

UNIVERSIDADE CATÓLICA DOM BOSCO

Master's Degree in Sustainable Territorial Development

Traditional Ecological Knowledge of Indigenous People in the Pantanal region (Brazil).

The potential for indigenous protagonism in forest conservation projects.

Connaissance Écologique Traditionnelle des Populations Indigènes dans le Pantanal (Brésil).

Le potentiel du protagonisme indigène dans les projets de conservation de forêts.

Conhecimento Ecológico Tradicional dos Povos Indígena na região do Pantanal (Brasil).

O potencial para o protagonismo indígena nos projetos de conservação florestal.

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DI PADOVA



Preface

This thesis is the result of the Joint Master's degree in Sustainable Territorial Development (STEDE). This programme is offered by a consortium made up of the following universities: Università degli Studi di Padova (Italy), Katholieke Universiteit Leuven - KU Leuven (Belgium), Université Paris1: Panthéon-Sorbonne (France), Universidade Católica Dom Bosco (Brazil), the University of Johannesburg (South Africa) and the Joseph Ki Zerbo University of Ouagadougou (Burkina Faso). This program has a duration of 24 months. The course started at the Università degli Studi di Padova in Italy, followed by a semester at KU Leuven in Belgium, another semester at University of Paris 1 Panthéon-Sorbonne in France and a semester at Universidade Católica Dom Bosco in Brazil.

Avant-Propos

Ce mémoire est le résultat du Joint Master Degree in Sustainable Territorial Development (STeDe). Ce programme est offert par un consortium constitué par les universités suivantes : Università degli Studi di Padova (Italy), Katholieke Universiteit Leuven - KU Leuven (Belgique), Université Paris 1: Panthéon-Sorbonne (France), Universidade Católica Dom Bosco (Brésil), University of Johannesburg (South Africa) and Joseph Ki Zerbo University of Ouagadougou (Burkina Faso). Ce programme a une durée de 24 mois. Le parcours a commencé à l'Università degli Studi di Padova en Italie, suivi d'un semestre à KU Leuven en Belgique, l'autre semestre à l'Université Paris1-Panthéon Sorbonne en France et un semestre à l'Universidade Católica Dom Bosco au Brésil.

Prefácio

Esta dissertação resulta do Joint Master Degree in Sustainable Territorial Development (STeDe). Este programa é oferecido por um consórcio constituído pelas seguintes universidades: Università degli Studi di Padova (Itália), Katholieke Universiteit Leuven - KU Leuven (Bélgica), Université Paris 1: Panthéon-Sorbonne (França), Universidade Católica Dom Bosco (Brasil), University of Johannesburg (África do Sul) e Joseph Ki Zerbo University of Ouagadougou (Burkina Fasso). O percurso começou pela l'Università degli Studi di Padova na Itália, seguido de um semestre em KU Leuven na Bélgica, outro semestre na Université Paris 1- Panthéon-Sorbonne na França e um semestre na Universidade Católica Dom Bosco no Brasil.

Note: This master's thesis came about (in part) during the period in which higher education was subjected to a lockdown and protective measures to prevent the spread of the COVID-19 virus. The process of formatting, data collection, the research method and/or other scientific work the thesis involved could therefore not always be carried out in the usual manner. The reader should bear this context in mind when reading this master's thesis, and also in the event that some conclusions are taken on board.

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Abstract

This work investigates the characteristics and the importance of Traditional Ecological Knowledge (TEK) of Indigenous People (IPs) in the Pantanal area in Brazil, and the relevance that this could have on improving indigenous protagonism in the design and implementation of forest conservation projects. Despite IPs being key contributors in forest conservation worldwide, and their role and rights being stated in the major international frameworks on the topic, they are rarely given recognition in practice. This weak involvement has its roots in land tenure rights, economic and political power inequalities, lack of free, prior and informed consent (FPIC), a lower consideration than scientific knowledge, and can have negative consequences on the accountability, acceptance and relevance of projects. IPs can provide TEK that is relevant for the understanding of local contexts, they have historical ecological memory and long term experience in traditional forest conservation strategies. Initiatives of indigenous protagonism are rare and have low recognition. This work will explore the case study of an indigenous agroecology organisation from the Pantanal area, the Caianas organisation, to see how they reappropriated and organised their TEK, how this became an instrument for increased protagonism in local forest conservation and how this experience can be of inspiration for similar initiatives. The qualitative research on the case study will be coupled with a theoretical framework review, context analysis and an overview of actors working on forest conservation involving IPs in the Pantanal area. This work intends to answer the following RQ: *How is the TEK of IP defined in the Pantanal area and how can it be a means for IP involvement in forest conservation projects there?*

Résumé

Ce travail étudie les caractéristiques et l'importance des connaissances écologiques traditionnelles (TEK) des peuples indigènes (IPs) dans la région du Pantanal au Brésil, et l'importance que cela pourrait avoir pour améliorer le rôle des populations indigènes dans la conception et la mise en œuvre de projets de conservation des forêts. Bien que les IPs soient des contributeurs clés à la conservation des forêts dans le monde, et que leur rôle et leurs droits soient énoncés dans les principaux cadres internationaux sur le sujet, dans la pratique ils reçoivent rarement la reconnaissance qu'ils méritent. Cette faible implication trouve ses racines dans les droits fonciers, les inégalités de pouvoir économique et politique, l'absence de consentement libre, préalable et éclairé (FPIC), une considération inférieure par rapport aux connaissances scientifiques et peut avoir des conséquences négatives sur la redevabilité, l'acceptation et la pertinence des projets. Les IPs peuvent fournir des TEK qui sont indispensables à la compréhension du contexte local, ont une mémoire écologique historique et une expérience de long terme dans les stratégies traditionnelles de conservation des forêts. Ce travail explorera l'étude de cas d'une organisation indigène qui travaille sur l'agroécologie dans la région du Pantanal, l'organisation Caianas, pour voir

comment ils ont su se réappropriier et organiser leur TEK, comment cela est devenu un instrument pour un protagonisme accru dans la conservation des forêts locales et comment cette expérience peut être une source d'inspiration pour des initiatives similaires. La recherche qualitative sur l'étude de cas sera couplée avec un examen du cadre théorique pertinent, une analyse du contexte et un aperçu des acteurs travaillant sur la conservation des forêts impliquant des IPs dans la région du Pantanal. Ce travail a pour objectif de répondre à la question de recherche suivante : *comment la TEK des IPs est-elle définie dans la région du Pantanal et comment peut-elle être un moyen d'implication des IPs dans les projets de conservation des forêts ?*

Resumo

Este trabalho investiga as características e a importância do Conhecimento Ecológico Tradicional (TEK) dos Povos Indígenas (IPs) na área do Pantanal no Brasil, e a relevância que isso pode ter para melhorar o protagonismo indígena na concepção e implementação de projetos de conservação florestal. Apesar de os IPs serem os principais contribuintes na conservação de florestas em todo o mundo, e seu papel e direitos serem declarados nas principais estruturas internacionais sobre o tema, eles raramente recebem na prática o reconhecimento que merecem. Esse fraco envolvimento tem suas raízes em direitos de posse da terra, desigualdades de poder econômico e político, falta de consentimento livre, prévio e informado (FPIC), uma consideração inferior ao conhecimento científico e pode ter consequências negativas na credibilidade, aceitação e relevância dos projetos. Os IPs podem fornecer TEK que seja relevante para a compreensão do contexto local, ter memória ecológica histórica e experiência de longo prazo em estratégias tradicionais de conservação florestal. Este trabalho explora o estudo de caso de uma organização agroecológica indígena da região do Pantanal, a organização Caianas, para ver como eles se reapropriaram e organizaram sua TEK, como isso se tornou um instrumento para aumentar o protagonismo indígena na conservação florestal local e como essa experiência pode ser de inspiração para iniciativas semelhantes. A pesquisa qualitativa sobre o estudo de caso será acoplada à revisão do referencial teórico relevante, análise de contexto e uma visão geral dos atores que atuam na conservação florestal envolvendo IPs na área do Pantanal. Este trabalho pretende responder ao seguinte RQ: *Como é definido o TEK dos IPs na área do Pantanal e como pode ser um meio para o envolvimento dos IPs em projetos de conservação florestal nessa área?*

List of Abbreviations

APIB	Articulação dos Povos Indígenas do Brasil
CAIANAS	Coletivo Ambientalista Indígena de Ação para Natureza, Agroecologia e Sustentabilidade
CBD	Convention on Biological Diversity
ECOIA	Ecologia e Ação
EMBRAPA	Empresa Brasileira de Pesquisa Agropecuária
FPIC	Free, Prior and Informed Consent
FUNAI	Fundação Nacional do Índio
IHP	Instituto Homem Pantaneiro
ILO	International Labour Organisation
IP, IPs	Indigenous People
ISA	Instituto Socioambiental
ITV	Instituto Taquari Vivo
MMA	Ministério do Meio Ambiente
MAPA	Ministério da Agricultura, Pecuária e Abastecimento
NEPPI	Núcleo de Estudos e Pesquisas das Populações Indígenas
PNGATI	National Policy for Environmental and Territorial Management on Indigenous Lands
REDD+	Reducing Emissions from Deforestation and Forest Degradation
TEK	Traditional Ecological Knowledge
UN	United Nations
UNDRIP	United Nations Declaration on the Rights of Indigenous Peoples
UNFCCC	United Nations Framework Convention on Climate Change
WB	World Bank

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To Andrea,
You are sharing this milestone with us.

Chapter 1: Introduction

The global rates of deforestation and forest degradation, and resulting negative impacts such as biodiversity loss, water scarcity, soil degradation, desertification and greenhouse gas emissions, are increasingly alarming (Börner et al, 2020; FAO, 2020; FAO, 2022). These negative trends have their roots in an unsustainable development model whose impact has been growing in the last decades, and that has been amplified by the constant global population growth and the consequent increase of resource demand (land, food, water, energy etc) (Börner et al, 2020; FAO, 2022). Forest conservation is thus a topic that has gained a permanent place in the global landscape of initiatives to contrast climate changes. Attention from the scientific world has been growing constantly in the last twenty years, with the number of scientific publications on the topic having increased significantly¹. This growing attention to the topic is necessary and positive, and multiscale initiatives have succeeded in slowing down the global deforestation pace (FAO, 2020). However, scientific literature is unanimous in denouncing the little inclusion in forest conservation projects of the people who live in and from these forest areas (Parrotta & Agnoletti, 2007; Da Silva et al., 2014; Parrotta et al, 2021; FAO, 2022). The Traditional ecological knowledge (TEK) of Indigenous Peoples (IP) can represent an essential contribution to forest conservation. In fact, it has been demonstrated that their involvement is likely to improve the sustainability, relevance and impact of conservation initiatives, but TEK is often considered as a sub-knowledge, secondary to the scientific one (Ban et al, 2013; Da Silva et al., 2014; FAO, 2016; Bourscheit, 2021; Robinson et al., 2021; Fachin, 2022; FAO, 2022).

Brazil hosts one of the largest portions of natural forest areas of the world, covering over 59% of its territory. In the last twenty years, it lost 27.8 Mha of primary forest due to deforestation (Global Forest Watch, 2022²). Deforestation in Brazil is linked to multiple economic activities including mining activities, oil and energy extraction, land clearing for agricultural and animal farming activities (Arts et al., 2018; Alho et al., 2019; Schulz et al., 2019; ISA, 2022; Gonzaga, 2022). The presence of IPs in Brazil is considerable, with 14% of the country's territory under indigenous land or reserves; at the same time, indigenous lands count for only 1% of the country's deforestation (Souza & Garcia, 2021; Bourscheit, 2021; APIB, 2021). The coupling of these peculiar characteristics qualifies the country as a crucial one to investigate the involvement of IPs in forest conservation.

¹ A research on Google Scholar shows that the number of scientific articles containing "forest conservation" in the title has grown from 22 in the period 2000-2004, to 27 (2005-2009), to 41 (2010-2014), to 59 (2015-2019), culminating in 43 articles only in the last two years and a half (2020-2022), more than what was published on the topic in five years just 8 years ago.

² [Global Forest Watch. Brazil dashboard](#). Last consulted on 08/08/2022.

Given its ecological importance and the scarce attention it receives at the international and national level in comparison to, notably, the Amazon, the focus of this research will be on the Pantanal biome, most of which is located within the Mato Grosso do Sul state (Reis de Sant'Ana, 2014; Schulz et al., 2019). The presence and relevance of the TEK of IPs in the Mato Grosso do Sul state will be investigated and particular attention will be given to an indigenous organisation working on forest conservation and restoration, the Indigenous Environmentalist Collective of Action for Nature, Agroecology and Sustainability - Coletivo Ambientalista Indígena de Ação para Natureza, Agroecologia e Sustentabilidade (Caianas).

1.1. Context analysis

In this section, an overview of the Brazilian context from a geographical, forestry and demographic point of view is provided, outlining the country's relevance both for forest conservation and IP. Then, the focus will be narrowed down to the Pantanal area, explaining the specific characteristics of this region that justify its choice as research focus.

1.1.1. Biomes of Brazil

Brazil is the world's fifth largest country and the richest in terms of biodiversity (Mittermeier, 1997, in de Mattos et al, 2017). The country hosts six biomes: Amazon, Cerrado, Caatinga, Mata Atlantica, Pantanal and Pampa³. 15-20% of the world's known fauna and flora species are located in the country⁴. This biodiversity is threatened by habitat loss and fragmentation, overexploitation of resources, introduction of hybrid and alien species, pollution, use of monoculture and climate change⁵. The Amazon is the largest biome in Brazil and hosts the largest and most biodiverse tropical forest on Earth, which places it under the spotlight of national and international policies, initiatives and scientific research (TNC, 2021). The focus of this research is on the Pantanal biome and will be further explored in sub-section 1.1.4.

³ "Biome" is defined as a collection of life (plant and animal) constituted by the grouping of contiguous vegetation types identifiable on a regional scale with similar geoclimatic conditions and shared history, which results in a unique biological diversity. [Global Forest Watch - Brazil biomes](#). Last consulted on 28/08/2022.

⁴ [Brazil - Main Details](#). Convention on Biological Diversity. Last consulted on 29/08/2022.

⁵ Ibid.

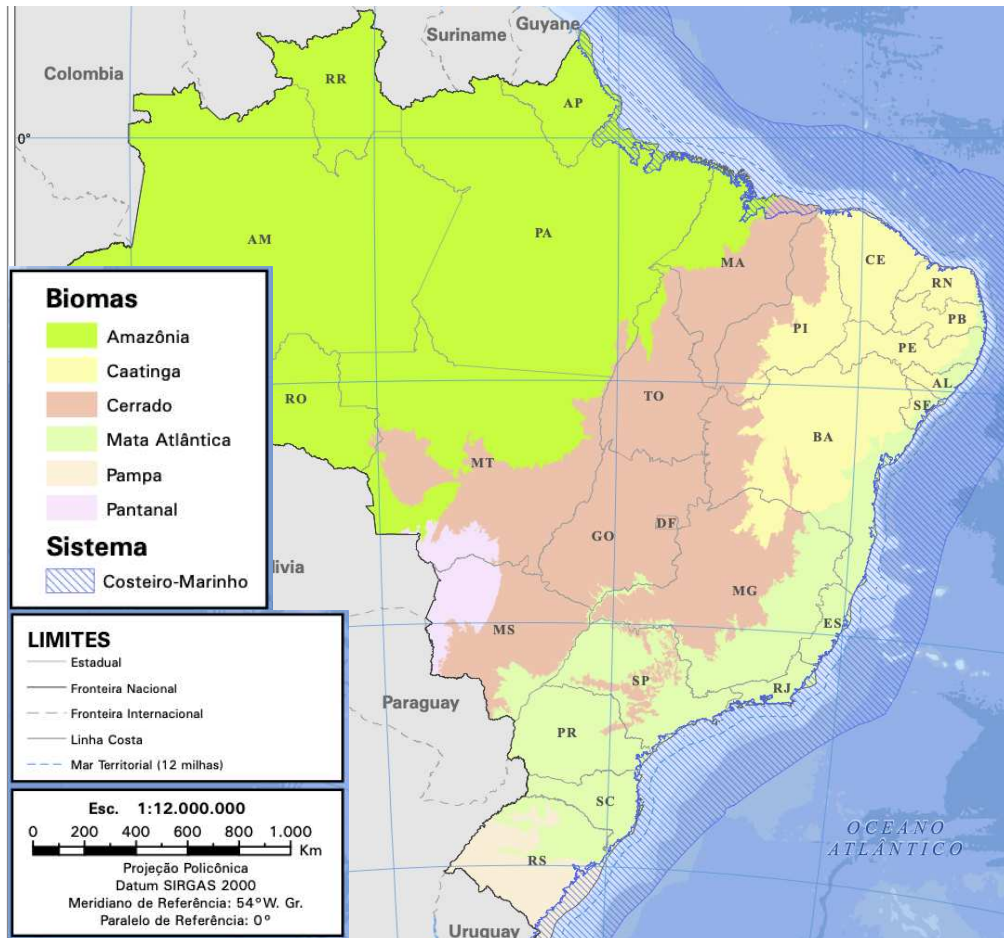


Figure 1 | Biomes of Brazil. Source: IBGE.

1.1.2. Forests in Brazil

Brazil is the second country of the world for percentage of forest cover (Mittermeier, 1997, in de Mattos et al, 2017). Alone, it contains 12% of global forests (FAO, 2020; Global Forest Watch, 2022; Climate Investment Funds, 2021⁶). Among other essential services for people and the planet, forests act as carbon sinks, and the Amazon alone absorbs 1.8 billion tonnes of CO₂ per year (Kaiser, 2019). Brazilian deforestation thus has an enormous impact on global changes at a global scale. As it can be seen in the graphic below (Figure 2), Brazil saw a consistent decrease in its deforestation rates between 2005 and 2015 (Börner et al, 2020; FAO, 2020; Parrotta et al, 2021), that can be attributed to “a combination of government policies (e.g. stronger law enforcement), supply-chain interventions (including private commitments on soy and cattle), and changes in market conditions” (FAO, 2022), which then increased again in the following years, particularly during the last four years of Bolsonaro government (Bourscheit, 2021; Verdum, 2021; Parrotta et al, 2021; PRODES, 2022).

