect the dominant conservation narrative of biocentrism, rendering community needs secondary to biodiversity conservation. This highlights the active role of identity as a mechanism for resource access within the community. Legal recognition of identity and cultural heritage, exemplified by documents like the TAUS concession, positions the community favourably within the power

dynamics that govern resource allocation. Yet this identity, which is connected to the Pantanal's ecosystem, is threatened by climate change and the resulting extreme weather. Residents need assistance diversifying their livelihoods as they lose access to certain resources to flooding, wildfires, and droughts, but the narrow legal definition of traditional livelihoods hinders their ability to adapt. The findings underscore the need for an adaptable regulatory system that accommodates changing dynamics and empowers local communities in decision-making processes.

Perceived challenges to livelihoods intersect with evolving conservation objectives and shifting power dynamics. The *riberinho* perception of access to land and resources is, therefore, a dynamic and evolving process influenced by changing political priorities, conservation goals, and external factors such as precarious seasonal changes. Understanding this is crucial for developing more inclusive and adaptive resource management strategies that empower local communities and align conservation objectives with the needs and aspirations of those living in the protected area.

The results of this study have important implications for global environmental initiatives such as the 30x30 target to conserve 30% of the world's biodiversity by 2030 (IUCN, 2023). The research in the APA underscores that the establishment of protected areas can create tensions when it intersects with the land use practices and livelihoods of traditional communities who rely on sustainable resource extraction. The research suggests that the success of the 30x30 target depends not only on the quantity of protected areas but also on how they are managed. Conservation strategies must not only focus on land designation but also on empowering communities, recognizing their traditional ecological knowledge, and ensuring their participation in decision-making processes.

Bibliography

Adger, W. Neil & Luttrell, Cecilia (10/2000), 'Property Rights and Utilisation of Wetlands', The Values of Wetlands: Landscapes and Institutional Perspectives, Vol. 35, No. 1, pp. 75-89, Available at: https://doi.org/10.1016/S0921-8009(00)00169-5, Accessed on: 27/07/2023

Adom, Dickson (11/2019), 'The place and voice of local people, culture, and traditions: A catalyst for ecotourism development in rural communities in Ghana', *Scientific African*, Vol. 6, pp. 1-12, Available at: https://doi.org/10.1016/j.sciaf.2019.e00184, Accessed on: 27/09/2023

Alho, Cleber J.R (11/2008), 'Biodiversity of the Pantanal: response to seasonal flooding regime and to environmental degradation', *Brazilian Journal of Biology*, Vol. 68, Available at: https://doi.org/10.1590/S1519-69842008000500005, Accessed on: 21/07/2023

Alho, Cleber J.R (04/2011), 'A conservation agenda for the Pantanal's biodiversity', *Brazilian Journal of Biology*, Vol. 71, No. 1, pp. 327-335, Available at: https://doi.org/10.1590/S1519-69842011000200012, Accessed on: 27/09/2023

Alho, Cleber J.R & Silva, Jão S.V (18/10/2012), 'Effects of Severe Floods and Droughts on Wildlife of the Pantanal Wetland (Brazil)—A Review', *Animals*, Vol. 2, pp. 591-610. Available at: https://doi.org/10.3390/ani2040591, Accessed on: 21/07/2023

Arts, Koen *et al*. (11/10/2018), 'Online and Offline Representations of Biocultural Diversity: A Political Ecology Perspective on Nature-Based Tourism and Indigenous Communities in the Brazilian Pantanal', *Sustainability*, Vol. 10, No. 10, pp. 1-20, Available at: https://doi.org/10.3390/su10103643, Accessed on: 01/10/2023

Bergier *et al*. (04/2018), 'Amazon Rainforest Modulation of Water Security in the Pantanal Wetland', *Science of the Total Environment*, Vol. 619, pp. 1116-1125, Available at: https://doi.org/10.1016/j.scitotenv.2017.11.163, Accessed on: 08/09/2023

