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**Shared Heritage, Shared Future**  
Cross-border conservation strategies  
for natural and cultural preservation  
in Iguaçu and Iguazú national parks

MASTER DISSERTATION

**Maria Fernanda Fracassi Pietrobeli**  
MASTER'S DEGREE IN REGIONAL AND LOCAL STUDIES



UNIVERSIDADE da MADEIRA

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## **Abstract**

This dissertation is a first study on border dynamics, developed during an academic internship at the European Association of Border Regions for the international master's program STeDe - Sustainable Territorial Development. It focuses on two national parks located on the Brazil-Argentina border, near Paraguay, and their cooperation. The study aims to understand their history, trace a territorial panorama, and suggest areas for fruitful collaboration to maintain the heritage.

The first chapter presents key concepts for border studies, bridging different author's perspectives on globalization, colonization, territory, region, borders, and regional identity. These concepts form the framework needed to analyse the chosen region.

The second one, offers a panorama of the Triple Border Region, known for the confluence of the Iguazu and Paraná Rivers, creating the border among the three countries. It starts by describing the region's physical aspects, including its unique geology, fauna, and flora, and the impact of national divisions and development projects. The chapter also covers the history of human occupation, territorial disputes, and socio-economic aspects of important municipalities, highlighting the pre-Columbian inhabitants and their role in the region's natural richness.

The following chapter introduces Parque Nacional do Iguazu in Brazil and Parque Nacional Iguazú in Argentina. By comparing their histories, goals, and management plans, the author identifies potential areas for joint improvement in heritage preservation, leisure, and education.

The final chapter explores cross-border cooperation between the parks, analysing current collaboration and proposing a project that involves indigenous populations in the parks' activities. This project aims to preserve cultural aspects while engaging visitors, the community, and academia in alignment with the parks' goals.

## **Key-words**

National parks; borders; cross-border cooperation; cultural heritage; indigenous; joint project.

## **Resumo**

Esta dissertação é um primeiro estudo sobre dinâmicas de fronteira, desenvolvido durante um estágio acadêmico na Associação Europeia de Regiões Fronteiriças para o programa internacional de mestrado *STeDe - Sustainable Territorial Development*. Discorre sobre dois parques nacionais localizados na fronteira entre o Brasil e a Argentina, perto do Paraguai, e sua cooperação. O estudo tem como objetivo compreender as suas histórias, traçar um panorama territorial e sugerir áreas de colaboração frutíferas para o mantimento do patrimônio.

O primeiro capítulo apresenta conceitos-chave para estudos fronteiriços, conectando perspectivas de diversos autores sobre globalização, colonização, território, região, fronteiras e identidade regional. Estes conceitos formam o quadro necessário para analisar a região escolhida.

A segunda, oferece um panorama da Região da Tríplice Fronteira, conhecida pela confluência dos rios Iguazu e Paraná, que forma a fronteira entre os três países. Começa por descrever os aspectos físicos da região, incluindo a sua geologia única, fauna e flora, e o impacto das divisões nacionais e dos projetos de desenvolvimento. O capítulo também aborda a história da ocupação humana, as disputas territoriais e os aspectos socioeconômicos de municípios importantes, destacando os habitantes pré-colombianos e seu papel na riqueza natural da região.

O capítulo seguinte apresenta o Parque Nacional do Iguazu no Brasil e o Parque Nacional Iguazú na Argentina. Comparando suas histórias, objetivos e planos de gestão, a autora identifica áreas potenciais para melhoria conjunta na preservação do patrimônio, lazer e educação.

O capítulo final explora a cooperação transfronteiriça entre os parques, analisando a colaboração atual e propondo um projeto que envolva as populações indígenas nas atividades dos parques. Este projeto visa preservar aspectos culturais, envolvendo visitantes, comunidade e academia em alinhamento com os objetivos dos parques.

## **Palavras-chave**

Parques nacionais; fronteiras; cooperação transfronteiriça; patrimônio cultural; indígena; projeto conjunto.

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## Introduction

This dissertation has as a broad framework the cross-border protected territory, the aspects that have a direct relation with the political limits such as arrangements and treaties between nations as well as with geographical aspects that don't obey mankind agreements. The focus is on two national parks located on the border between Brazil and Argentina, close to Paraguayan as well, their history of cooperation and suggesting potential areas where it can be fruitful in maintaining the heritage.