⁶ [Brazil | Climate Investment Funds](#). Last consulted on 08/08/2022.

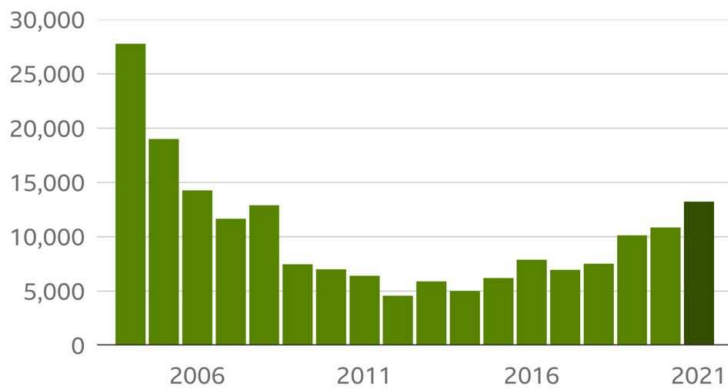


Figure 2 | Amazon deforestation rates (annual rate in km²). Source: PRODES.

Public sector initiatives during the last government lifespan make this trend evident: significant reduction of the budget allocated to government bodies working on environmental matters, hostility towards IPs and civil society organisations working on environmental matters, introduction of newly approved pesticides (Gonzaga, 2022). In January 2019, the Brazilian Forest Service was moved from the Ministry of Environment to the Ministry of Agriculture, an institutional change that, according to the MAPA: *“is expected to strengthen the implementation of actions towards the Sustainable Forest Management of all types of forests, increasing the productive use of natural and planted forests, in public and private lands, from small to large scales of properties and business, contributing better and more to the economy”* (MAPA, 2020). Observers agree on a deliberate preference for economic interests over environmental ones during the last government (Bourscheit, 2021; Verdum, 2021; Parrotta et al, 2021).

1.1.3. Distribution of IPs in Brazil

According to a 2010 census of the Brazilian Institute of Geography and Statistics (IBGE), 896,917 people declared themselves as indigenous, around two thirds of which lived in rural areas (Verdum, 2021). 724 indigenous lands have been formally recognised in some way from the national state, counting for around 14% of the national territory managed by more than 200 IPs, highlighting its important cultural and traditional diversity also (Freire, 2002; Verdum, 2021). Of these, 237 have not reached the highest level of formal ratification, which means they have not been registered in the Union Heritage Secretariat (SPU), leaving their inhabitants and territories out of the formal protection guaranteed to formally recognised indigenous lands (Verdum, 2021). Indigenous presence in the region of Mato Grosso do Sul

counts around 80 500 people, the second largest indigenous presence in the country, divided among 29 municipalities⁷ (ISA, 2010).

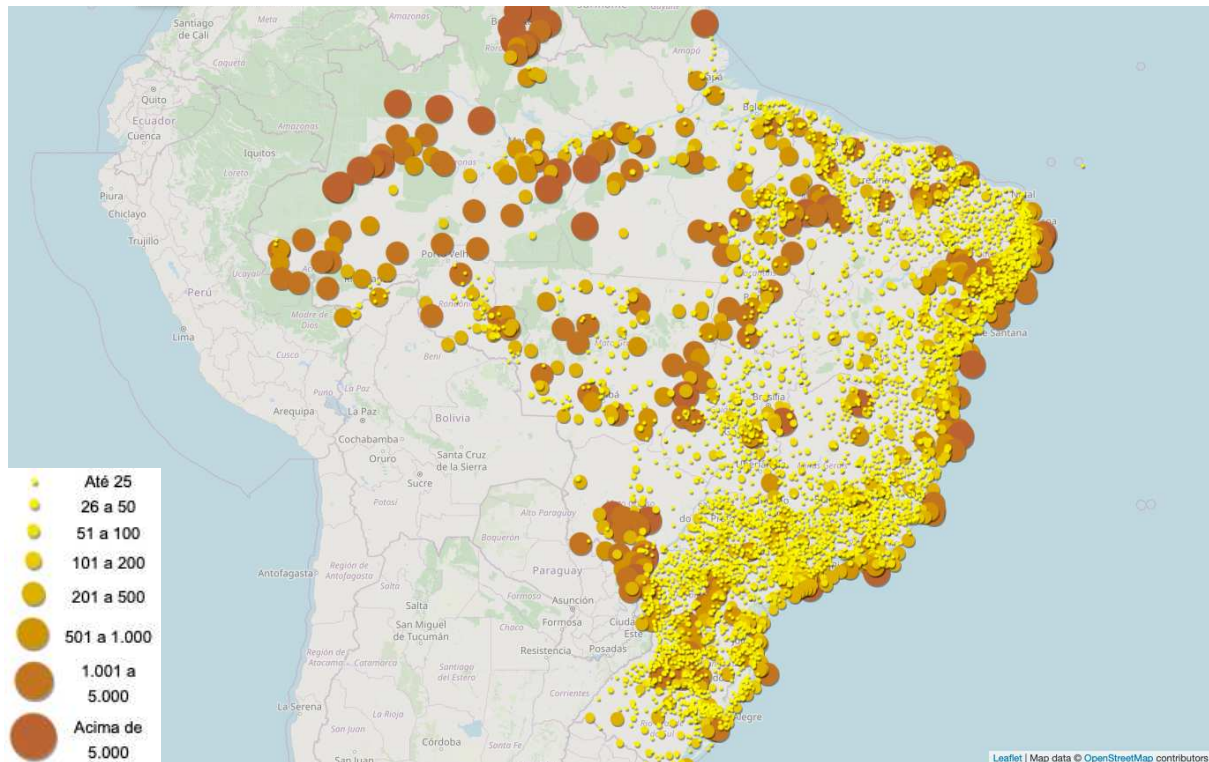


Figure 3 | Distribution of indigenous people in Brazil. Source: IBGE.

Brazil has a history of difficult relations between the private, the public sector and indigenous peoples. This is especially true for the Amazon and some other areas, also within the Mato Grosso do Sul state, where conflicts over the rights of IPs, land and resources use have dramatic scale and consequences for people and the environment (ISA, 2010; Human Rights Watch, 2019). According to the ISA, Mato Grosso do Sul has the worst rates of violation of the rights of IPs recognised by the Federal Constitution, the lowest index of recognised indigenous land per indigenous inhabitant (less than 1 hectare per person) and the highest violence levels against indigenous people (ISA, 2010). Indigenous presence is unequally distributed in Mato Grosso do Sul, with low presence in the Pantanal area (Schulz et al., 2019). The phenomena highlighted by the ISA also have lower relevance for the area considered in this research, but they are still worth consideration because of the deep consequences they have on how indigenous involvement is perceived at federal and state level.

⁷ A list of all indigenous communities of the Mato Grosso do Sul state, divided by municipality and ethnicity, is available on the official government website: [Comunidades Indígenas – SECIC](#), Secretaria de Estado de Cidadania e Cultura. Last consulted on 13/08/2022.

1.1.4. The Pantanal region

The Pantanal is an important natural area in Latin America; one of the largest continuous wetlands on Earth, extended among Brazil, Bolivia and Paraguay, with 140,000 square km in the regions of Mato Grosso and Mato Grosso do Sul in Brazil (Soriano et al, 2019; Harris et al, 2005; WWF, 2016; Hugueney & Braun, 2019). It is situated in the convergence of three major ecosystems: tropical rainforests (Amazonian and Mata Atlântica), Cerrado (savannah) and Chaco, and is therefore a great mosaic of ecosystems (Ab'Saber, 1988; WWF, 2016; Schulz et al., 2019). Due to this peculiar position and coupling of different habitats in the Pantanal, the concentration of biodiversity is greater than in each of the other biomes of Brazil (Alho et al., 2019).



Figure 4 | The Pantanal. Source: Schulz et al., 2019.

95% of the land is privately owned, mainly by large landowners (*fazendeiros*) (Arts et al., 2018). The remaining 5% hosts natural and indigenous reserves and indigenous lands, which are property of the federal government (Verdum, 2021). Indigenous presence was more consistent in the past but has declined historically due to conflicting interests over land ownership, isolation and difficult logistics in the area, displacement and identity loss (Chamorro & Combès 2015).

In the Pantanal, the main threats to the biomes are represented by deforestation, construction of hydroelectric plants, waterway projects, and mining⁸ (WWF, 2016; Schulz et al., 2019). The fact that most land is privately owned has its roots in the war with Paraguay between 1864 and 1870, when land that was previously occupied by IPs and then abandoned because of the war was arbitrarily assigned from the government to non-indigenous individuals as a reward for their contribution to the war (Azanha, 2005; Chamorro & Combès 2015). Despite this historical overcoming of IPs' rights over land, the events that led to the current state of things are nowadays so remote that there is not really anymore an indigenous movement to recuperate those lands. This only happens in some areas, the so-called *retomadas* (recuperated), portions of privately owned land have been recognised as indigenous land but never devolved to their original owners, and that are now being occupied by IPs (Reis de Sant'Ana, 2014). The major activity carried out in those privately owned *fazendas* is cattle ranching, with pasture being responsible for land degradation (Arts et al., 2018; Alho et al., 2019; Schulz et al., 2019; ISA, 2022).

⁸ [Brazilian Pantanal](#). Observatorio Pantanal. Last consulted on 18/08/2022.

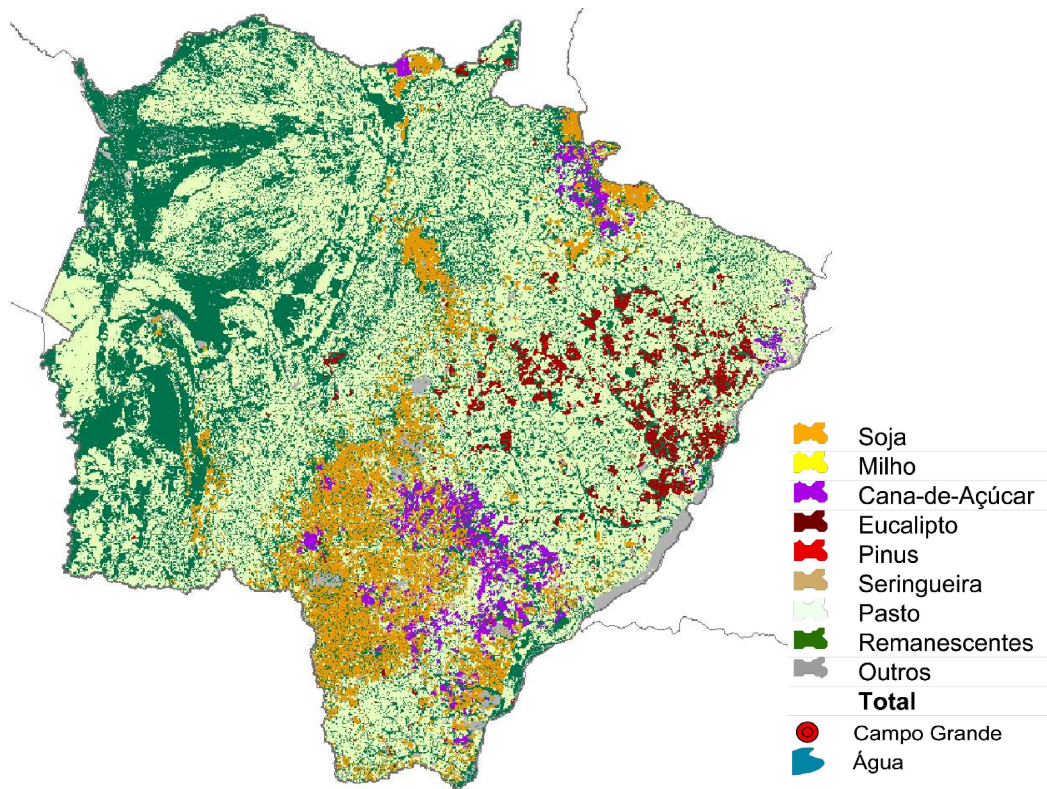


Figure 5 | Land use in Mato Grosso do Sul. Translation of the legend, from top to bottom of the list: soy, millet, sugar cane, eucalyptus, pine, rubber tree, pasture, preserved land, other. Source: FAMASUL, 2020.

Consequently, deforestation, land clearing for pastures and climate change increased dramatically the probability of wildfires in the Pantanal over the last 20 years, from 1,2% to 11% (Alho et al., 2019; Schulz et al., 2019; ECOA, 2020; ISA, 2022). In Figure 6, we can see the increase of wildfires in the year 2019/2020, compared to 2017/2018. We can see how the Pantanal has been by far the most affected among all of Brazil's biomes (Gonzaga, 2022). The last three years, 2020 to 2022, have registered the worst droughts of the Pantanal's recent history (ISA, 2022).

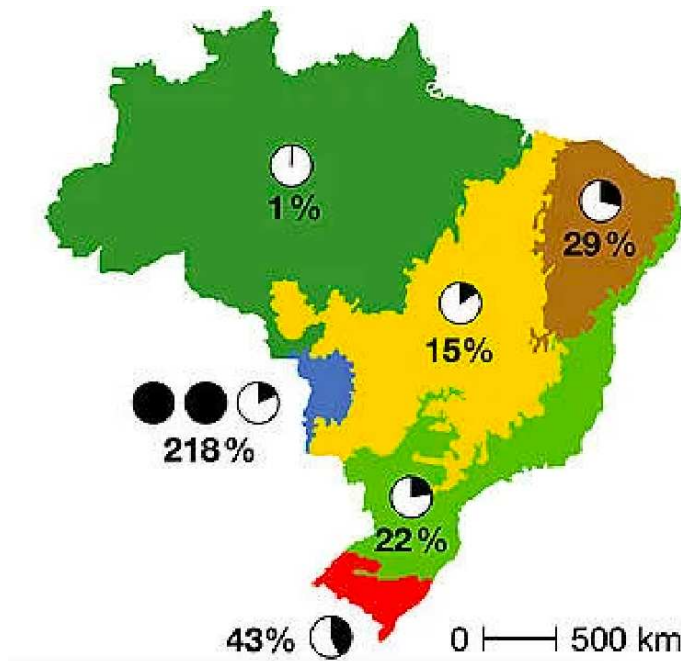


Figure 6 | Increase of wildfires in each of Brazil's biomes in the year 2019/2020, compared to 2017/2018. Source: INPE, 2021, in Gonzaga, 2022.

Thus, given the negative impacts associated with forest loss and the importance of forest land to the range of stakeholders and the importance of forests, forest conservation is a hot topic in the Pantanal, especially in light of the extreme droughts and wildfires that have been happening in the area during the last years (ECOIA, 2020; ISA, 2022). Forest loss and degradation are particularly relevant to this research because they are often responsible for loss of identity and traditional knowledge.

1.2. Problem statement

Many IPs are vulnerable to forest loss and degradation, not only when they are directly dependent on forests for their subsistence - which is not the case for many IPs in the Pantanal area⁹ - but also because their TEK is challenged by the changing climate and environment. In fact, the TEK of IPs *"is often the result of centuries of adaptation to difficult environmental conditions"* (Parrotta & Agnoletti, 2007), which potentially makes it resilient and capable of facing the impact of climate change. However, the modifications that global change is bringing at the local level and the consequences it has on lifestyles - not only the ones of IPs - make it difficult to preserve a TEK that often finds it difficult to evolve at the same pace as a changing environment (Da Silva et al., 2014; Parrotta et al, 2021). It has also been demonstrated how TEK plays a crucial role in forest conservation, which is a key

⁹ [Os Povos indígenas do Pantanal](#), Observatorio Pantanal, 2021. Last consulted on 11/08/2022.

contribution to climate change mitigation. In fact, it has been estimated that 24% of global tropical forests are managed by indigenous people and local communities (IPLCs) and it has been demonstrated by multiple studies that the proximity, historical connection, dependence and knowledge of IPs on their living environments has an overall positive impact on biodiversity, ecosystems and forest conservation, as well as water management (Da Silva et al., 2014; Evans & Guariguata, 2016; Parrotta et al., 2021; Robinson et al., 2021; CBD, 2020; FAO, 2022). The knowledge of IPs is also a source of information and “*a useful model for biodiversity policies*” (CBD, 2020).

The Pantanal area is less considered in scientific literature on environmental conservation than the Amazon forest, despite being one of the most unique and biodiverse biomes of Latin America (Reis de Sant’Ana, 2014; Alho et al., 2019; Schulz et al., 2019; Hugueney & Braun, 2019). Indigenous presence in the area is lower than in other parts of the country, as well as indigenous protagonism in forest conservation-related initiatives (Schulz et al., 2019). This is why the presence and relevance of IPs in the area is weakly perceived (Schulz et al., 2019; Sudré, 2020). The need to develop socio-environmental conservation projects in regions other than the Amazon one had been made clear at the national level by IPs representatives from Mato Grosso do Sul during the consultations for the GATI project; this will be explained in more detail in sub-section 2.3.2. (Reis de Sant’Ana, 2014). Probably due to the low presence of IPs in the Pantanal area, studies on how local forest conservation could be improved thanks to a greater involvement of their TEK are practically absent (Schulz et al., 2019). However, as introduced before, involvement of TEK of IPs is not only a rightful claim but it also has a potential positive impact on conservation initiatives sustainability, acceptance and impact (Ban et al., 2013; Da Silva et al., 2014; FAO, 2016; FAO, 2022).

1.3. Research question and objectives

The focus of this research is to understand if and to what extent TEK is present and valorized, both by indigenous people and by non-indigenous actors in forest conservation in the Pantanal area. The research aims at answering the following research question (RQ): *How is the TEK of IPs defined in the Pantanal area and how can it be a means for IP involvement in forest conservation projects there?* Several sub questions will also be investigated, which will help address the RQ and add detail to the results. Most importantly, they will help justify and frame the case study of the “Coletivo Ambientalista Indígena de Ação para Natureza, Agroecologia e Sustentabilidade”, hereinafter “Caianas” choice and uniqueness. This is in line with the recommendation of Schulz et al., 2019, according to

which “*future environmental research should build more strongly on the positive example of a small number of case studies where traditional and local knowledge of the environment was put into a dialogue with scientific knowledge and techniques*” (Schulz et al., 2019). The explored sub-questions are:

- How is the TEK of IPs defined in the study area?
- What are the context specificities?
- What are the main obstacles and opportunities for involvement of IPs in local forest conservation?
- In what way is the Caianas' example relevant?
- Could the Caianas case study be replicated in the region?