Birkmann, J. *et al*. (2022) 'Poverty, Livelihoods and Sustainable Development' *Climate Change 2022: Impacts, Adaptation and Vulnerability*. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press, pp. 1171–1274, Available at: https://doi.org/10.1017/9781009325844.010, Accessed on: 30/09/2023

Blaikie, Piers (1985), *The Political Economy of Soil Erosion*, London, Routledge

Castro, Brianna & Kuntz, Christina (15/07/2022), 'Land Tenure Insecurity and Climate Adaptation: Socio-Environmental Realities in Colombia and Implications for Integrated Environmental Rights and Participatory Policy', *Land Tenure Security and Sustainable Development*, Palgrave Macmillan, pp. 177-199

Chiaravalloti, Rafael Morais (12/2016), *Local communities and conservation in the Pantanal wetland*, Thesis submitted in the fulfilment of the requirements for the degree in Doctor of Philosophy, Department of Anthropology, University College London, Available at: https://core.ac.uk/reader/111003300, Accessed on: 27/09/2023

Chiaravalloti, Rafael Morais (2017), 'Overfishing or Overreacting? Management of Fisheries in the Pantanal Wetland, Brazil', *Conservation and Society*, Vol. 15, No. 1, pp. 111-122, Available at: https://www.jstor.org/stable/26393275, Accessed on: 03/10/2023

Chiaravalloti, Rafael Morais (2019), 'The Displacement of Insufficiently "Traditional" Communities: Local Fisheries in the Pantanal', *Conservation and Society*, Vol. 17, No. 2, pp. 173-183, Available at: https://www.jstor.org/stable/26611743, Accessed on: 22/09/2023

Chiaravalloti, Rafael Morais & Homewood, Katherine & Erickson, Kirsten (05/2017), 'Sustainability and Land Tenure: Who owns the floodplain in the Pantanal, Brazil?', *Land Use Policy*, Vol. 64, pp. 511-524, Available at: https://doi.org/10.1016/j.landusepol.2017.03.005, Accessed on: 18/09/2023

Climate Policy Initiative (08/2016), 'Insecure land rights in Brazil', Available at: https://www.climatepolicyinitiative.org/wp-content/uploads/2016/08/Insecure_Land_Rights_in_Brazil_CPI.pdf, Accessed on: 19/07/2023

Climate Policy Initiative (04/2017) 'Evolution of land rights in rural Brazil', Available at: https://www.climatepolicyinitiative.org/wp-content/uploads/2017/06/Evolution_of_Land_Rights_In_Rural_Brazil_CPI_FinalEN.pdf, Accessed on: 19/07/2023

Coad, L., Campbell, A., Miles, L., Humphries, K. (2008). 'The Costs and Benefits of Protected Areas for Local Livelihoods: a review of the current literature', Working Paper, UNEP World Conservation Monitoring Centre, Cambridge, U.K

Conrado da Cruz, Denis *et al*. (03/02/2020), 'An overview of forest loss and restoration in the Brazilian Amazon', *New Forests*, Vol. 52, pp. 1-16, Available at: https://doi.org/10.1007/s11056-020-09777-3, Accessed on: 09/08/2023

Constitution of Brazil (04/10/1988), *Constitution of Brazil*, National Legislative Bodies

Cunningham, Susan M (07/1976), 'Planning Brazilian Regional Development During the 1970s', *Geography*, Vol. 61, No. 3, pp. 163-167, Available at: https://www.jstor.org/stable/40568545, Accessed on: 02/10/2023

ECOA (2016), 'Encarte I Caracterização Geral Da APA Baía Negra', Available at: https://ecoa.org.br/wp-content/uploads/2016/11/Encarte_I_Plano_de_Manejo_APA_Ba_a_Negra_ok-1.pdf, Accessed on: 30/09/2023

ECOA (2021), 'APA Baía Negra', Available at: https://ecoa.org.br/apa-baia-negra/, Accessed on: 16/08/2023

ECOA (2021), 'Institutional', Available at: https://ecoa.org.br/ecoa-institucional/, Accessed on: 02/10/2023

Fairbairn, Madeleine (15/03/2013), 'Indirect Dispossession: Domestic Power Imbalances and Foreign Access to Land in Mozambique', *Development and Change*, Vol. 44, No. 2, pp. 335-356, Available at: https://doi.org/10.1111/dech.12013, Accessed on: 06/09/2023

Foucault, Michael (1991), *Discipline and Punishment*, London, Tavistock

Foucault, Michael (1991), 'Governmentality', *The Foucault Effect*, Chicago, University of Chicago

Foucault, Michael & Davidson, Arnold I. & Burchell, Graham (2010), *The Birth of Biopolitics: Lectures at the Collège de France, 1978-1979*, London, Palgrave MacMillan

Hall, Derek & Hirsch, Philip & Murray Li, Tania (2011), *The Powers of Exclusion*, Honolulu, University of Hawaii Press

Haller, Tobias (27/06/2019), 'The Different Meanings of Land in the Age of Neoliberalism: Theoretical Reflections on Commons and Resilience Grabbing from a Social Anthropological Perspective', *Land*, Vol. 8, No. 104, pp. 1-22, Available at: https://doi.org/10.3390/land8070104, Accessed on: 16/8/2023

Haq, Shiekh Marifatul *et al*. (10/08/2023), 'Integrating traditional ecological knowledge into habitat restoration: implications for meeting forest restoration challenges', *Journal of Ethnobiology and Ethnomedicine*, Vol. 19, No. 33, pp. 1-19, Available at: https://doi.org/10.1186/s13002-023-00606-3, Accessed on: 22/09/2023

Hosen, Nadzirah & Nakamura, Hitoshi & Hamzah, Amran (16/01/2020), 'Adaptation to Climate Change: Does Traditional Ecological Knowledge Hold the Key?', *Sustainability*, Vol. 12, No. 676, pp. 1-18, Available at: https://doi.org/10.3390/su12020676, Accessed on: 22/09/2023

Hunne, Eugene (1993), 'What is Traditional Ecological Knowledge?', *Journal of Political Ecology*, Vol. 2, No. 43, pp. 13-20, Available at: https://doi.org/10.2458/v2i1.20159, Accessed on: 13/09/2023

Inogwabini, Bila-Isia (2020), *Reconciling Human Needs and Conserving Biodiversity: Large Landscapes as a New Conservation Paradigm*, Cham, Springer

International Labour Organisation (1989), *Indigenous and Tribal People's Convention*, Available at: https://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:55:0::NO::P55_TYPE,P55_LANG,P55_DOCUMENT,P55_NODE:REV,en,C169,/Document, Accessed on: 28/09/2023

ISA (02/2018), 'Who are they?', Available at: https://pib.socioambiental.org/en/Who_are_they%3F, Accessed on: 04/10/2023

IUCN (09/03/2020), 'Guidelines for applying protected area management categories', Available at: https://www.iucn.org/content/guidelines-applying-protected-area-management-categories-0, Accessed on: 03/10/2023

Jones, Kelly W. & Blackman, Allen & Arriagada, Rodrigo (15/07/2022), 'Methods to Advance Understanding of Tenure Security: Impact Evaluation for Rigorous Evidence on Tenure Interventions', *Land Tenure Security and Sustainable Development*, Palgrave Macmillan pp. 291-312

Junk, Wolfgang J. & Nunes de Cunha, Catia (05/04/2005), 'Pantanal: a large South American wetland at a crossroads', *Ecological Engineering*, Vol. 24, No. 4, pp. 391-401, Available at: https://doi.org/10.1016/j.ecoleng.2004.11.012, Accessed on: 21/07/2023