The general objective of the thesis is thus to investigate the characteristics and the importance of Traditional Ecological Knowledge (TEK) of Indigenous People (IP) in forest conservation in the Pantanal area in Brazil. The pursuit of this objective will be guided by the RQ and sub-questions presented above.

1.4. Structure of the thesis

Chapter 1 presented the introductory information, an overview of the context, the problem statement, research question and the research objectives. Chapter 2 consists in the theoretical framework, where the main terms and concepts used in the research are explained, with reference to relevant literature. The State of the Art explores scientific literature to expose the relevance of the TEK of IPs, which has been widely demonstrated. Finally, an exhaustive overview of the existing frameworks and policies on forest conservation and the involvement of the TEK of IPs is done, first at the international level, and then narrowing it down to the national and local level. This constitutes the theoretical landscape that the case study and research result is assessed against. Chapter 3 describes the methodology, justifying the choice of the methods and of the study area, exposing the data collection techniques that were considered more adapted to the research, describing the ethical considerations and limits. Chapter 4 presents the research results, starting from a description of the actors involved, and moving then to the presentation of the case study that constitutes the core of the research results and discussion. Chapter 5 merges the findings of chapters 2 and 4. Here, the situation of TEK in the Pantanal area, involvement of IPs in forest conservation and the relevance and replicability of the Caianas experience is discussed, building both on primary and secondary data findings. Finally, in chapter 6, the conclusions are drawn.

Chapter 2: Theoretical framework & literature review

2.1. Definition of concepts

In this sub-section, concepts of relevance for this research will be listed and described, and the chosen definition and scope that was considered for each of them will be presented. It is not the focus to cover all of them, because of their complexity, but it is important to briefly frame them in the measure in which they will be included and interlaced within this research.

2.1.1. Forest conservation

The practice of forest conservation includes a large spectrum of activities and approaches aimed at preserving and protecting forests. These can be organised as follows (USAID, 2021):

- Policy, Planning, and Governance: this constitutes the legal (binding or non-binding) framework that regulates forest conservation at the international, national and local level.
- Protected Area Management: protected areas gained a statute that regulates their sustainable use, and whose environmental relevance is often broader than their geographical borders.
- Forest Monitoring: all the different monitoring approaches to ensure conservation. This can include ground-based dedicated forest conservation entities, aerial, drone or satellite monitoring and observation of phenomena like land cover change, fire tracking etc.
- Finance and Markets: tools that couple economic advantages with forest conservation. This includes, payment for ecosystem services (PES), sustainable tourism, sustainable investments, sustainable forest products supply, carbon markets, etc.
- Rights and Resources: forest land and resources management largely benefit from the involvement of forest-dependent communities, such as IPs. The respect of their rights has to be taken into consideration for sustainable forest management, and is key to the success of community management initiatives. In the words of Robinson et al., 2021: *“protecting Indigenous peoples’ rights will help protect traditional ecological*

knowledge, and restore knowledge, language, biodiversity, and ecological functions”
(Robinson et al., 2021).

2.1.2. Indigenous People (IPs)

Indigenous people is a term that is widely used in literature and defined in different ways. The definition adopted in this research for the groups whose TEK is being researched is the one from the FAO, which lists several characteristics that are found in the study area, namely: groups referring to themselves as indigenous, having ancient historical presence and linkage with a specific territory, having a cultural identity that is peculiar to the group and handed down from one generation to another, having experienced in the past or in the present “*subjugation, marginalisation, dispossession, exclusion or discrimination*” (FAO, 2016). The establishment of characteristics helps to outline an understanding of who IPs are, but cannot be taken as an absolute. With regard, for example, to linkage with a specific territory, it is necessary to make this criterion flexible in countries like Brazil, where conflicts over land are common (Moreira, 2007). Indeed, this is why dispossession is also included in the FAO definition. The terms of native or autoctonos people, also used in literature, could have been appropriated. However, the choice was made to use the term that Terena people from the Caianas organisation used to describe themselves, which was *povos indigenas* - indigenous people. This appeared as the most coherent and respectful choice to make, in addition to self-identification being the first of the characteristics listed by the FAO to identify IPs (FAO, 2016).

Indigenous People (IPs) are often coupled with Local Communities (LCs) and referred to with the acronym IPLC. This is the case for most bibliography and for international frameworks (CBD, 2006; Moreira, 2007). However, in the case of the Pantanal area, considering them as a whole would bring to a misdescription of the actors. In fact, despite having traditional presence and activities, Local Communities in the Pantanal have very different characteristics than Indigenous People in the same area. For instance, the *ribeirinhos* - non-indigenous traditional riparian communities - that live along the Rio Paraguay can be considered local communities, but they have a very peculiar history and traditional knowledge heritage. They live in river areas and have almost no connection with forest areas (CBD, 2006; Arts et al, 2018; Schulz et al, 2019). The *pantaneiros*, mostly colonisers' descendants who live in the Pantanal ever since its occupation in the 18th Century¹⁰, and who mostly work with cattle farming activities, can also be called LCs (Da Silva et al., 2014; De Mattos et al, 2017; Schulz et al., 2019). Considering such heterogeneous actors as a

¹⁰ [Tradicional Peoples - Observatorio Pantanal](#). Last consulted on 18/08/2022.

whole, broad category of IPLC would bring to misperception and misdescription of the context (CBD, 2006; Moreira, 2007; Arts et al, 2018). The choice was thus made to only include IPs in the research focus.

2.1.3. Traditional ecological knowledge (TEK)

Traditional ecological knowledge has multiple definitions in scientific literature. The one adopted here is the one taken from Elias, 2018: “A *cumulative body of knowledge, practice and belief, evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment*” (Berkes 2012, as in Elias, 2018). This definition was chosen because of multiple aspects it takes into consideration:

- *cumulative body*: TEK is not only about one single field of knowledge. It is a holistic consideration of ecology that includes and interlaces several elements, not only strictly environmental but also cultural, social, spiritual and economic ones (Parrotta & Agnoletti, 2007; Moreira, 2007; Da Silva et al., 2014; CBD, 2020; Robinson et al., 2021).
- *knowledge, practice and belief*: knowledge translates into practice, and practice generates knowledge. As an example, IPs' livelihood largely depends on knowledge of edible, medicinal and useful plants and seeds. The concept of belief links TEK with spirituality, which is an essential component of indigenous holistic vision of reality (Moreira, 2007; CBD, 2020).
- *evolving by adaptive processes*: as previously stated, TEK is threatened by a changing climate and environment. Its capacity to adapt determines its ability to survive (Parrotta & Agnoletti, 2007; Da Silva et al., 2014).
- *handed down through generations by cultural transmission*: elders are the custodians of TEK, and generational knowledge transpass is an essential part of indigenous heritage (Moreira, 2007; Da Silva et al., 2014).
- *about the relationship of living beings (including humans) with one another and with their environment*: this part of the definition is crucial because it explicits the interrelation and co-evolution of human and environmental spheres (Robinson et al., 2021).

Other scientific literature adds interesting elements to this definition, such as a “*sense of shared ownership*” embedded in TEK (Schulz et al., 2019), which explicits the collective character of indigenous knowledge, and a practical aspect of TEK in regards to the fields of


“agriculture, fisheries, health, horticulture, forestry and environmental management” (Moreira, 2007; CBD, 2020).

2.1.4. Free, prior and informed consent (FPIC)

FPIC is a norm of international law that requires the obtention or withholdment of IPs and vulnerable stakeholders’ consent to projects affecting their territories and communities as an imprescindible condition. This consent has to be free, meaning that no coercion, manipulation or intimidation can be present; prior to the commencement of any activity; and informed, meaning that full access to relevant information must be guaranteed in a way that is accessible to interested communities (Hanna & Vanclay, 2013). The concept of FPIC has been developed and defined by the FAO and adopted by several international frameworks such as the Declaration on the Rights of Indigenous Peoples (UNDRIP), the ILO Indigenous and Tribal Peoples Convention, the Convention on Biological Diversity (CBD), as well as other international conventions and charters¹¹ that constitute its normative framework (Hanna & Vanclay, 2013; FAO, 2016). More details on the most relevant frameworks will be provided in sub-section 2.3.1. FPIC is also included in national laws, following the statement of the Committee on Economic, Social and Cultural Rights according to which states have to respect FPIC of IPs *“in all matters covered by their specific rights”* (FAO, 2016). The universal rights to non-discrimination, self determination, participation, property, culture, land and resources are all included and interlaced within the concept. FPIC implies the obligation of IPs consultation, consent, negotiation rights and participation in all phases of project development - design, implementation, monitoring and evaluation (Hanna & Vanclay, 2013). The concept of participation is particularly relevant to this research, whose interest is in the consultation of IP that derives from their consideration not only as relevant stakeholders but as source of knowledge (Hugel, 2018). In fact, FPIC is also strictly related to the concept of TEK involvement, of which it represents a precondition (Robinson et al., 2021). Obtaining FPIC from holders is the first step in requesting the use of TEK¹². The capacity of self determination also includes the recognition and valorisation of IPs’ own knowledge, which should be progressively enabled by the action of organisations and countries (FAO, 2016).

¹¹The International Covenant on Civil and Political Rights (ICCPR); the International Covenant on Economic, Social and Cultural Rights (ICESCR); the International Convention on the Elimination of All Forms of Racial Discrimination (ICERD); the American Convention on Human Rights; the African Charter on Human and Peoples’ Rights (ACHPR) (FAO, 2016).

¹² [Patrimônio Genético e Conhecimentos Tradicionais Associados — Português \(Brasil\)](#). Ministry of the Environment (MMA). Last consulted on 30/08/2022.



Degree of Participation	Types of Engagement	Description
HIGH ↑ LOW	Empowerment	Transfers control over decision making, resources & activities
	Joint decision making	Joint collaboration with shared control over a decision
	Collaboration	Joint activities without decision making authority and control
	Consultation	Two-way flow of information & exchange of views
	Information sharing	One-way flow of information

Figure 7 | Five types of engagement based on degree of participation. Source: UN-REDD Guidelines on FPIC, 2011, as in Hugel, 2018.

2.2. State of the Art

This sub-section will build on the concepts defined in the previous, and present a state of the existing knowledge of the object of study - the relevance of TEK of IPs for forest conservation. To do this, scientific literature has been explored and coupled with information from relevant international policy landscape, which will be presented in more detail in the next sub-section.

2.2.1 The importance of TEK of IPs in scientific literature

Historically, TEK of IPs has often been undervalued by scientists, who link it to superstition, tribalism and irrationalism, unless it is translated in scientific terms and “institutionalised”. This despite TEK being the oldest science production form of history (Moreira, 2007) and having been recognised by the UN since the end of 20th century as having the same reliability and status as scientific knowledge (Mauro & Hardison, 2000). TEK can be considered a component of IPs’ cultural rights, since it is strongly interlinked with their cultural identity (Hanna & Vanclay, 2013). TEK is also strongly place-specific and capable of adaptation to changing conditions in its native environment (Reyes-García & Benyei, 2019). The topic of TEK of IPs is up to our days not very much explored in literature, but the attention to it is growing¹³ in light of successful evidence that has shown how IP’s forest management is beneficial to the environment because of its low intensity, which allows

¹³ Using the same indicator that was used to research forest conservation related publications, a keyword research on Google Scholar has shown that the number of publications containing “indigenous AND traditional ecological knowledge” in the title has grown from 9 in the period 2000-2004, to 13 (2005-2009), to 11 (2010-2014), to 21 (2015-2019), to 11 papers only in the last two years and a half (2020-2022).

regeneration of resources over time (Evans & Guariguata, 2016; Robinson et al., 2021; Aragão, 2022).

2.2.2 The consideration of TEK of IPs in forest conservation projects

The consideration of TEK of IPs should be an implicit characteristic not only of forest conservation projects but of all environmental projects that are carried out on or impact indigenous land. It should be, first and foremost, a matter of rights being respected, and a non-prevarication of those living in and from forests and natural areas (Mauro & Hardison, 2000; USAID, 2021). However, this is often not the case because of the exclusively environmental values that guide many conservation initiatives. The joint consideration of social and ecological imperatives is still often undervalued (Parrotta & Agnoletti, 2007; Ban et al, 2013; CBD, 2020).

TEK of IPs has two additional values for forest conservation projects. First of all, it has been demonstrated by scientific evidence that forest areas managed by IP are the ones where land use change is likely to be lowest (Mauro & Hardison, 2000; Evans & Guariguata, 2016; Souza & Garcia, 2021, Parrotta et al, 2021). Secondly, it represents an asset for forest conservation projects promoters. Including IPs in projects not only as beneficiaries but in the decision making, project design and implementation phase can bring greater internal and external acceptance to the projects, ease the implementation, make the project more realistic, improve the sustainability - not only environmental but also economic - and meet the requirement of associated recommendations (Moreira, 2007; Ban et al, 2013; Evans & Guariguata, 2016; FAO, 2016; Reyes-García & Benyei, 2019; Fachin, 2022; FAO, 2022). Sustainable management practices, coexistence with nature, historical memory of environment changes and adaptation capacity are all elements that should be taken into consideration in the design phase of a project. This is not to say that IPLC's knowledge or way of doing should set the tone or guide forest conservation projects, but their consideration is relevant to a proper understanding of a context and the transformation trends that interest it. Participation also includes involvement in decision-making in areas where this can be difficult or uncommon also – but not only – because of land tenure rights (Hugel, 2018).

It is more frequent in literature to have IPs cited as beneficiaries of projects, but the valorization of their own TEK is largely insufficient in international frameworks, as it will be seen in sub-section 2.3.1. (Mauro & Hardison, 2000; Moreira, 2007; Da Silva et al., 2014). Of course, obstacles exist that might in some cases make involvement of the TEK of IPs difficult. These include: lack of trust bonds that can make IPs willing to share their TEK,

asymmetries in power and rights, lack or insufficient knowledge of approaches for TEK of IPs engagement, incompatible worldviews and ethics (FAO, 2022).

2.2.3. TEK of IPs consideration in Brazil

TEK of IPs has also been considered with prejudice by Brazilian society. It was “*despised and ridiculed*”, as if it was the denial of science and objectivity (Freire, 2002; Hanna & Vanclay, 2013). A present vision in Latin American elites still associates the valorisation of indigenous cultures and rights with the risk to slow down a country’s development. National interest is thus used as a pretext to prevaricate the rights of IPs. In Brazil, this has been seen in the 2012 Ordinance 303 government act (Portaria 303 da AGU) which stated: “*the enjoyment of the riches of the soil, rivers and lakes existing in indigenous lands (art. 231, §2 of the Constitution) can be relativized whenever, as in art. 231, 68, of the Constitution, there is relevant public interest of the Union, in the form of a supplementary law*”. This Ordinance has been suspended upon request of civil society organisations like the APIB, but has never been revoked (Hanna & Vanclay, 2013). In contrast with this prejudice, in 1992 the Goeldi Museum from the Brazilian city of Belém created an expo on the Kayapó people’s TEK. The message of the expo, in the words of one of its organisers, was: “*if indigenous knowledge was taken seriously by modern science and incorporated into research and development programs, indigenous people would be valued for what they are: resourceful, intelligent and practical people who have successfully survived for thousands of years in the Amazon. This positioning would create an “ideological bridge” between cultures, which could allow indigenous peoples to participate, with the respect and esteem they deserve, in the construction of a modern Brazil*” (Freire, 2002).

A recent study from the Instituto Socioambiental proved that in Brazil, IP’s traditional forest management improves the quality of territorial governance in terms of degraded land recuperation. The same study showed a better performance in terms of forest conservation in Indigenous lands and reserves than in environmental protection areas (Áreas de Proteção Ambiental, APAs). The latter are important units for environmental conservation, managed by different actors (NGOs, municipalities, communities). Table 1 shows that in the Pantanal, 85% of Indigenous lands (Terra indigena) are preserved (Aragão, 2022).

Table 1 | Total preserved area occupied by different kinds of traditional settlements, for each of Brazil biomes. Source: Aragón, 2022.

Área Preservada - % da área total (a)

Ocupação tradicional	Amazônia	Cerrado	Mata Atlântica	Caatinga	Pantanal	Pampa	Brasil
Terra Indígena	95	89	37	46	85	72	89
Quilombo	56	68	37	43	-	55	49
UC - OT permitida	95	91	85	49	-	-	94
UC - OT tolerada	97	57	50	89	-	-	88
UC - OT não permitida	97	87	83	87	98	69	87
UC sem restrição	70	57	42	67	-	65	55

IPs have also proved to be essential protectors of biodiversity. A research from 1986, conducted in a small area of the Amazonas state (Uaupés river), found that 137 different species of manioc were cultivated among the Tukano indigenous people (Freire, 2002). The Brazilian National Biodiversity Strategy Project, which will be presented in sub-section 2.3.2. on national legislation, provided support for *“the development of a synthesis on biodiversity-related traditional knowledge in Brazil through inventorying all work published during the last 20 years on the knowledge and use of biodiversity by traditional peoples in Brazil. Most titles refer to Amazonian populations, followed by coastal and Cerrado populations, but it is worth noting that, of the 206 indigenous nations in Brazil, only 106 have had their traditional knowledge studied”*¹⁴.

With regards to the Pantanal, the need to integrate scientific and traditional knowledge is stressed in scientific literature, in light of its value as a source of information and validation of conventional science. Contribution of TEK in the Pantanal is still seen as a potential by scientific research, but the area is lacking a concrete application of this alliance of knowledges (Schulz et al, 2019; Bergier et al., 2019, Guerreiro et al., 2019 in Schulz et al, 2019).