Kareiva, Peter & Marvier, Michelle (11/2012), 'What is Conservation Science?', *BioScience*, Vol. 62, No. 11, pp. 962-969, Available at: https://doi.org/10.1525/bio.2012.62.11.5, Accessed on: 27/03/2023

Kauffman, Jason B. (08/2015), *The Unknown Lands: Nature, Knowledge, and Society in the Pantanal of Brazil and Bolivia*, A dissertation submitted to the faculty at the University of North Carolina at Chapel Hill in partial fulfilment of the requirements for the degree of Doctor of Philosophy in the Department of History, University of North Carolina, Available at: https://core.ac.uk/download/pdf/210597303.pdf, Accessed on: 30/09/2023

Lapola, David *et al*. (2019), 'A climate-change vulnerability and adaptation assessment for Brazil's protected areas', *Conservation Biology*, Vol. 34, No. 2, pp. 1-25, Available at: https://doi.org/10.1111/cobi.13405, Accessed on: 27/09/2023

Laschefski, Klemens & Zhouri, Andréa (05/02/2019), 'Indigenous Peoples, Traditional Communities and the Environment: The 'Territorial Question' Under the New Developmentalist Agenda in Brazil', *The Brazilian Left in the 21st Century*, pp. 205-236, Available at: https://doi.org/10.1007/978-3-030-03288-3_10, Accessed on: 09/08/2023

Lele, Sharachchandra *et al*. (2010), 'Beyond Exclusion: alternative approaches to biodiversity conservation in the developing tropics', *Current Opinion in Environmental Sustainability*, Vol. 2, No. 1-2, pp. 94-100, Available at: https://doi.org/10.1016/j.cosust.2010.03.006, Accessed on: 13/09/2023

Little, Paul E. (2018), 'Social Territories and Traditional Peoples in Brazil: For an Anthropology of Territoriality', *Anthropological Yearbook*, Vol. 28, No. 1, pp. 251-290, Available at: https://periodicos.unb.br/index.php/anuarioantropologico/article/view/6871, Accessed on: 04/10/2023

Machado, Carolina S. *et al*. (22/06/2017), 'Health risks of environmental exposure to metals and herbicides in the Pardo River, Brazil', *Environmental Science and Pollution Research*, Vol. 24, pp. 20160-20172, Available at: https://doi.org/10.1007/s11356-017-9461-z, Accessed on: 09/08/2023

Mader, Ron (29/03/2010), 'Latin American Ecotourism: What is it?', *Current Issues in Tourism*, Vol. 5, No. 3-4, pp. 272-279, Available at: https://doi.org/10.1080/13683500208667923, Accessed on: 27/09/2023

Maikhuri, Rakesh Kumar *et al*. (2000), 'Promoting ecotourism in the buffer zone areas of Nanda Devi Biosphere Reserve: an option to resolve people-policy conflict', *International Journal on Sustainable Development*m Vol. 7, pp. 333-342, Available at: https://doi.org/10.1080/13504500009470052, Accessed on: 27/09/2023

Martin, Adrian & Akol, Anne & Gross-Camp, Nicole (2015), 'Towards an Explicit Justice Framing of the Social Impacts of Conservation', *Conservation and Society*, Vol. 13, No. 2, pp. 166-178, Available at: https://www.jstor.org/stable/26393195, Accessed on: 24/01/2023

Massarella, Kate *et al*. (04/2021), 'Transformation beyond conservation: how critical social science can contribute to a radical new agenda in biodiversity conservation', *Current Opinion in Environmental Sustainability*, Vol. 49, pp. 79-87, Available at: https://doi.org/10.1016/j.cosust.2021.03.005, Accessed on: 13/09/2023

Masuda, Yuta J. *et al.* (2022), 'Emerging Research Needs and Policy Priorities for Advancing Land Tenure Security and Sustainable Development', *Land Tenure Security and Sustainable Development*, Palgrave Macmillan, pp. 313-326