2.3. The relevance of the TEK of IP in select forest conservation policies

2.3.1. International level

In the 1980s, for the first time environmental associations and social movements from different parts of the world started participating in UN meetings and began to discuss development paths including reference to IP's rights and participation (Zanirato & Costa,

¹⁴[Brazil - Main Details](#). Convention on Biological Diversity. Last consulted on 30/08/2022.

2007; Popova, 2014). Within the last 30 years, there have been several important additions to international laws on the topic of IPs' contribution in environmental conservation. IPs' participation in all development phases of forest conservation projects is today recognised in several frameworks developed by the most important UN programmes, specialised agencies, related organisations and bodies. The most relevant frameworks covering forest conservation, IPs and TEK will be briefly described, listed in chronological order and critically analysed in the following paragraphs. Those were selected through review of relevant literature on international frameworks covering the research main topics, namely: Mauro & Hardison, 2000; Zanirato & Costa, 2007; Hanna & Vanclay, 2013; FAO, 2016; Elias, 2018; Hugel, 2018; Parrotta et al, 2021. As pointed out already in 2000 by Mauro & Hardison and in 2007 by Zanirato & Costa, IP's related international frameworks express different visions, are constantly evolving and many of the rights that are stated in international legislation are not always secured (Mauro & Hardison, 2000; Zanirato & Costa, 2007; Robinson et al., 2021).

World Bank

The World Bank works on global poverty reduction and on the improvement of living standards (education, health, infrastructure etc.) through the provision of financial support to countries. It is very active in IPs' engagement, whose traditional knowledge is considered a resource for climate change mitigation and adaptation. It implements a series of measures like direct financial grants to IPs, inclusion and recognition of IPs traditional knowledge contribution to forest and biodiversity conservation. From the World Bank official page dedicated to Indigenous Peoples¹⁵: *“Specific initiatives in this sphere include: a Dedicated Grant Mechanism (DGM) for Indigenous Peoples and Local Communities under the Forest Investment Program (FIP) in multiple countries; a capacity building program oriented partly toward Forest-Dependent Indigenous Peoples by the Forest Carbon Partnership Facility (FCPF); support for enhanced participation of Indigenous Peoples in benefit sharing of carbon emission reduction programs through the Enhancing Access to Benefits while Lowering Emissions - EnABLE Fund; and analytical, strategic planning, and operational activities in the context of the FCPF and the BioCarbon Fund Initiative for Sustainable Forest Landscapes (ISFL). Indigenous Peoples are also observers to the Climate Investment Funds (CIF)”*. In line with the WB economic vocation, it appears from this list that the World Bank approach is more focused on financial empowerment than on recognition of IPs' place in the scientific discourse.

¹⁵ [Indigenous Peoples Overview](#). World Bank. Last consulted on 05/09/2022.

One relevant framework developed by the WB is the Environmental and Social Framework (ESF), notably in its Standards 5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement; 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; 7: Indigenous Peoples; 8: Cultural Heritage (WB, 2016). All of these Standards address aspects of interest for TEK of IPs consideration, with ESS7 making specific reference to IP's traditional knowledge. Here also, IPs are seen largely as beneficiaries and their cultural heritage (Standard 8) is not as much about immaterial traditional knowledge as it is about sites, manufacts or manifestations of artistic and/or historic value (Ibid.).

International Labour Organisation | Indigenous and Tribal Peoples Convention

The ILO, UN agency, developed the Indigenous and Tribal Peoples Convention (Convention 169) in 1989, which also includes consideration to IPs participation in Art 7. IPs “*shall participate in the formulation, implementation and evaluation of plans and programmes for national and regional development which may affect them directly*”. The role foreseen for IPs here is proactive, but no specific mention is done to their traditional knowledge, nor it is clear what the Convention means by development plans and programmes, and whether this also includes environmental conservation projects or not. However, in the same article it is also stated that “*governments shall take measures, in cooperation with the peoples concerned, to protect and preserve the environment of the territories they inhabit*”, and in Art 15 it is stated that people concerned by the resources of a natural area should participate in their use, management and conservation (ILO ITPC, 1989).

Recently, federal deputy Alceu Moreira, with the support of representatives from the main agribusiness parliamentary group (FRA) and agribusiness organisations from the Pará state in Brazil drafted a legislative decree (177/2021) to resign from the Convention 169 (Verdum, 2021; ISO, 2022).

UN Rio Summit

The Rio Summit was a UN Conference from 1992, also known as Earth Summit, which was the first global Convention dedicated to the environment. It developed a series of official documents that are very relevant to forest conservation and involvement of IP (Zanirato & Ribeira, 2007; Popova, 2014). These include:

- Agenda 21: Agenda 21, particularly in its Section III, Chapter 26, details methods to recognise and support IPs' “vital role” (Mauro & Hardison, 2000). It includes among several of its programme areas' objectives mentions like the following “*conservation of biodiversity, watershed protection, sustainability of their production and agricultural development, and other purposes, with the full participation of indigenous people*”,

“Recognize and foster the traditional methods and the knowledge of indigenous people”. It is one of the international frameworks where full support and participation of IPs are stated with the most clarity, and TEK is taken into adequate consideration. It also includes some recommendations for implementing this into legislation and practice¹⁶.

- Convention on Biological Diversity (Target 17): The CBD might be one of the most proactive and specific international frameworks with consideration to the TEK of IPs role in environmental conservation. It is the first framework where traditional knowledge is specifically mentioned, and with a protagonist role (Moreira, 2007; Zanirato & Ribeira, 2007; Popova, 2014). Art 8 states the importance for countries to *“respect, preserve and maintain traditional knowledge of IPLCs relevant to the conservation and sustainable use of biological diversity”*. The interpretation of this article has been controversial, since it hits the nerve of implementation in national legislation (Mauro & Hardison, 2000). Art 8 also promotes traditional knowledge *“wider application with the approval and involvement of the holders of such knowledge”*. Article 17 is the most interesting and complete one, promoting *“the exchange of information, from all publicly available sources, relevant to the conservation and sustainable use of biological diversity”*, including *“training and surveying programmes, specialised knowledge, indigenous and Traditional Knowledge”* (Hanna & Vanclay, 2013; CBD, 2020). Art 8 and Art 17 open the discussion to the topic of *“public availability”* of TEK, which is a very controversial one since the right to have their TEK recognised should not go against the right of IPs to decide on the disclosure and use of their TEK (Moreira, 2007; Zanirato & Ribeira, 2007). This will be discussed later in the research.

UN Framework Convention on Climate Change

The UNFCCC is a Convention that was created in 1992 and is responsible for coordinating the global fight against climate change. It originated several outcomes, both as treaties and as approaches, of which the most relevant for this research are:

- REDD+: Reducing Emissions from Deforestation and Forest Degradation (REDD+) is an approach for climate change mitigation with a focus on forests, first developed in 2005 by the UNFCCC with the name of RED. The “+” was added later to include forest carbon stocks conservation and enhancement, and sustainable forest management. According to REDD+ guidelines, countries are responsible for ensuring equal participation in decision-making regarding the definition of actions and policies

¹⁶ [Core Publications Agenda 21](#) . UN. Last consulted on 02/09/2022.

and measures (PAMs), with particular attention to marginalised groups such as IPs (Parrotta et al, 2021). In its safeguards C and D, REDD+ insists on the importance of guaranteeing, along with their rights, the respect for the knowledge of IPs with reference to international obligations, and their full and effective participation (Hugel, 2018). Participation here includes both consultation, which is defined as the exchange of information and views, and decision-making power (Ibid). Regarding Brazil, REDD+ is widely applied in the country but most projects interest the Amazon area. In its practical application, REDD+ is often heavily criticised by civil society organisations, especially in relation to its scarce attention to IPs rights, FPIC and consideration of cultural and social aspects in IPs connection with forests (REDD Monitor, 2014).

- Paris Agreement (Article 7): the Paris Agreement had as an aim to limit climate change and improve mitigation and adaptation action worldwide. Art 7 states that the latter should be “*based on and guided by the best available science and, as appropriate, traditional knowledge, knowledge of indigenous peoples and local knowledge systems, with a view to integrating adaptation into relevant socioeconomic and environmental policies and actions*”. This represents an important acknowledgement of the added value of merging scientific and traditional knowledge¹⁷.

UN Declaration on the Rights of Indigenous Peoples

The Declaration on the Rights of Indigenous Peoples, UN resolution adopted in 2007 by the General Assembly, addresses the specific topic of traditional knowledge in Articles 29, 31 and 32. It is stated in these articles that IPs have the right to “*the conservation and protection of the environment*” (Art 29), to “*maintain, control, protect and develop*” their sciences and knowledge of seeds, fauna and flora and their properties (Art.31) and to “*determine and develop priorities and strategies for the development or use of their lands or territories and other resources*” (Art 32). In regards to the implementation and exertion of these rights, Art 29 perpetuates a paternalistic approach by stating that “*states shall establish and implement assistance programmes for indigenous peoples for such conservation and protection*”, while Art 32 states that governments “*shall consult and cooperate*” with indigenous peoples “*in order to obtain their free and informed consent*” for projects affecting their territories. This choice of words is also going in the direction of a secondary role for IPs in conservation projects, where the interest is that of “*obtaining*” their approval, but where no space is given to concepts like protagonism, collaboration or contribution that can derive from the

¹⁷ [The Paris Agreement | UNFCCC](#). Last consulted on 18/08/2022.

valorisation of their TEK. In the UNDRIP, FPIC is also addressed (UNDRIP, 2007; Hanna & Vanclay, 2013; Robinson et al., 2021).

Other relevant sources on the topics considered in this research are:

- The United Nations Development Programme (UNDP) - UN programme;
- The United Nations Permanent Forum on Indigenous Issues (UNPFII) - UN related body;
- Article 1 of both the UN International Covenant on Civil and Political Rights (ICCPR); and
- The UN International Covenant on Economic, Social and Cultural Rights (ICESCR) (FAO, 2016; Elias, 2018; CBD, 2020).

2.3.2. National level

IPs are acknowledged as collective landowners of traditional territories in the Constitution, which guarantees IP's permanent possession of indigenous lands, and their right to have their interests respected (Wily, 2018). Despite this recognition, national politics in Brazil is often criticised within and outside the country for its shady and contradictory approach to both forest conservation and IPs rights, which are often being violated in the development of big projects promoted by public-private partnerships (Hanna & Vanclay, 2013; Souza, 2021; Verdum, 2021; Gonzaga, 2022). The interests of agribusiness lobbies are particularly influential on these topics, both at the economical and political level, with the parliamentary group linked to the agribusiness sector (FRA) being the National Congress's most powerful supra-party thematic collegiate body (Verdum, 2021). In the documents of national legislation reviewed for this research, IPs are poorly mentioned and only in relation to their land tenure rights, not in relation to the contribution their traditional knowledge can bring¹⁸. Several policies on environmental conservation have been developed at the national and subnational level, many of them have been reviewed by Verdum, 2021. Another source of information on forestry-related policies are the Ministries of the Environment (MMA) and Agriculture (MAPA), which is responsible for the Brazilian Forest Service. Here, only the policies with reference or direct impacts over IPs have been included.

National Biodiversity Strategy And Action Plan

At the national level, the National Biodiversity Strategy And Action Plan prepared by the Ministry of the Environment (de Mattos et al, 2017) focuses on traditional knowledge and its important contribution to biodiversity conservation. However, traditional knowledge is never

¹⁸ [Brazil's third biennial update report to the UNFCCC](#). Last consulted on 22/08/2022.

presented as the active protagonist of environmental conservation projects but rather as a heritage to be “*preserved*”, “*respected*” and that can “*improve benefit sharing*”. Few actions foreseen in the document include the Implementation of Programs on Participatory Management of Biological Resources, but this only interests the Amazon and no specific organisation is mentioned as responsible for this action apart from a generic mention to “*NGOs*”. Another action consists in the “*valuation of the traditional knowledge of family rural producers and indigenous peoples*”, but this is under the responsibility of the “*academia*” that has to “*provide guidance*” (de Mattos et al, 2017). The overall impression is that of a perpetuated paternalistic vision of traditional knowledge.

National Policy for Environmental and Territorial Management on Indigenous Lands (PNGATI)

The National Policy for Environmental and Territorial Management on Indigenous Lands (PNGATI) was the result of a national project (GATI) active from 2011 to 2016 and is considered as one of the most advanced and best performing policy tools of Brazil for indigenous protagonism in conservation initiatives. It was born within the scenario of Rio Summit 1992, when the CBD and Agenda 21 were signed, which was a fruitful incubator to start discussing the importance of preserving biodiversity and traditional knowledge at the national level (Reis de Sant’Ana, 2014). Its core consisted in strengthening local territorial management including IPs in the conservation, defence, management, sustainable use and government of their lands and of natural resources. PNGATI resulted from Partnership within the Brazilian indigenous movement, the National Foundation for Indigenous Peoples (FUNAI), the Ministry of Environment (MMA), The Nature Conservancy (TNC), the United Nations Development Programme (UNDP), and the Global Environment Facility (GEF) (Bavaresco et al., 2016). The PNGATI’s development was itself a virtuous example of IPs involvement, since it included consultations with 150 indigenous groups (Reis de Sant’Ana, 2014). Similarly, a tool was created that serves IPs as a guideline to develop their own Territorial and Environmental Management Plan (PGTA). More than 110 PGTAs have been developed by IPs throughout Brazil (APIB, 2021; Souza & Garcia, 2021). The methodology adopted for the development of GATI courses built on indigenous approach to environmental and territorial management of their lands and coupled it with scientific and technical knowledge (Bavaresco et al., 2016).

One of the main points raised by those who participated in the construction of the PNGATI project at the national level was that socio-environmental actions also needed to be carried out in regions other than the Amazon. This point had been raised long time before by the

indigenous movement in Mato Grosso do Sul (MS), given the lack of public policies in this sector for the indigenous lands present in the state, despite the local environmental and territorial conservation experiences in need of support for the survival of communities and of the environment as a whole (Reis de Sant'Ana, 2014).

2.3.3. Local level (Pantanal)

The environmental and forest conservation policies for the Pantanal are very recent and are taking place, in particular, at the initiative of the government of Mato Grosso do Sul, with particular attention to the intense fires that have occurred in recent years (Schulz et al., 2019; ISA, 2022, FAO, 2022). Policy initiatives are tackling conservation issues and mainly affect large private properties. An example is the institution of legal reserves, a portion of private land whose natural vegetation must be kept; this is a national policy (Law 12651/2012), but is particularly relevant in the context of Pantanal, where large private properties make the most of the land (MAPA, 2020; FAO, 2022). The financings that it has been possible to access through them have benefited, in particular, the Brazilian agribusiness export elite (Schulz et al., 2019). The policy initiatives listed below make practically no mention of IPs. Even when traditional or indigenous communities are included, they have very weak participation in governance processes, or none (Ibid.).

The 1988 Federal Constitution mentioned the need for adopting a specific legislation on protection and regulation of economic activities in the Pantanal, but this is still not the case (Hugueney & Braun, 2019). In 2011, Senator Blairo Maggi proposed a law on Management and Protection of the Pantanal biome (N° 750/2011)¹⁹ (Schulz et al., 2019). Article 3 states as an objective the conservation of the area, following the principle of the recognition of traditional knowledge as a contribution to the development and management of the region's potential. Article 4 includes as guiding principles the promotion of the necessary means for the effective participation of traditional peoples and communities in decision-making processes related to their rights and interests; as well as the recognition, implementation and support for sustainable activities developed by traditional peoples and communities. The so-called "Pantanal law" has represented a positive attempt to advance on the Pantanal conservation, but it provided insufficient concrete guidance for environmental management (Schulz et al., 2019). In 2017, Deputee Alessandro Molon also proposed a law on Conservation and Sustainable use of the Pantanal biome (N° 9950/2018)²⁰. Articles 3 and 8 mention the respect and valorisation of traditional knowledge in relation to land and

¹⁹ [PROJETO DE LEI DO SENADO Nº 750, DE 2011](#). Last consulted on 18/08/2022.

²⁰ [PROJETO DE LEI Nº 9950, DE 2018](#). Last consulted on 18/08/2022.

resources management, but no explicit mention is done to indigenous nor traditional people, apart from “*comunidades tradicionais extrativistas*”, who live from forest products collection. Article 16 states that it is the responsibility of Federal and State-level bodies to implement several conservation initiatives, such as sustainable management, planting and reforestation with native species, restoration of vegetation around water sources, riparian forests and areas of restricted use (Art 16, Comma 7). In Chapters 4 and 5 of this research, where the Caianas case study will be presented, it will be seen how its activities are perfectly in line with these. An opening could thus be possible for collaboration or at least consultation of indigenous TEK, also for policies interesting the local level. Unfortunately, both proposals have not passed the stage of Parliament approval and have not been adopted.

In 2018, on the occasion of the 8th Global Water Forum held in Brasilia, the Ministries for Environment of Brazil, Bolivia and Paraguay have signed a Declaration for Conservation, Integral and Sustainable Development of the Pantanal (Schulz et al., 2019). With this document, the three countries declare the common interest of protecting and valorising this biome, but it is a very generic commitment and no mention is done to instruments and further policies to concretely implement this agreement²¹.

In 2019, a Presidential Decree (No 10.085, 05/11/2019²²) revoked the zoning for sugar cane farming areas, opening the protected areas of the Amazon and Pantanal to this activity. Flexibilisation of current legislation on environment preservation represents an incentive for farming expansion (Schulz et al., 2019; Sudré, 2020).

The fact that the Pantanal biome is shared among two Brazilian states (Mato Grosso and Mato Grosso do Sul) means nothing in ecological terms, but it has deep consequences at the political level. The Constitutions of Mato Grosso and Mato Grosso do Sul require that the two states jointly elaborate mechanisms capable of preserving and sustainably using the natural resources of this biome. However, such cooperation has not yet taken place (Hugueney & Braun, 2019). In July 2022, the Parliament of Mato Grosso state passed a law (Law 561/2022) to allow extensive cattle farming in the Pantanal protected area (Permanently Preserved Area, APP). Despite being promoted in Mato Grosso, and not in Mato Grosso do Sul, this is bad news for environmental preservation of the Pantanal and will affect it as a whole. The law was defined as a “*legal authorisation*” to degrade the biome and

²¹ [Declaração para a Conservação, o Desenvolvimento Integral e Sustentável do Pantanal](#). Last consulted on 22/08/2022.

²² [Decreto 10.084](#). Last consulted on 18/08/2022.

it was adopted without any kind of consultation with local and indigenous communities (ISA, 2022).

Chapter 3: Methodology & research design

3.1. Methods

The research is an exploratory one, a format chosen to properly familiarise with the research object and analyse it. As highlighted with the State of the Art, information on the involvement of TEK of IPs in the Pantanal region is very poor. This research intends to contribute to the scientific literature by analysing a virtuous example of indigenous protagonism in forest conservation, as in the case study of the Caianas organisation. The adopted definition for case study comes from Yin, 2002: “*a case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident*”, where the “*context*” is the local situation of TEK of IPs, and the phenomenon is the Caianas organisation. The case study methodology has been preferred as a research strategy to investigate *how* TEK can be a means for IP involvement in forest conservation projects in the Pantanal area (Yin, 2002). More case studies were researched in the area, but none were found that could contribute to the study. This element will be explained in greater detail in the research limits.

The approach and use of information of this research are qualitative. It mainly consists of the organisation and interpretation of data coming from reports of persons with a peculiar knowledge or familiarity with the chosen context. The choice of a qualitative research was made to properly take into consideration the subjective vision, perception of context and research topic, and interpretation of those people (Creswell, 2009; Da Silva et al., 2014). The research results build on the material collected through qualitative research and consist of the researcher’s interpretation of their meaning. Finally, it is a contextual research, exploring the historical, geographical, environmental and social specificities of the chosen context, which are crucial to the proper framing and understanding of the latter (Creswell, 2009). The qualitative research and context exploration have included a field work period at the *aldeia* Cachoeirinha, where the Caianas organisation was developed. The interviews to Caianas personnel have been conducted on this occasion.

3.1.1. Primary and secondary data collection

For this research, data was collected in two ways. First, secondary data from bibliography was collected on the concepts relevant for the study, as well as on documentation and guidelines on forest conservation projects and the involvement of TEK of IPs at international,

national and local level. Secondly, primary data in the form of first hand insights, perceptions and information was provided by interviews of relevant actors, that will be listed below.

Information about TEK of IPs and its consideration in forest conservation projects has been mainly collected through the means of semi-structured interviews. For the semi-structured interviews, a topic guide was used, dividing information in categories. Topics included are shown and can be organised as in the following table (Table 2).

Table 2 | Semi-structured interviews' topics.

Conservation projects	
Indigenous People	IP presence
	IP TEK
	IP involvement <ul style="list-style-type: none"> - reasons for weak IP involvement - possibility for greater involvement
	IP as beneficiaries
Land	land ownership
	conflicts of IP with private landowners
Case study	the Terena people
	Caianas organisation <ul style="list-style-type: none"> - Start - Young people and children - Activities - Partners/knowledge exchange - Multiplication
TEK	reappropriation of TEK and visibility

The contacts and interviewed people were selected through a judgemental sampling, a technique for a deliberate and purposeful selection of actors that are relevant to the phenomenon of interest, done by the researcher. This technique requires a good knowledge of the context and its actors to guide the selection, and is used in qualitative research when a random sampling would not be adequate to properly address the phenomenon of interest for the research (Marshall, 1996; Palinkas et al., 2013). The sampling for this research was designed with the help of:

- The thesis supervisor, who has deep knowledge of the research context and actors, for what regards conservation projects promoters, academics, environmental organisations and the entry contact to the Caianas organisation (the coordinator).
- The Caianas organisation coordinator, who selected the Caianas members to be interviewed. This was done with consideration to their profile, role and experience within the organisation.

In total, 10 people were interviewed. Their profiles and acronyms are summarised in the table below. To protect their privacy, they will only be identified with their acronym. Their contributions on the research topics are also summarised in the table (Table 3).

Table 3 | Interviewees roles, acronyms and contribution.

Category:	Institution	Interviewee role	Acronym	Relevant contribution on topics (as in Table 2):
Conservation projects promoters (CP)	Instituto Homem Pantaneiro (IHP)	REDD+ project coordinator	CP1	Conservation projects IP (presence, TEK, involvement, beneficiaries)
	Comité da Reserva da Biosfera	Analyst	CP2	Conservation projects IP (presence, TEK, involvement) Land
	Instituto Taquari Vivo (ITV)	Director	CP3	Conservation projects IP (presence, involvement, beneficiaries) Land
Academics (A)	UCDB	Indigenist professor	A	IP presence Land Reappropriation of TEK and visibility Terena Caianas organisation <ul style="list-style-type: none"> - Partners/knowledge exchange - Multiplication
Case study - CS	Caianas organisation	Caianas active member	CS1	Land Reappropriation of TEK and visibility Caianas organisation <ul style="list-style-type: none"> - Start - Young people and children - Activities - Partners/knowledge exchange

				- Multiplication
			CS2	Caianas organisation - Start - Young people and children
			CS3	Land Reappropriation of TEK and visibility Caianas organisation - Start - Young people and children - Partners/knowledge exchange
			CS4	Caianas organisation - Start - Partners/knowledge exchange - Multiplication
		Caianas active member (elder - E)	CS-E1	Reappropriation of TEK and visibility Caianas organisation - Start - Young people and children - Knowledge exchange - Multiplication
			CS-E2	Reappropriation of TEK and visibility Caianas organisation - Start - Young people and children

For the interviews with members of the Canaias organisation, the approach was mixed. During the fieldwork visit at the *aldeia* Cachoeirinha, where the Caianas organisation is from, six of them were interviewed in a semi-structured way, using the topic guide presented in Table 2, but more were involved in a *roda de conversa*, in two different occasions. This consisted basically in an open discussion, where small groups of 3-4 people from the organisation participated and shared information and personal perspectives, with the researcher guiding the conversation to address relevant data investigated in the research. Despite the weak adherence to the interview structure, the choice was made to use this technique because it is the most familiar to indigenous people and corresponds to their communication techniques. This allowed data collection in a more informal way, and a more spontaneous and free participation of the interviewed. For the same reason, these *rodas de*

conversa were not recorded, but the information that emerged from them will be included in the research results.

All interviews were conducted in Portuguese, and have been recorded and transcribed in an English translation by the researcher. The interview transcriptions are available upon request.

3.1.2. Data analysis

Primary data from the interviews have been coded and organised in an Excel file, with the same topics division as in Table 2. The interview coding table, with reference to the topics, is reported among the Annexes. The topics have been chosen both prior to the interviews and new ones have been added for elements that were not initially considered as research topics, but resulted from semi-structured interviews.

All information, where possible, has been checked against literature and scientific data. Where personal opinion has been expressed by the interviewees, this has also been considered relevant for the research and has been directly quoted in italics, to express it with the same words that were used by the interviewee and to avoid interpretation.

3.2. Choice of the case study

The choice of the case study was done with consideration to the low attention that is given to the Pantanal area when it comes to forest conservation projects, to TEK of IPs and its consideration in conservation policies and projects (Huguene & Braun, 2019; Schulz et al., 2019).

The aim of this research being to investigate the presence and valorization of TEK of IPs in the Pantanal area, the presence of indigenous organisations operating in this field was investigated. Through online research, questioning of experts and relevant forest conservation organisations, it was found that almost no IP in the area has developed some kind of organic valorization of its traditional knowledge, as it will be shown in Chapter 4. The Caianas organisation created from the Terena people of the Cachoeirinha settlement, in the municipality of Miranda, appeared to be the only relevant example in the area of reappropriation, systematisation and valorization of TEK done by indigenous people. The choice was thus made to consider the Caianas organisation as the case study for this research. In the next two Chapters the reasons and potential of this uniqueness will be explored.

3.3. Permission seeking and ethical considerations

FPIC was applied in the process of contacting and discussing the research design with IPs from the Caianas organisation. Two video calls were made with the coordinator and personnel from the organisation, to present the research, with the participation of the thesis supervisor that acted as the middleman between the researcher and the case study organisation, thanks to her trust bond with the Caianas coordinator. The consent to participate in the research was thus prior to the start of any activity, free, because the people from the Caianas freely accepted their role of case study, without any obligation, and informed, since from the very beginning the research has been contextualised within the STeDe master and the UCDB university, where the Caianas coordinator also graduated from his master under the guide of this research's supervisor. During the fieldwork in the *aldeia* Cachoeirinha, where the interviews and *rodas de conversa* were conducted, the first step has been to inform and consult the local leader, the *cacique*, about the research design and objective. This has been repeated to each interviewee, and when it was needed for a proper understanding, translation to Terena language has been provided by one of the Caianas elders. For all the participants who cooperated in the research and provided primary data, permission on use of materials such as interview transcripts was explicitly requested. To preserve anonymity, the interviewees are only identified through acronyms and personal data are not disclosed in any part of this research.

3.4. Delimitations, limitations and assumptions

Bias can always enter qualitative research. This is a fundamental limitation to be aware of, since a lot of the information comes from personal opinion and could be incomplete, incorrect or biased (Yin, 2002). The effort has been made to conduct research on the case study without omitting important data or prioritising some information over others, reporting all evidence fairly (Ibid.). Given the very local scope of the research, most information on the Caianas comes from insiders and it was difficult to find information from outside. Some information could thus be biased by the regard of interviewees and internal documents review. Wherever possible, primary data has been checked against complementary relevant literature and scientific data. Secondary data has also been cross-checked.

The fact that only one relevant case study of environmental conservation indigenous organisation was found in the area constitutes both an interesting finding and a limit of this research. Caianas organisation is a pretty unique example of indigenous reappropriation and dissemination of TEK. This makes it an interesting case study, but at the same time it

qualifies the research with a narrow scope. In light of these considerations, it was decided to not enlarge the scope to broader context areas or case studies, in order to properly place results and discussion over the uniqueness and replicability potential of the Caianas experience. Generalisation of results are not within the objectives of this research. However, attention will be given to the potential of expansion, imitation and inspiration that the described case study might entail, as well as on the virtuousness of the Caianas experience within the theoretical and normative landscape of TEK of IPs consideration for forest conservation (Yin, 2002).

Chapter 4: Contextualisation of research content and case study

4.1. Identifying, characterising and mapping the actors involved

In the Pantanal area, several actors interact that are relevant for the topic of involvement of TEK of IPs in forest conservation. These include forest and environmental conservation projects promoters, academics and indigenous people - which correspond to the actors listed in the methodology among the interviewed people. The relevant actors in the area will be presented more in detail in the following paragraphs. The selection of relevant actors was done using a combination of sources and criteria: suggestion of the thesis supervisor or mention by the Caianas personnel (judgemental sampling), frequent mentions as relevant conservation actors in the area in scientific bibliography, local news, policy or operational documents (this includes, for instance, the organisations that participated in the GATI project). Although it was not possible to reach or directly interview representatives from all organisations, research has been done on each of these organisations and the publications, actions and information they made available have been of great use for this research.

Ecologia e Ação (Ecoa)

Ecology and Action, founded in 1989, is an NGO working on projects and policies elaboration and development on environmental conservation and sustainability. It adopts a socio environmental approach, coupling scientific investigation and political action for nature and communities conservation, involving local people, research institutions, governmental bodies and organisations and NGOs. The dialogue between scientific and traditional knowledge is a key approach of Ecoa (Schulz et al., 2019).

In the Pantanal, Ecoa is present with projects, researches, technology application, monitoring activities and support of local initiatives in defence of the territory. The closest links Ecoa has with local communities interest *ribeirinhos* communities from the Paraguay River²³ (ECOIA, 2020). Ecoa was contacted for this research but it has not been possible to organise an interview.

²³ [Ecoa](#). Last consultation on 19/08/2022.

Empresa Brasileira de Pesquisa Agropecuária (Embrapa)

Embrapa, or the Brazilian Agricultural Research Corporation, is a federal government creation that is particularly relevant for the agricultural sector. It was created in 1973 to research and develop on agricultural sector technologies and innovation for an original model of agriculture and cattle farming. It has very few direct links with IPs, but it is largely present in the area where the Caianas is working, which justifies its place among the relevant actors for this research²⁴. Embrapa was contacted for this research but it has not been possible to organise an interview.

Comitês da Reserva da Biosfera do Pantanal

The Pantanal was declared a UNESCO Biosphere Reserve in 2000 (Hugueney & Braun, 2019). The Committee responsible for the management of the Reserve is responsible for multiple activities, namely: the production and diffusion of scientific and traditional knowledge, environmental education, monitoring activities for conservation and sustainable development, support to the sustainable development of the principal activities carried out in the area (agriculture and cattle farming, minerary activity, fishery, tourism among others)²⁵ (WWF, 2016). Despite this strong focus on sustainability, the Reserve is particularly close to cattle farming activities and, as an initiative of the Federal and State-level governments, it has a stronger focus on economic activities than it has on local communities' protagonism (Ibid.). In relation to IPs, there is no information on the website; a paternalistic approach and a marginal role for IPs prevale²⁶.

A member of the Committee of the Pantanal Biosphere Reserve from the WWF, who has a background in biology, was interviewed for this research. Her main contribution to the research was on topics of conservation projects, IP (presence, TEK, involvement), land ownership.

Instituto Socioambiental (ISA)

The Socio Environmental Institute was born in 1994 and constitutes a database of information on IPs. Its action range is wider than the Pantanal, operating in the whole country. It works with indigenous and local communities, developing solutions to protect and valorise their territories, culture and traditional knowledge²⁷. It is an important source of data

²⁴ [Embrapa](#). Last consulted on 19/08/2022.

²⁵ [RB Pantanal | RBRB \(reserva da biosfera.org.br\)](#). Last consulted on 14/08/2022.

²⁶ [A Empresa - Biosfera do Pantanal \(rbpantanal.org.br\)](#). Last consulted on 14/08/2022.

²⁷ [ISA. Instituto Socioambiental](#). Last consulted on 14/08/2022.

and information on Brazilian IPs and has a dedicated agency working and producing information on Indigenous lands and people (Terras Indígenas).

ISA was contacted for this research but it has not been possible to organise an interview. Instead, as suggested by the organisation, the archive of ISA publications was consulted in search of information on TEK of IPs in the area.

Instituto Homem Pantaneiro (IHP)

The Institute of the Pantanal Man is an ONG from Corumbá, Mato Grosso do Sul, working on the conservation of the Pantanal biome and local culture. By local culture, as it is made evident by the organisation name, it is meant mainly the *pantaneiro* one, and not as much indigenous and local communities' one. Concretely, it works on protected areas management, research, dialogue facilitation among local actors, as well as a series of activities and projects related to tourism, conservation, culture, tradition and history preservation, socio economic development, consulting services²⁸.

The IHP is the promoter of the only REDD+ project in all the Pantanal biome: the project Serra do Amolar. It focuses on biodiversity conservation with the creation of a biological corridor. The project covers an area of 140 900 km² with high deforestation caused by land use changes, cattle ranching and agricultural activities. It offers educational and working opportunities to local communities, covering territories of local inhabitants (*ribeirinhos*) that are living on private land, but it does not cover indigenous land and it was thus considered of little use for this research. A former member of the IHP and coordinator of the REDD+ project was interviewed for this research. Her main contribution to the research was on topics of conservation projects in the Pantanal area and IP involvement, and is included among the research results in chapter 5.

Articulação dos Povos Indígenas do Brasil (APIB)

Brazil Indigenous People Articulation was created in 2005 and represents the coming together of IPs local organisations from the whole country. Its aim is the strengthening and valorisation of IPs instances, claims and political actions, as well as denounce and make visible the injustices suffered by IPs²⁹. Despite its political focus, it was included among the relevant organisations for the studied area because members from the Caianas are also active in the APIB, and because, as it was said by one of the Caianas members during one

²⁸ [Instituto Homem Pantaneiro](#). Last consulted on 16/08/2022.

²⁹ [The Articulation of Indigenous Peoples of Brazil \(APIB\)](#). Last consulted on 16/08/2022.

of the *rodas de conversa*, IPs' environmental and political actions are one only thing and one cannot be addressed without the other.

The state of Mato Grosso, sharing the northern border of Mato Grosso do Sul, where a smaller area of the Pantanal is located, is having the first policy initiatives related to REDD+, including the participation of indigenous groups belonging to APIB. However, these largely interest the Amazon area and not the Pantanal. The coordinator of the juridic department of the APIB was contacted for this research and expressed interest in it, but because of the dramatic events that happened in Brazil in June 2022 with the death of the Indigenous advocate Bruno Pereira³⁰, it has not been possible to organise an interview.

Fundação Nacional do Índio (FUNAI)

The National Indigenous Foundation is the governmental body responsible for indigenous matters. It gives support to projects promoted by IPs with sufficient elements of sustainability, management capacity, economic viability, protagonism³¹.

The FUNAI course changed strongly during the last 4 years, under the government of Bolsonaro. In this period, allocated funds to the organisation were reduced by almost 25% (from R\$ 715,7M to R\$ 561,6M) (Verdum, 2021; Aragão, 2022). During the same period, the “*new course*” promoted by the FUNAI President Marcelo Xavier, appointed by Bolsonaro and supported by the Parliament Group of agribusiness entrepreneurs (Frente Parlamentar Agropecuária, FPA), blocked the recognition process of at least 27 indigenous lands³² (Verdum, 2021; Abrão, 2022). FUNAI was contacted for this research but it has not been willing to disclose information through an interview.

Núcleo de Estudos e Pesquisas das Populações Indígenas (NEPPI)

Based at UCDB University of Campo Grande, this centre supports researchers, teachers of basic education, indigenous people and all public interested in accessing materials on indigenous peoples. It presents a rich collection of data on the nine ethnic groups that live in the Mato Grosso do Sul state: Terena, Kadiwéu, Atikum, Kamba, Kinikinau, Ofaié-Xavante, Guató, Guarani and Kaiowá. It was created in 1995 to coordinate the multiple research and project initiatives linked with indigenous matters. The intent of NEPPI is the creation of links

³⁰ [Bruno Pereira: the dedicated defender of Indigenous rights missing in Brazil](#). The Guardian, 2022.

³¹ [Fundação Nacional do Índio](#). Last consulted on 16/08/2022.