McMillen, Heather & Ticktin, Tamara & Springer, Hannah K (15/09/2016) 'The future is behind us: traditional ecological knowledge and resilience over time on Hawai'i Island', *Regional Environmental Change*, Vol. 17, pp. 579–592, Available at: https://doi.org/10.1007/s10113-016-1032-1, Accessed on: 22/09/2023

Meinzen-Dick, Ruth & Mwangi, Esther (01/2009) 'Cutting the web of interests: Pitfalls of formalizing property rights', *Land Use Policy*, Vol. 26, No. 1, pp. 36-43, Available at: https://doi.org/10.1016/j.landusepol.2007.06.003, Accessed on: 30/09/2023

Met Office (2020), 'Studying extreme weather and climate events in Brazil', Available at: https://www.metoffice.gov.uk/research/approach/collaboration/newton/insights/brazil---special-issue-journal#:~:text=Extreme%20rainfall%2C%20or%20lack%20thereof,%25%20of%20weather%2Drelated%20disasters., Accessed on: 08/09/2023

Ministry of Economy (28/05/2015), 'SPU gives Mato Grosso fishermen authorization to use public land', Available at: https://www.gov.br/economia/pt-br/assuntos/patrimonio-da-uniao/noticias/spu-entrega-a-pescadores-de-mato-grosso, Accessed on: 16/08/2023

Myers, Rodd & Hansen, Christian Pilegaard (28/02/2018), 'Revisiting A Theory of Access: A review', *Society and Natural Resources*, Vol. 33, No. 2, pp. 146-166, Available at: https://doi.org/10.1080/08941920.2018.1560522, Accessed on: 18/09/2023

Nugroho, Iwan *et al*. (2016), 'Promoting the Rural Development through the Ecotourism Activities in Indonesia', *American Journal of Tourism Management*, Vol. 5, No. 1, pp. 9-18, Available at: https://doi.org/10.5923/j.tourism.20160501.02, Accessed on: 27/09/2023

Ostrom, Elinor (1990), *Governing the Commons*, Cambridge, Cambridge University Press

Ostrom, Elinor (2002), 'Common-pool resources and institutions: Toward a revised theory', *Handbook of Agricultural Economics*, Vol. 2, pp. 1315-1339, Available at: https://doi.org/10.1016/S1574-0072(02)10006-5, Accessed on: 11/09/2023

Patel, Kamna (2013) 'The Value of Secure Tenure: Ethnographic Accounts of How Tenure Security is Understood and Realised by Residents of Low-Income Settlements in Durban, South Africa', *Urban Forum*, Vol. 24, pp. 269-287, Available at: https://doi.org/10.1007/s12132-012-9169-6, Accessed on: 04/10/2023

Peluso, Nancy Lee & Kelly, Alice B. & Woods, Kevin (7/06/2013), 'Context in Land Matters: Access Effects and History in Land Formalization', *Commoners and the Changing Commons: Livelihoods, Environmental Security, and Shared Knowledge, the Fourteenth*

Biennial Conference of the International Association for the Study of the Commons, Mt Fuji, Japan

Peluso, Nancy Lee & Ribot, Jesse C (06/2003), 'A Theory of Access', Rural Sociology, Vol. 68, No. 2, pp. 153-181, Available at: https://doi.org/10.1111/j.1549-0831.2003.tb00133.x, Accessed on: 18/07/2023

du Plessis, Christina & Cole, Raymond J. (05/08/2011), 'Motivating Change: shifting the paradigm', *Building Research and Information*, Vol. 39, No. 5, pp. 436-449, Available at: https://doi.org/10.1080/09613218.2011.582697, Accessed on: 27/09/2023

Pletsch, Mikhaela *et al*. (2021), 'The 2020 Brazilian Pantanal Fires', *Annals of the Brazilian Academy of Science*, Vol. 93, No. 3, pp. 1-3, Available at: https://doi.org/10.1590/0001-3765202120210077, Accessed on: 08/09/2023