³² [Funai Anti-Índígena | APIB](#). Last consulted on 16/08/2022.

among the scientific and academic world and the traditional and indigenous one. It also creates a space within the university to facilitate and support indigenous protagonism³³.

Instituto Taquari Vivo (ITV)

Institute Taquari Vivo was born with the aim to protect the Taquari River, in the Pantanal, which was strongly affected by climate changes and degradation, by coordinating and performing restoration activities. Its focus was then enlarged to the whole Pantanal, to improve the economic and socio environmental conditions of the *pantaneiros*³⁴.

ITV is mainly oriented towards economic activities and does not have links with IPs. The director of ITV, who has a background in agronomy, was interviewed for this research. His main contribution to the research was on topics of conservation projects in the Pantanal area, IP involvement, land ownership.

Indigenous People in the Pantanal

Before presenting and discussing the results of the research on IPs in the Pantanal and their TEK, an overview of the main ethnies that are present in the area will be done in this paragraph, including some historical elements on each of them. Some common trends are found among IPs in the Pantanal, especially for what regards land and identity loss.

IP in the Pantanal include³⁵:

- Kadiwéu; historically bellicose, they contributed to the Paraguay war and received land in reconnaissance of their contribution. They are today the only IP that legally owns the land it lives in (Azanha, 2005). This information is interesting when compared to the Terena people's history and current fight for land, as it will be explained below.
- Kinikinau; considered extinct, in 1998 a census revealed 58 people who considered themselves as Kinikinau. They occupy the same areas as the Terena people, with whom they share an attachment to agricultural activities (Chamorro & Combès 2015).
- Guató; nomadic people, they live mainly in the Mato Grosso state, with a community along the Paraguay River in Mato Grosso do Sul. They formerly occupied a wider

³³ [NEPPI | Grupos e Núcleos de Pesquisa](#). Last consulted on 16/08/2022.

³⁴ [Instituto Taquari Vivo](#). Last consulted on 16/08/2022.

³⁵ [Os Povos indígenas do Pantanal](#), Observatorio Pantanal, 2021. Last consulted on 11/08/2022. [ISA, Instituto Socioambiental](#). Last consulted on 14/08/2022.

A list of all indigenous communities of the Mato Grosso do Sul state, divided by municipality and ethnicity, is available on the official government website: [Comunidades Indígenas – SECIC](#), Secretaria de Estado de Cidadania e Cultura. Last consulted on 13/08/2022.

region, but halfway through the 20th century they started being systematically expelled by cattle farmers. They largely ended up migrating to the periphery of cities, and gradually lost their identity traits, until they were considered extinct. In 1976 some people from the periphery of Corumbá were identified as Guató and a slow process of identity reappropriation started³⁶.

- Terena; one of the largest peoples of the Pantanal area. During the Paraguay war, all their villages were abandoned to escape violence. With the end of the war, differently than the Kadiwéu they had no recognition and did not receive land as a reward for the military help they provided. Instead, their land was arbitrarily given to ex-military and *fazendeiros*. Today, the Terena people live between their Indigenous Lands and several *aldeias urbanas* (urban villages, or communities). A big part of the Terena people has abandoned traditional lifestyles and has found occupations in the *fazendas* or in the cities³⁷. Today, the Terena people are very active in the reappropriation of their traditional knowledge (Azanha, 2005; Reis de Sant'Ana, 2014; Chamorro & Combès 2015).

In Figure 9 we can see the distribution and extent of indigenous lands in the Pantanal area. The names have been added by the researcher, based on information from the ISA, where the map is taken from.

³⁶ [ISA, Instituto Socioambiental](#). Last consulted on 14/08/2022

³⁷Ibid.

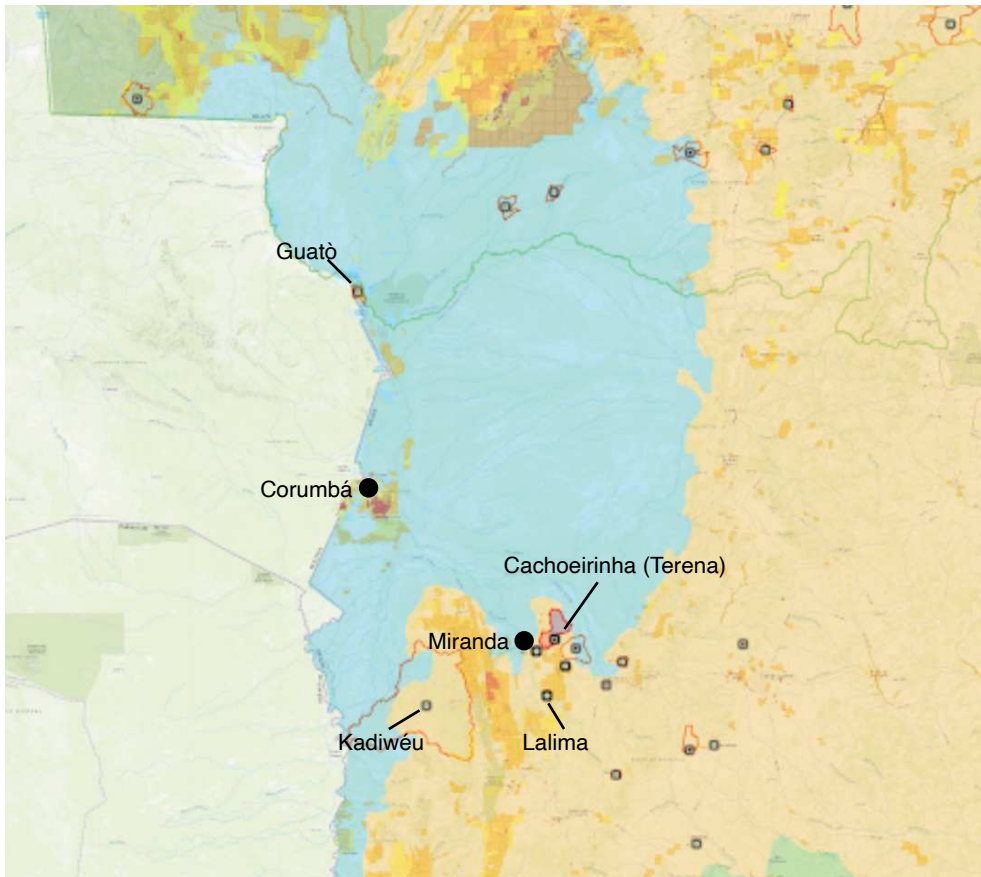


Figure 8 | The Pantanal. The blue area is the Pantanal biome, the orange perimeters are Indigenous lands, the areas in different shades of yellow are the ones interested by minerary activities. Source: [Terras indígenas](https://terrasindigenas.org.br/).

4.2. The Caianas case study (Coletivo Ambientalista Indígena de Ação para Natureza, Agroecologia e Sustentabilidade)

The Terena community living in the *aldeia* Cachoeirinha, home to 1 376 people (FUNASA, 2005), where the Caianas organisation was born, is located in the municipality of Miranda, in the State of Mato Grosso do Sul. Miranda is located in a region where the Pantanal biome meets the Cerrado (savannah) and its work is thus relevant for and regards both biomes.

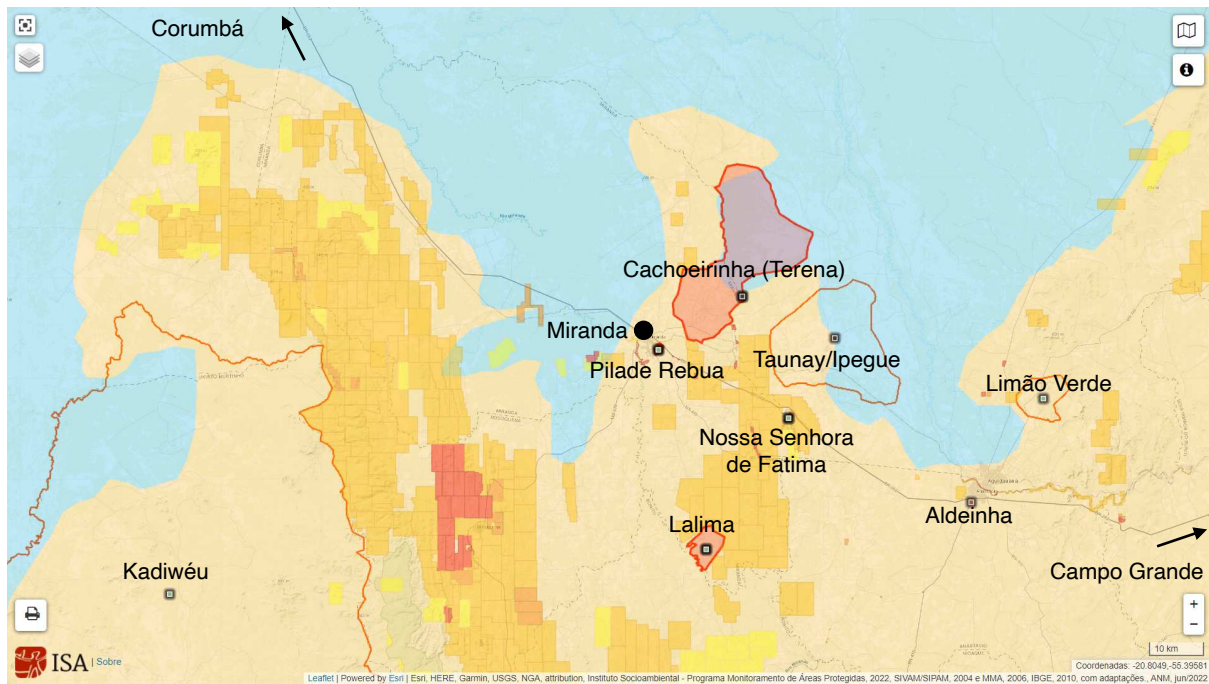


Figure 9 | The Miranda municipality (detail from Figure 9). The blue area is the Pantanal biome, the orange perimeters are Indigenous lands (the Northern one is the aldeia Cachoeirinha), the areas in different shades of yellow are the ones interested by minerary activities. Source: [Terras indígenas](https://terrasindigenas.org.br/).

4.2.1. The path of the Terena people’s reappropriation of traditional knowledge

After the dramatic events of the Paraguay war and the successive diaspora and identity loss, the Terena people have started a work of recuperation of traditional knowledge, identity and language (Azanha, 2005; Chamorro & Combès 2015). Language is being the key to this active recuperation of traditional knowledge, allowing them to access a heritage of historical narrative, world vision and understanding of reality. The Terena language is being taught in school in several *aldeias* (A; CS1; CS3). This cultural reappropriation and protagonism is also being the instrument through which Terena people are gaining visibility to the outside, shaping local leaders and strengthening their communities (A) (Reis de Sant’Ana, 2014). The Terena Assembly, which reunites all the local leaders (*caciques*), is celebrating this year (2022) the 10 years from its foundation and is actively working on indigenous rights, integrating the APIB. FUNAI representatives also participate in the Terena Assembly. The work of the Terena Assembly is supported by indigenous lawyers, who are also having great visibility at the national level³⁸.

³⁸ Two out of six members of the APIB juridic department, including the coordinator, are Terena. [Advocacia Indígena | APIB](https://advocaciaindigena.org.br/apiib/). Last consulted on 20/08/2022.

The Caianas organisation is thus part of this broader mission the community has set for itself. In the words of one of the elders interviewed:

“Indigenous people have always been environmentalist, but with time science has changed and indigenous people have jumped on this boat of modernity forgetting their culture, their territory. Caianas came to recuperate all of this. The language too, beliefs, practical ways of working with agroecology [...] What I want to do is to preserve my knowledge of Terena language to not lose my identity. If I lose it, I will have to enter this globalised world, but this model of development is not life” (CS-E1).

The Caianas appears to be the only organisation in the Pantanal area active on agroecology, environment and biodiversity conservation. It is composed mainly by Terena people from the *aldeia* Cachoeirinha. The choice was made to consider it as a case study to see how indigenous TEK has been organised, transmitted to younger generations and valorized at the local level and beyond. The three interviewees working in conservation projects in the Pantanal area (CP1, CP2 and CP3) denounced the lack of indigenous organisations working on environmental conservation in the Pantanal area. None was aware of the work of traditional knowledge reappropriation actively done in the *aldeia* Cachoeirinha, nor knew the Caianas Organisation. However, they were not directly working in the Municipality of Miranda, nor with a specific focus on IPs. They are also not working for organisations that are partnering with the Caianas. It has also been confirmed by one interviewee of the Caianas how they *“just have contacts with the institutions that are partners of some activity or project”* (CS1). Instead, interviewee A, who is an indigenist professor at UCDB and has a great knowledge of IPs of the Pantanal, clearly stated the uniqueness of the work that the Terena people and Caianas are doing.

Reappropriation of land: the *retomadas*

There is one phenomenon that is dramatically present in southern areas of Mato Grosso do Sul, and in the studied area is peculiar to the Terena people in the municipality of Miranda, the *retomada das terras* (Reis de Sant’Ana, 2014). It consists in the occupation of privately owned land that was in the past - and in some cases has been officially recognised as - part of the *aldeias* land. This claim over land resonates with the Terena reappropriation of traditional identity, as land loss was the dramatic experience at the origin of identity loss, and is based on the statement of Brazil Constitution, which bases indigenous lands recognition on the concept of traditional occupation - *“perpetual territorial use rights”* (Bavaresco et al., 2016; Wily, 2018; Bourscheit, 2021, FAO, 2022). This is also in line with the ILO Convention 169, which states that *“the rights of ownership and possession of the peoples concerned over the lands which they traditionally occupy shall be recognised”* (ILO ITPC, 1989). There are in the Miranda municipality at least two experiences of *retomadas*, one in the *aldeia*

Cachoeirinha and one in the *aldeia* Moreira. The phenomenon is only present in some limited areas, as it was stated by one interviewee:

“conflict with indigenous people is not very relevant in the Pantanal because land ownership is well established and accepted. [...] There are conflicts in the area of the Kadiwéu communities, a very small area, because the main conflict happened in the 80s [...] and in Miranda. But it is very localised. If you consider the whole Pantanal, I would say conflicts regard less than 1% of the area” (CP3).

In the Cachoeirinha, the *retomada* began in 2005, with the occupation of a pasture land of a neighbouring *fazenda*, renamed Mãe Terra (Mother Earth). The process has involved some conflict with the landowner, especially during the first years. Today, indigenous rights over the Mãe Terra area have not been legally recognised yet, despite it being confirmed to be indigenous territory by the competent authority. This experience is relevant to the research because in the 17 years since its occupation the Mãe Terra, previously completely deforested for pasture use, has been largely restored through an active reforestation process done by the indigenous community. It also received the support of the GATI project, which helped include teaching of Terena Agroecology in the newborn local school curriculum and provided tools and material - including gardening kits and seedlings (Bavaresco et al., 2016). The people from the Caianas played a key role in this. In fact, 3 of the Caianas interviewees have lived in the Mãe Terra since 2005, two of which are local teachers, and have actively participated in the forest restoration process. In their words:

“This area was once part of the fazenda and it was pasture land. There were no trees. We thought on how to plant some new trees, started educating children, we worked a lot, we planted native trees and introduced some new ones. [...] I’ve lived here in Mãe Terra since the very first day in 2005. All these trees here did not exist” (CS3).

Figure 11 shows the results of the reforestation activities in the Mãe Terra with the comparison of two satellite images of the same area. The first image is from 2010, just 5 years after the *retomada* started, at a time where the situation was still very conflictual. It was the oldest satellite image that could be found from Google Earth. The second image is from 2022, and it can be seen how large areas have completely changed their canopy.

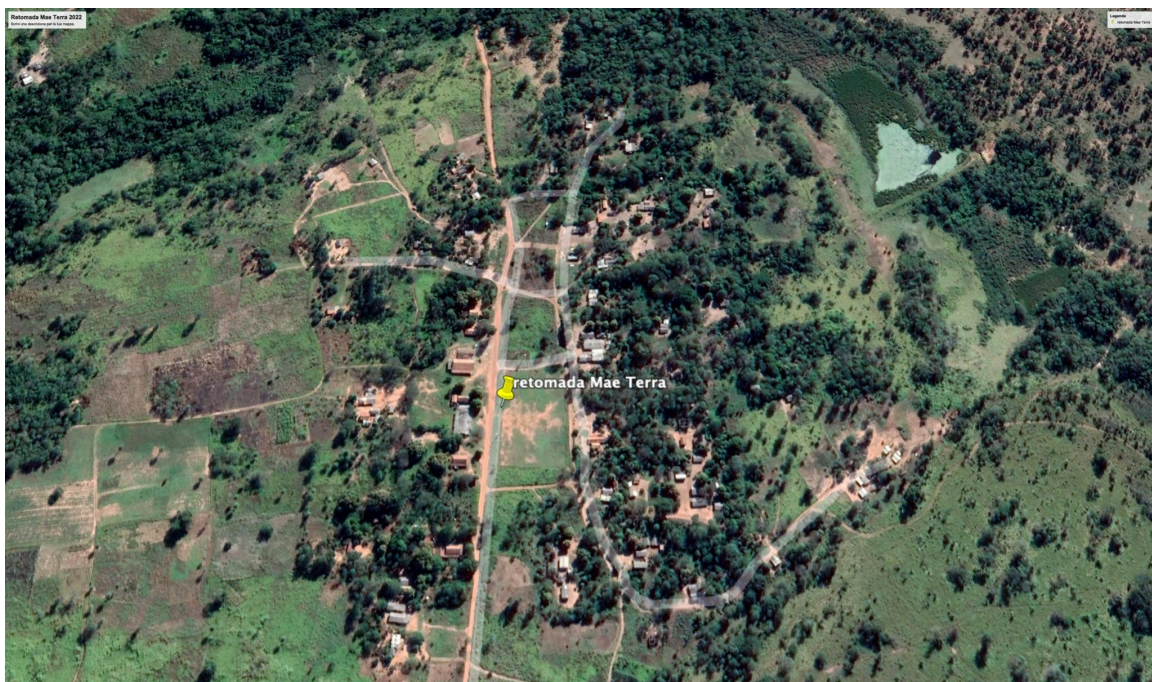


Figure 10 | The results of reforestation activities in the Mães Terra. Source: Google Earth satellite images (Maxar technologies) from 2010 and 2022.

This experience goes beyond the findings from scientific literature, according to which indigenous lands are likely to be the ones where forest is best preserved, by showing that they can also be the promoters of forest restoration. Moreover, this example shows the interconnection of political and ecological activism, as in the holistic vision of the indigenous people.

4.2.2. The Caianas work and actions

The Caianas organisation was born in 2013, in the context of the GATI project, and was formally registered in 2015. It is coordinated through a Deliberative Council, composed of elders, young people, women and men. Its foundation was promoted by the current coordinator, who holds a PhD in Agroecology from the UCDB University in Campo Grande (Dias, 2019). The Caianas organisation counts on a number of academic partners, like: Instituto Federal de Mato Grosso do Sul (IFMS), Universidade Federal de Mato Grosso do Sul (UFMS), Universidade Católica Dom Bosco (UCDB), Universidade Estadual de Mato Grosso do Sul (UEMS); as well as organisations like Embrapa Pantanal and FUNAI. Several activities, events, courses and workshops have been developed by the organisation along the years, many in partnership with these organisations and many others. The Caianas has also hosted several internships and thesis researches.

The organisation is active on multiple agroecology activities including: soil restoration in degraded areas, revitalization and preservation of springs, maintenance and revitalization of native plant species, collection and storage of seeds, planting of gardens in agroforestry systems, production and distribution of seedlings, knowledge, collection and use of medicinal plants, teaching of Terena Agroecology in village schools programs, production of biofertilizer, cultivation in agroecological systems, implementation of the first creole cocoa plantation in the state of Mato Grosso do Sul³⁹. Most of these activities are carried out without the aim of economic revenue. Local seeds are collected and traded with other native species during indigenous seeds fairs, but never sold. During one of the *rodas de conversa* conducted for the research, one of the Caianas members who was participating in the discussion received a call from the organiser of a fair asking him to sell native seeds. He repeatedly refused and explained the approach of the Caianas. The episode is interesting because it shows how for the Caianas people, the reappropriation of TEK is not seen as a business opportunity, on the contrary it has identity and territory as its main objectives. Medicinal plants are also collected for the sake of the community's health:

“All the medicines, I take them from here, from the forest. [...] Our plants are being commercialised, and for me as a pajet (traditional medicine man) this does not make sense. I cannot have people pay for it. It is a great fight to share this view” (CS-E2).

In the words of the Caianas founder and coordinator, interviewed by the Brasil de Fato newspaper: *“Our relationship with the Pantanal is ancestral, historical. In addition to the environmental aspect, there is a cultural and cosmological connection with the Pantanal” (Sudré, 2020).*

³⁹ [Caianas: quem somos](#). Caianas organisation website. Last consulted on 11/08/2022.

The traditional knowledge passing over in indigenous communities is done both within the family and within the community, through the heritage of the elders (*“Education does not come from school. School prepares people for the job market. The real education comes from within the family. We need to decolonise school and formal education”* (CS-E1)) (Robinson et al., 2021). The active participation of the latter in the activities of the Caianas is contrasting the risk of losing traditional knowledge and allowing the transpass, in a more structured way, to the younger generations. The respect for the elders is anchored in the indigenous societal structure and their knowledge constitutes the bases of the organisation’s content and action, but the protagonists in the Caianas are young people, a growing number of whom studied at the university (Bachelor or Master level, mostly in Agronomy and Engineering. The coordinator holds a PhD). As testified by the organisation members during the interviews and the *rodas de conversa*, at the time when the coordinator first returned to the village after the obtention of his PhD to promote the GATI project and the creation of the Caianas there was very little trust in him and his ideas. Most people from the village thought he had been “contaminated” by a “white man thinking” and only the support of some of the elders made the beginning of this experience possible. In the words of one elder that was interviewed:

“Several indigenous organisations were born and elders do not trust organisations because we saw several that were not doing projects that benefited forests⁴⁰. When (the coordinator) first arrived, [...] it was very difficult to convince people. My knowledge was needed to know how to do everything. But this initial lack of trust was due to this, organisations claiming they would help the environment and not reaching this objective” (CS-E2).

⁴⁰ Evans & Guariguata, 2016 also point out the “*stakeholder fatigue*” caused by the frequent failure of projects that do not bring the promised benefits or outputs (Evans & Guariguata, 2016).

Chapter 5: Results and discussion

5.1. Assessing the situation of TEK in the Pantanal area

The interviews made clear the absence of organisations working on TEK of IPs in the Pantanal area. This could have multiple reasons, that were explored both through literature and through the interview of an indigenist professor from the UCDB University of Campo Grande. It emerged from literature that IPs in the Pantanal have experienced a common history that made their presence in the area discontinued, mainly at the time of the Paraguay war. With their displacement and land loss, they also started losing their cultural and identity traits, including their TEK (Azanha, 2005; Chamorro & Combès 2015). It was also confirmed from the interviews that the only IP that is actively working for the recuperation of their traditional knowledge is the Terena people, which in the *aldeias* located in the municipality of Miranda is nowadays teaching Terena language at school and implementing a series of measures at the local level to recuperate their cultural traits, with the Caianas working specifically on TEK.

Not only is TEK poorly considered, but it emerged from interviews that IPs and local communities are rather seen as targets or as beneficiaries of projects than as actors capable of giving a contribution to their development, thanks to TEK (CP1, CP3). TEK is either absent or its contribution is not sufficiently explored nor valued by project promoters. This perpetuates a paternalistic vision that is, not surprisingly, in line with the national and local approach to IPs consideration, as it was seen in sub-section 2.3. It also confirms the findings of scientific literature explored in the State of the Art (Mauro & Hardison, 2000; Moreira, 2007; Da Silva et al., 2014). The example of one of the interviewees is particularly explicit to see how this TEK is not explored, and at the same time there is a prejudice on traditional practices. The interviewee's example is in relation to the *ribeirinhos* community and not IPs, however, a similar judgement applies to IPs (Leonel, 2000).

“(To say that ribeirinhos have TEK on fire management) is very controversial, because there is this expectation that they could have some knowledge to fight fires, but we witnessed ribeirinhos being the cause of fires because they use fire to free some space for cultivation. They set an area on fire and then manage to stop it. This happened until the 90s, because with climate change happening in the last decades the ribeirinhos are not able anymore to stop fires. [...] I do not know enough about the traditional knowledge of ribeirinhos to say whether or not they have sufficient knowledge on fire management. I know that using fire is a common practice for the ribeirinhos, but this practice is not suitable anymore today because they do not manage to contain the fire they start” (CP1).

5.2. IP involvement in forest conservation projects: obstacles

The involvement of IPs in forest conservation projects in the Pantanal area appears to be a difficult task. Land ownership remains challenging to implementation of projects in indigenous land. In fact, as it was stated before, all indigenous lands are as a matter of fact property of the federal government (Verdum, 2021). It was said from interviewee CP3 with regards to REDD+ projects:

“To register a project and certify carbon you need to show proof of the land ownership, which is not possible for indigenous communities. Projects cover 30 years, so you have to show proof that for 30 years the land ownership will not change. But all indigenous land is owned by the country” (CP3).

This emerged as the main obstacle that makes it impossible for IPs to be promoters of or to be involved in REDD+ projects. One of the interviewees (CP3) stated that IPs preserving forests would be the most entitled to receive payments for ecosystem services (PES), but he confirmed that

“The form of governance – legislation of indigenous lands, policies of FUNAI and all of this – make it impossible for indigenous lands to generate carbon credits in the voluntary market” (CP3).

For the same reason, in areas where conflicts over land exist, as is the case in the *retomada* areas of the Terena *aldeias* in the municipality of Miranda, the mere implementation of a REDD+ project, or even a conservation project requiring collaboration of *fazendeiros* and indigenous people would be impossible. This despite the evidence that in the *retomada* area of the *aldeia* Cachoeirinha, where several Caianas members also reside, the reforestation activities have increased the canopy of large portions of land previously dedicated to extensive pasture. In the words of one of the Caianas elders interviewed for this research, who lives in the Mãe Terra and has a straightforward opinion on their opportunities of dialogue with *fazendeiros*:

“It is very difficult to have contacts with fazendeiros. They have strong links with political powers, prefecture, the state, the federal state. It is very hard for us to have access to this kind of world. Their ideas do not match with our work. It never will. If we stand up and confront them, we will not have a future. They will eliminate us” (CS-E1).

Despite this point of view being not necessarily representative of the relation between IPs and private landowners it is useful to understand how the phenomenon is perceived by the people who are most impacted by this conflictual relation.

Another obstacle is the territorial configuration of the Pantanal region. With a very large surface, a massive portion of land that is privately owned and small indigenous lands,

projects that could benefit from the contribution of IPs TEK do not even interest the areas where these are located. Due to their size and to the poor attention they receive, the inclusion of indigenous lands is not even strategic for project promoters. IPs action without the engagement of private landowners is not likely to have an extended impact over the territory, since they can only act on a small portion of the land. Involvement of private landowners is essential, but they are not interested in partnering with IPs on forest conservation topics.

“95-96% of the area is privately owned and the indigenous conservation reserves are few and very small. It is a region where if private initiative does not happen, it is impossible to bring on conservation projects” (CP3).

“Here, there are no contacts with private landowners. Just in the retomada area, and at the time of the conflict. It is very hard to have contacts. The coordinator tried once, but he did not succeed in talking with the landowner. It was a fazenda that work with reforestation too, but the relation between landowners and indigenous people is very complicated” (CS1).

Municipalities - at least the one of Miranda - are also not seen as an actor that is willing to collaborate with IPs on such matters or at least did not do it until now.

5.3. IP involvement in forest conservation projects: opportunities

Interviewers were sceptical on possibilities of greater involvement of IPs in forest conservation projects. This only seems possible as an accidental side effect, and in the areas where IPs happen to neighbour with some conservation initiative: *“(Indigenous people) can be involved in the case where they are close to project areas, and a relation with them can be built” (CP3)*. This state of things should be addressed and political and practical solutions should be sought, since scientific literature, as it was seen in Chapter 2, agrees on the benefit that the TEK of IPs consideration could bring to the Pantanal (Schulz et al, 2019; Bergier et al., 2019, Guerreiro et al., 2019 in Schulz et al, 2019).

It seems more probable for IPs to develop their own projects or to autonomously build partnerships with organisations, like the Caianas did (A, CS1). For this, financial empowerment could be a useful instrument for IPs (Evans & Guariguata, 2016). Talking about opportunities for development of initiatives, one of the interviewees talked about

“a fiscal incentive that exists in all of Brazil and that generates income for states. Some states allocate 5% of this income to environmental projects, each state defines the criteria for this. In Mato Grosso do Sul, this 5% is allocated to areas that have either

indigenous lands or conservation units in their territories. It is a consistent income. There is an evaluation system that yearly allocates the benefit based on the performances. Indigenous lands are very impacted by this instrument” (CP2).

In regards to areas interested by conflictual dynamics, as it is the case for the *retomadas*, they could be a field for mediation and experimentation of inedit forms of collaboration on forest conservation. In fact, as it was stated in Chapter 2, the inclusion of IPs in project design and implementation phase can also ease their acceptance. This is of course a very delicate and complex topic, and it is unclear who could play the middleman role between IPs and private landowners. However, it could be interesting to start a political and environmental reflection on the benefits that this could bring (Moreira, 2007; Ban et al, 2013; FAO, 2016; Reyes-García & Benyei, 2019; Fachin, 2022; FAO, 2022).

5.4. Relevance of the Caianas experience

Despite the Caianas being born and developed as a local experience, from the very beginning it benefited from being linked to the GATI project, and is mentioned as a successful example by the PNGATI documents (Bavaresco et al., 2016). Agroforestry practice, one of the main foci of the Caianas activities, has been considered by recent scientific literature as one that could contrast soil degradation in the Pantanal (Schulz et al., 2019). The organisation reunites characteristics that are peculiar to its context - knowledge of local biomes and species, strong identification with the Terena cultural world, members that are issued mostly by a narrow area including the *aldeias* surrounding the municipality of Miranda - but is also very present at the regional and national level. In fact, it counts participation in several events, fairs, conferences and roundtables involving indigenous and non indigenous actors from all around the country, as well as a number of key partners that provide consultancy and support to its activities. However, during the last three years, some partners have encountered difficulties in maintaining their support, mainly due to their budgetary capacity and the lack of government support⁴¹. The presence of large Terena communities in the urban area of Campo Grande also contributes to the impact and visibility the organisation has outside its local area.

Lastly, the presence of Terena students in the state's universities is consistent (mainly in Campo Grande and Dourados, the two main cities and universities of Mato Grosso do Sul), an element that on one side contributes to the contamination between academic and

⁴¹ [Caianas: quem somos](#). Caianas organisation website. Last consulted on 11/08/2022.

traditional knowledge, and on the other brings the Terena work inside the academic world. As it was stated by the Caianas coordinator in an interview to the ABRASCO newspaper:

“In order to continue resisting and existing, it is necessary to ‘demarcate’, not only traditional territories, but also the academic space of postgraduate studies and teaching in higher education, as well as of public institutions that provide assistance, implement public policies and take decisions that affect indigenous communities” (Dias, 2019).

The same idea resonates in the words of Carlos Marés, ex president of the FUNAI in an interview to the ISA:

“In general, modern science and Western culture deny the ability of these peoples to take knowledge and use it without having formal education. This is a first problem of prejudice against indigenous people's knowledge, especially because there are so many different IPs. The availability of technology and its merging with IP's knowledge is something that is very enriching. That is, indigenous people have certain knowledge, learn different things, and merge and apply it together with their own knowledge” (Fachin, 2022).

On a broader scale, this is also supported by scientific literature (Schulz et al, 2019) and by international frameworks revised in chapter 2 (CBD, Paris Agreement).

5.5. Replicability of the Caianas experience

The conditions that allowed the birth of the Caianas were very peculiar ones and without the presence of similar conditions it is unlikely that this experience could be replicated in the Pantanal area and beyond.

It was explained how the Terena people are following a long-term path of reappropriation and valorization of their traditional knowledge. This has been core to the development of the Caianas experience, which was born within this wider project. In the case where other communities would be willing to implement a similar experience, it might be difficult to do it if this was isolated from a wider project. As it was said, TEK is not an isolated knowledge but is interlinked with all aspects of indigenous culture (Parrotta & Agnoletti, 2007; Moreira, 2007; Da Silva et al., 2014; CBD, 2020). Where identity loss made traditional spirituality, language, cosmology, medicine etc disappear - as it seems to be the case for most IPs in the Pantanal -, TEK reappropriation alone would be unlikely to be a fruitful process. However, the Terena experience might be an inspiration not only for TEK reappropriation but for a more holistic work at the community level to recuperate their cultural roots (Robinson et al., 2021).

The presence of a promoter and the propice incubator represented by the GATI project were also key to the birth of the Caianas. The coordinator's impulse to the Caianas work and his restless dedication to the Caianas growth, outreach and activities promotion has been

identified by all Caianas interviewees as the most important factor for the success of the organisation (CS1, CS3, CS4, CS-E2).

“If he was just like any other professor he would not even think about us, he would have a different life. Instead, he had this idea of studying and then came back to talk with us. We sat together and started to think of this project, the school, the cultivation... And we are still here, accompanying this work” (CS2).

The presence of a promoter having both the competences and the charisma to promote a similar initiative, and the support of the community, is essential (Evans & Guariguata, 2016): *“I think that based on the little knowledge we have of other people they could create their own project. But it is not something that can be done alone. Here (the coordinator) has been the promoter, everything started from him”* (CS1).

The coordinator also had a very strong and relevant set of competences that he put to the service of the newborn organisation, and that coupled with the elders' TEK constituted a perfect combination. Thus, it is important that IP communities gain academic and professional skills and knowledge and that they manage to combine this with TEK (Mauro & Hardison, 2000): *“Caianas proved to be successful because we have people who have a technical and scientific “white man” expertise and at the same time elders' traditional knowledge”* (CS-E2).

One last element that was crucial to the development of the Caianas is the context where it was born. Terena people in the *aldeia* Cachoeirinha never completely lost their TEK because they lived in a rural area and a part of the community kept working with the traditional agricultural activities. Thus, not only was TEK not entirely lost, but there is the possibility for people to learn how to do agroecology activities and implement their projects in the very territory of the *aldeia*. This is not the case, for instance, for those communities that were displaced or whose living area was incorporated by growing urbanised areas. An example of this was observed during a field visit to the *aldeia urbana* Passarinho, located in the municipality of Miranda. Some members of the Caianas live in the Passarinho, but they pointed out the difficulty of creating a movement or a discourse around forest conservation and agroecology activities in an area that is largely urbanised and whose inhabitants lost the connection with nature:

“If it is hard to involve the community here, imagine how it is there in the aldeias urbanas, where the city reaches the very entrance of the aldeia and there is no initiative. It seems like people are alienated by the city and the elders there are very worried. There is no space there, they live one on top of the other” (CS-E1).

Despite all these conditions being key to the launch and success of similar experiences, Caianas is already doing outreach activities, by holding courses and workshops in other communities, sharing seeds of native species, teaching agroecology and planting techniques, and promoting reforestation activities. It is succeeding in creating new hotspots of people working on forest conservation in other communities, with the support of local leaders. Thus, even if it is unlikely for other communities to develop similar initiatives to the Caianas, there is potential for the Caianas to grow, gain visibility and contribute to the construction of other virtuous experiences, by disseminating TEK and encouraging the recuperation of other communities own TEK.

“Another thing that I think could be interesting is the potential of expansion that this project has. When there is a new project in a community, they always train people from the community itself to continue the project there and then come back to supervise” (A).

“When we do some activities in other villages we normally go back to see what they did. It is very gratifying to see when they produce something. In the aldeia Lalima they created a project too, that was born with the Caianas. So the work of Caianas is growing” (CS1).

“We are going to other aldeias. Last week we were in a school. I think that this topic of awareness raising is crucial. [...] When other people see our work they follow it but willingness and support from the local leaders is crucial” (CS4).