Presidency of the Republic Civil House (18/07/2000), Law No. 9,985 , Of July 18, 2000', Available at: https://www.planalto.gov.br/ccivil_03/leis/l9985.htm, Accessed on: 04/10/2023

Sauls, Laura Aileen & Galeana, Fernando & Lawry, Steven (15/07/2022), 'Indigenous and Customary Land Tenure Security: History, Trends, and Challenges in the Latin American Context', *Land Tenure Security and Sustainable Development*, pp. 57-79, Available at: https://doi.org/10.1007/978-3-030-81881-4_4, Accessed on: 30/09/2023

Schlaeger, Edella (01/2002), 'Rationality, Cooperation, and Common Pool Resources', *American Behavioural Scientist*, Vol. 45, No. 5, pp. 801-819, Available at: https://doi.org/10.1177/0002764202045005005, Accessed on: 30/09/2023

Sillitoe, Paul (2004), *Investigating Local Knowledge*, London, Routledge

Silva, Alberto J.R. & Andrade, Laise de Holanda C. (2006), 'Cultural significance of plants in communities located in the coastal forest zone of the State of Pernambuco, Brazil' *Human Ecology*, Vol. 34, No. 3, pp. 447–465, Available at: https://doi.org/10.1007/s10745-006-9026-0, Accessed on: 22/09/2023

Silva, Carolina J.& Silva, Joana A.F. (1995), *No Ritmo das Águas do Pantanal*, Nupaub, São Paulo

da Silva Melo, Marta Regina (11/2015) 'Turismo Sustentável: alternativa para o desenvolvimento da APA Baia Negra, Pantanal de Mato Grosso do Sul', *Revista Brasileira de Ecoturismo*, Vol.12, No. 5, pp. 757-771, Available at: https://doi.org/10.34024/rbecotur.2019.v12.6738, Accessed on: 04/10/2023

Sjaastad, Espen & Cousins, Ben (01/2009), 'Formalisation of Land Rights in the South: An overview', *Land Use Policy*, Vol. 26, No. 1, pp. 1-9, Available at: https://doi.org/10.1016/j.landusepol.2008.05.004, Accessed on: 30/09/2023

Soto, Hernando de (2000), *The Mystery of Capital*, London, Black Swan Books

Ternus, Raquel Zeni *et al*. (06/2011), 'Influence of urbanisation on water quality in the basin of the upper Uruguay River in western Santa Catarina, Brazil', *Chemical Limnology*,

Vol. 23, No. 2, Available at: https://doi.org/10.1590/S2179-975X2011000200009, Accessed on: 09/08/2023

Tsing, Anna (2015), *The Mushroom at the End of the World*, Princeton, Princeton University Press

UNEP-WCMC (04/2011) 'Pantanal Conservation Area', Available at: http://world-heritage-datasheets.unep-wcmc.org/datasheet/output/site/pantanal-conservation-area/#:~:text=In%202001%20Brazil%20established%20The,%2C%20human%2C%20economic%20and%20ecological., Accessed on: 02/10/2023

UNESCO (2021), 'Pantanal Conservation Area', Available at: https://whc.unesco.org/en/list/999/, Accessed on: 09/09/2023

West, Paige (2006), Conservation Is Our Government Now: The Politics of Ecology in Papua New Guinea, Duke University Press

Woodhouse, Emily & Bedelian, Claire & Barnes, Paul *et al.* (2022) 'Rethinking entrenched narratives about protected areas and human wellbeing in the Global South'. *UCL Open Environment*, Vol. 4. Available at: https://doi.org/10.14324/111.444/ucloe.000050, Accessed on: 13/09/2023

WWF (2023), 'Pantanal', Available at: https://www.worldwildlife.org/places/pantanal, Accessed on: 21/07/2023