Lastly, all possible expansion, multiplication and replicability of the Caianas experience and TEK should be left to people from the Caianas, and that they should set the limit to using their knowledge to ends and in ways that they agree with. The risk of prevarication is always present and the willingness to protect TEK from external or improper use must be respected - even in the cases where this translates in an unwillingness to share TEK (Mauro & Hardison, 2000; Moreira, 2007; Zanirato & Ribeira, 2007; FAO, 2022). This was also clearly stated by one of the elders that was interviewed:

“In relation to outsider researchers, we are from a generation that was afraid of white men. My mother used to send us inside the house whenever there was some white man arriving in the village. I am not willing to give away my knowledge to just any person” (CS-E2).

This does not translate in a rejection of the possibility to open up to externals - otherwise this citation would not even be in this research - but affirms clearly the right to decide on if and how to share a knowledge that is, after all, a precious and powerful component of a secular culture.

Chapter 6: Conclusions

The limited practical impact that the presented international frameworks have on the involvement of TEK of IPs in forest conservation programs and projects has been shown in the first part of this research. This is particularly relevant in the Pantanal biome, where geography, history and demographic distribution, complex land ownership dynamics and lower international and national attention in comparison to other areas - notably the Amazon biome - make forest conservation action even more difficult and left to the autonomy of single actors, mostly private ones. Given the urgency and the extent of the forest loss and degradation problem in Brazil and in the Pantanal area, conservation projects are essential to guarantee the monitoring, mitigation and adaptation actions needed to contrast the phenomenon. It has been shown how the consideration of the TEK of IPs is an essential element for ensuring the development of forest conservation projects that are compliant with international standards, respectful of IPs rights, context-aware, sustainable and successful. This is also true for the Pantanal, despite the consideration that TEK of IPs there has largely been lost due to historical, socio-economic and political reasons, The case of the Caianas organisation shows that a recuperation of this TEK is possible and fruitful to improve indigenous protagonism at the local level and beyond. The replicability of this experience is not so evident, since it presents some peculiar characteristics that both insiders and outsiders agreed upon, namely: the presence of a promoter, the support of the local community, a broader process of recuperation of traditional knowledge, a geographical localisation in an area that makes agricultural and agroforestry activities possible. It is not excluded, though, that some communities might be willing in the next future to follow the same path and create their own TEK organisation. This would place them among the protagonists of forest conservation actions. The involvement of IPs has to go beyond the current paternalistic approach, that perpetuates a consideration of IPs only as beneficiaries of initiatives, without sufficient consideration for their own contribution and the added value this could bring to conservation initiatives. It also has to go beyond a utilitaristic vision of TEK, which cannot be considered as an exploitable resource, but it has to occupy a space that will be decided by knowledge holders and be incorporated within the rightful sources of science. Some elements are already going in this direction, with the Caianas organisation disseminating its knowledge and laying the foundation for new local experiences to develop in other villages. Of course, the organisation of TEK of Pantanal IPs alone will not be able to access the landscape of large-scale forest conservation projects, but it is necessary for their voice to be heard and for their contribution to be solid, for them to be proactive and change-making actors.

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Annex 1 | Interviews coding

ACRONYM	CP1	CP2	CP3	A	CS1	CS-E1	CS2	CS3	CS4	CS-E2	
DATE OF THE MEETING	17/08	27/08	17/08	22/08	24/07	25/07	25/07	25/07	25/07	25/07	
CATEGORY	CONSERVATION PROJECT PROMOTER (CP)	CONSERVATION PROJECT PROMOTER (CP)	CONSERVATION PROJECT PROMOTER (CP)	ACADEMIC (A)	CASE STUDY (CS)	CASE STUDY (CS)	CASE STUDY (CS)	CASE STUDY (CS)	CASE STUDY (CS)	CASE STUDY (CS)	
INSTITUTION/ ORGANIZATION	Instituto Homem Pantanal (former employee) (HP)	Comitê da Reserva Da Biosfera Do Pantanal	Instituto Tiquari Vvo (ITV)	UCDB	Caiaias	Caiaias	Caiaias	Caiaias	Caiaias	Caiaias	
ROLE	REDD+ project coordinator		Analyst	Director	Indigenous professor	Caiaias active member	Caiaias active member - elder	Caiaias active member	Caiaias active member	Caiaias active member - elder	
Conservation projects		Biosphere Reserve is a name given by UNESCO to areas that are socially and environmentally relevant. The Pantanal raised using this status because the states were not respecting the fundamental principles of the Biosphere. [...] The FUNAI ended its involvement in this. [...] Another project that we have with IP is about the management and fire effects in the Pantanal. It is a study developed by the Federal University, Universidade Federal do Mato Grosso do Sul. [...] It will also include traditional knowledge of fire management. [...] The part of the Pantanal that is more affected and degraded is the highlands, which is where the water sources are located. All conservation projects that you will see interest the Cerrado, the highlands. When you protect the water sources you are also protecting the lowland. [...] We work a lot with limiting projects in the area, there are many hydroelectric power stations, if all were to be constructed the Pantanal would not exist anymore. We work with other energy sources, but again, this is more linked to the highlands. And also PÉS: in Campo Grande we did a work of several years, but it is very much linked to farming actors.	The best way to preserve the Pantanal is to keep its original conservation strategies. [...] For both projects, the focus is environmental protection.								
IP presence	there are in the project area, 4 communities of ribeirinhos (people who live by and from the river) and the caiaias indigenous land is outside the project area.	There are no indigenous people here, which represented a problem when we discussed how to incorporate IP in the Biosphere. [...] IP in Mato Grosso do Sul are much more present in the areas of Miranda, Apudandara, and also in the northern part.	Since the Pantanal has few indigenous areas, the interaction is very rare.	The Pantanal is the area with the largest diversity of indigenous peoples in Mato Grosso do Sul region, which also means linguistic diversity. The Terena people is the largest one, and the one that covers the largest territory, the largest number of villages (aldeias). The Kadwéu people, which is located in the North, more in the Cerrado region, live up in the highlands, differently from the Kaiaias that live in the lowlands.							
IP TEK	(To say that ribeirinhos have TEK on fire management is very controversial, because there is this expectation that they could have some knowledge to fight fires, but we witnessed (witnessed) because the cause of fires because they use fire to free some space for cultivation, for example. They set an area on fire and then they start to stop it. This happened until the 90s, because with climate change happening in the last decades the ribeirinhos are not able anymore to stop fires. This because the atmosphere is much drier, because there is more organic material in the soil, because there is very low and this does not keep the soil humid, there are thus several factors that the ribeirinhos are not used to, in these more climatic conditions. [...] I do not know enough about the traditional knowledge of ribeirinhos to say whether or not they have a sufficient knowledge on fire management. I know that using fire is a common practice for the ribeirinhos, but this practice is notifiable anymore today because they do not manage to contain the fires any more. Many of the fire fires that happened – and here you have to differentiate among the ribeirinhos and the pantaneiros, because the pantaneiros also are traditional people because they have lived there for 300 years and they also traditionally use fire. So, for the Pantanal, the use of fire is a traditional practice. Now, if they have a traditional knowledge on fire management, I do not know.	The movement of civil society in Brazil is very weak on environmental matters. There is no strong organization of indigenous or traditional communities.	The indigenous communities are close by, but they are not directly involved in the project. In the case of the Rio Negro-Aquidauana conservation area, [...] Indigenous people do not have this participation in seminars etc, it is still in very low. [...] If you are looking for an organization working with IP it is the Ecoza. They have action plans with traditional territories.								
IP involvement	I can't say that the activities we have today were developed for the REDD+ project, it would be urban, but 80% of the activities that the HP does today in the area include something the ribeirinhos community, being this through reforestation of some areas, firefighting, integrate management of fire. There are various activities done by the HP that are inside the REDD+ programme, but REDD+ was not created with this aim. [...] It is because they are far away, they are 4 hours far from the project area, by boat. The ribeirinhos live right on the other side of the river and thus have a direct impact from the project. The Quato people have been included in the HP work on tourism, so maybe you should speak with someone from the HP that could give you some more information on how the HP works on tourism, but not in relation to REDD+.	In relation to indigenous people, they have never been a direct focus. Indigenous lands are considered protected areas, but our main focus is on the community, being this through reforestation of some areas, firefighting, integrate management of fire. There are various activities done by the HP that are inside the REDD+ programme, but REDD+ was not created with this aim. [...] It is because they are far away, they are 4 hours far from the project area, by boat. The ribeirinhos live right on the other side of the river and thus have a direct impact from the project. The Quato people have been included in the HP work on tourism, so maybe you should speak with someone from the HP that could give you some more information on how the HP works on tourism, but not in relation to REDD+.	The indigenous communities are close by, but they are not directly involved in the project. In the case of the Rio Negro-Aquidauana conservation area, [...] Indigenous people do not have this participation in seminars etc, it is still in very low. [...] If you are looking for an organization working with IP it is the Ecoza. They have action plans with traditional territories.								
IP beneficiaries	Communities are not a priority in the project verification, even if we do have official benefits for communities. [...] I understood that for these communities there was not just the need for a revenue and employment, but was stated to be about the empowerment of women an brigadistas (volunteers who work for fires prevention and extinction), the development of agribusiness for food security.			There are social benefits from both, which is why they are seeking to apply the certification IPPI (certification of social co-benefits). In the case of Serra do Amolar, this includes education, employment and revenue generation thanks to activities of ecotourism, but (desconhecido) projects exclusively aimed at social benefits for indigenous communities. [...] The biggest potential is that of creating projects close by and with the co-benefits generated by the project make investments in the indigenous communities in terms of development.							
Land ownership	in the Pantanal, 80% of land is private. So, when you work on conservation you have to deal with a few landowners with large properties, that are dependent, land mainly with farming activities (cattle, soy, sugar cane). That, most NGOs are linked to these actors, starting from the assumption that indigenous lands are already protected.	95-98% of the area is privately owned and the indigenous conservation reserves are few and very small. It is a region where a private initiative does not happen, it is impossible to bring on conservation projects. [...] to register a project and certify carbon, you need to show proof of the land ownership, which is not possible for indigenous communities. Projects cover 30 years, so you have to show proof that for 30 years the land ownership will not change. But all indigenous lands is owned by the country. [...] This is true for both indigenous lands and reserves, but reserves can be owned by either the federation, the state or the municipality.	The Kadwéu form a considerably large group and they own their land, a characteristic that is different from any other part of Brazil. They discovered it during the Paraguayan war as a reward for their help, and they are the only indigenous people that owns its land. In the case of the other people, they are "quato" of the land, they have rights over the land, but the property of the Union (Brazil). All the conflicts must go through the executive power, when it comes to issues regarding land. Land is given to indigenous people for them to use [...]. The Terena are the ones that worked more on the recuperation of their land. [...] Ours is a State entirely against indigenous people, where politics are more at the service of private owners' interests than at the service of native communities.	(Can you work autonomously, without the need to ask for permission for your activities)? Yes, because we are held responsible for what we do. This organization is from the community, so it is an action of the community itself and there is no need for authorization.							
Reasons for weak IP involvement		There is a whole sector of the organization that works with traditional communities, but I do not know which are the criteria for accession making on when and how to work with indigenous territories. In any case, we have a more specific focus on vulnerable populations, it is even complicated to work with indigenous territories. We are trying to involve IP/Cs in our actions, but there are no specific actions here in the Pantanal with indigenous populations. [...] I think there is a need to include and involve more IP, but in the Pantanal, 80% of land is private. [...] But if the discourse is not about responsibility on these topics, this does not have an impact on public policies. So they have to occupy this public discourse and decision making space. It is all about how you can transform this traditional knowledge into public policy. I think this is the major difficulty that you are facing, low responses of organizations working with indigenous people.	indigenous lands (terras indígenas) have their own regulations. And it is very hard to build communal relations that are necessary to build REDD+ projects. So REDD+ projects do not succeed in including indigenous lands, which is a common issue, there is no clear regulation on this. [...] you cannot include indigenous lands. [...] I think in the Pantanal 80% of the reason is the low presence of indigenous people in the area – except from the Kadwéu, which have a territory of almost 500 000 km². The second factor which is important not just for the Pantanal but for all Brazil, is governance of indigenous lands. The form of governance – legislation of indigenous lands, policies of FUNAI and all this – make it impossible for indigenous lands to generate carbon credits in the voluntary market.								
Possibility of greater involvement	What IP receives is a fiscal incentive that exists in all of Brazil and that generates income for states. Some states allocate 5% of this income to environmental projects, each state defines the criteria for this. In Mato Grosso do Sul, this 5% is allocated to areas that have either indigenous lands or conservation units in their territories. It is a consistent income. This is an evaluation system that yearly allocates the benefit based on the performance. Indigenous lands are very impacted by this instrument.	They can be involved in the case where they are close to project areas, and a relation with them can be built [...]. There is no perspective for them to improve. Our legislation is a mess and it is very complicated to work with it. There is only a voluntary market, it will be very hard to have carbon credits in indigenous areas. One day we were with a regulated market – there has been recently a decree which created a regulated market for carbon, but there are several critics – it would be the government itself to manage the documentation, they would make the projects together with the indigenous communities and other people benefits would be created. In the private market, I see it very difficult.									
Conflicts of IP with private landowners		It is a very localized problem. There are conflicts in the area of the Kadwéu communities, a very small area, because the main conflict happened in the 80s when the Kadwéu were in the area, but there are also small conflicts, and in Miranda, but it is very localized. If you consider the whole Pantanal, I would say conflicts with less than 1% of the area. Conflict with indigenous people is not very frequent in the Pantanal because land ownership is well established and accepted.	The Terena today are going through a process of occupation of their territories, which brought to conflicts.	Here, there are no contacts with private landowners. Just in the reforestation area, and at the time of the conflict, I was very hard to have contacts with land owners, who did not succeed in talking with the land owner. It was a fazenda that work with reforestation but, with the relation between landowners and indigenous people is very complicated.	The white man monoculture system that they brought here is a lot. We are considered as underdeveloped for what we are, that just because we have not had money. [...] It is very difficult to have contacts with fazendeiros. They have strong links with political powers, professors, the state, the federal state, it is very hard for us to have access to this kind of world. Their ideas do not match with our work, it never will, if we stand up and confront them, we will not have a future. They will eliminate us. Somehow they do eliminate us anyway. Local leaders represent IP's bodies that they control, so they have control over what is said.	This area was once part of the fazenda and it was pasture land. There were no trees. We thought on how to plant some new trees, started educating children, we worked a lot, we planted many trees and introduced some new ones. [...] I lived here in Mato Terena since we were first day in 2005. All these trees here did not die.					
Responsibility of TEK & Visibility				They also actively recuperate their culture, despite the language being the key to it. From the movement of knowledge, medicinal plants, natural origin their culture and its processes of reconstruction, the work's vision, this understanding of reality is done through the indigenous language. [...] I think that in a political question the production of this knowledge is relevant for themselves. They showed the potential of traditional knowledge, they are becoming protagonists and gaining autonomy for the Terena people. This gives a great visibility to the Terena people, they formed very strong leaders and were very active in strengthening their own communities.	elders have the greatest traditional knowledge, we are revitalizing it because it is the most important knowledge we have. Through the knowledge of the elders, like São Aloisio, who taught us what each plant could be used for. [...] We are always collecting the fruits of our work, for instance in the water sources restoration. There is one in the Mato Terena that is very dry, we planted trees and some years from now we will be able to see water coming back there.	Indigenous people have always been environmentalist, but with time science has changed and indigenous people have jumped on this boat of modernity forgetting the culture, that territory. Caiaias came to modernity through the culture, the language, but, beliefs, practical ways of working with agribusiness. [...] What I want to do is to preserve the knowledge of Terena language to not lose my identity, if I lose it, I will have to enter this globalized world, but this model of development is not life.	Elders are not somewhere far, they are willing to talk. [...] In relation to outside researchers, we are from a generation that was afraid of white men. My mother used to send us inside the house whenever there was some white man arriving in the village, I am not willing to give away my knowledge to just any person. [...] All the medicines, I take them from here, from the forest. [...] Our plants are being commercialized, and for me as a piglet this does not make sense, I cannot have people pay for it, it is a great gift to share this view.				
Terena				Terena assembly which is very strong and organized, it was from this assembly that leaders came out that led ESI. They are doing a continuous fight, together with the APB, and have great visibility. The Terena have greater visibility than other people.							
Caiaias				It is an instrument, a tool for empowerment. Leosimar (Terena leader) did a great job in recuperation of knowledge, medicinal plants, natural alimentation, music [...]. I linked to the agricultural processes, and this makes the Caiaias a reference point. Leosimar is also a leader, people point outside the region. [...] I do not know any other project like this in the Pantanal. [...] I do not know other projects in the state of Mato Grosso do Sul in the area of Pantanal. There are some small projects but not as structured.	When we do our meetings, we have several groups: elders, children, young people, women and men. All these people are present in the Caiaias and we listen to each representative of these groups. We treat them as the elders, who are the ones with the greatest knowledge. This is how we work, we build a discussion. [...] Women, in the Caiaias work, participate more in the planting activities, while men work more in the hort work. In any case, it is a shared work. Children are the first ones to help too. They are very motivated and curious, they want to learn. Young people work with media, they take pictures for their own opinion on some matter. We try to listen to a maximum of people. We follow what was decided by the group. Each person has their own opinion on some matter. We listen to everyone and look for an agreement. [...] We have contacts with the couples of a nearby village, but we do not see the participation from all of them. For all we need, they are there, but they do not participate a lot. This is a case of a lack of knowledge of all of them, or actions, because when they learn what we do they are more involved.						



THESIS APPROVAL

[This document must be submitted by the student together with the thesis]

I, CLEONICE ALEXANDRE LE BOURLEGAT, as supervisor of the student SOFIA MARZOLO, hereby APPROVE
the thesis entitled: **“Traditional Ecological Knowledge of Indigenous People in the Pantanal region (Brazil):
the potential for indigenous protagonism in forest conservation projects”**.

Campo Grande, September 1, 2022.


Cleonice Alexandre Le Bourlegat