It was written as the conclusion paper of the Sustainable Territorial Development Master's degree course, simultaneously with an internship at the Association of European Border Regions. For that reason, the cross-border bibliography is mostly from the association, having also other authors to add to the subject. The territory chosen for this analysis is in Latin America, namely the areas of two national parks, the *Parque Nacional do Iguaçu/ Parque Nacional Iguazu* on the border between Brazil, Argentina (and Paraguay). It is important to note that STeDe's approach to understanding the territory is a holistic one, so the analysis and comparison need contextualisation and touch subjects from different fields of knowledge such as geography, culture and heritage, political relations, management and cartography.

First, the author defines key concepts for cross-border studies through specific bibliography and authors who theorise about border regions. Then, presents a synopsis of the Triple Border context, giving an overview of the unique geographical and climatic aspects, its history of occupation, activities developed on the land and their impact, and some of the socioeconomic indexes of key municipalities for a better understanding of the territorial dynamics. The goal is to contextualise the reader with the local reality and present the triple border region as a whole composed of three national states. Sources for this step of the research use the Sustainable Development Goals as a framework for the cities and the final chapter also relies on this tool.

The next step is introducing the twin parks, also based on authors dedicated to this territory, explaining the history of their separated creation, and a historical timeline of cooperation between them and, on the other hand, to showcase former differences in the

park's management and permissibility, which highlights the complexity of jointly managing natural heritage. The author tried to contact both parks for an interview, unsuccessfully.

Then, is a documental analysis comparing the Managing Plans of both parks - they are essential guiding documents to ensure the effective conservation and sustainable management of protected areas because they intend to balance conservation goals with social, economic, and cultural considerations -, noting how frequently the plans mention the other park and most importantly, identifying challenges in common which can be tackled through cross-border cooperation.

The fourth chapter presents possible cross-border solutions for common obstacles based on publications from sources such as the Association of European Border Regions and strategies from their experience of how to overcome them. The author, then, frames the issues found in common between the parks on those directives and discusses the viability of a joint approach to tackle them.

## **Key Concepts for Border Studies**

### **Territory and Territorial Protection**

When studying borders, one core concept concerns the object of the bordering - the land or the territory. According to Latour (2020), in his famous book *Facing Gaia: Eight Lectures on the New Climatic Regime*, an agent's territory can be defined as the series of other agents with whom he must compose and with whom he must survive in the long run, and those do not necessarily follow the political limits. Paasi (2009), breaks down the term into four categories, which he names "experimental dimensions", consisting of social - experienced by inhabiting collectively; political - to preserve or enlarge the land; cultural - containing collective memories; and cognitive - transforming the others into subjective. Those dimensions create attachments and a sense of belonging. The territories studied for this dissertation, although being in different national states, share many of the agents mentioned by the authors, composing what can be read as one unique terrain.

Territorial protection is an idea born in the 19th century, according to Martins (2022), and was spread worldwide in the following century. Different legislation and categorisation occur in different countries but overall, they follow the same pyramid of priorities: protection, conservation and, once they're both ensured, "visitation and cultural, educational and recreational activities, as well as activities that constitute alternative paths of sustainable local development, benefiting the generation of benefits for local communities, from products or the provision of services, through the participation of local entities." (Gamito & Silva, 2012, as cited in Martins, 2022). As elucidated by the last author, protected areas can be classified at various levels or even be private. The protected areas of this dissertation are classified as World Heritage by UNESCO, meaning they house rare and threatened species and hold unique beauty and, according to Kropf & Euleterio (2017), guaranteeing them advantages when it comes to access to protection, research and monitoring.

The ICNF (2020) recognises the worth of the distinct natural, landscape, and cultural values that are inherent to the territory of classified areas and consequently the growing demand for recreation and leisure activities in these places. The user seeks for close proximity to nature and local cultures position these spaces as emerging tourist destinations. Optimistically, the author claims the evident growth in the demand for sustainable tourism,



present in the ICNF text just mentioned, echoes a greater common concern about the quality of the natural environment and the tourism activities' effects.

To sum up, tourism in protected areas such as the parks this dissertation compares, can be an ally in preservation, but some caution is needed. The natural areas which attract tourists to natural parks, according to Martins (2022), are sensitive and demand from their managers accuracy in identifying and mitigating environmental negative impacts. Another important aspect to keep in mind the author brings is the inclusion of the local community to guarantee the sustainability of the activity.

Environmental preservation often comes together with heritage and cultural ones. Indigenous people's role in preservation is so substantial they are considered guardians of the forest by many authors. Chomsky et al. (2020), are probably not the first but suggested REDD ('reducing emissions from deforestation and degradation'): "to reward governments, companies, forest owners, *and forest dwellers* in the global South for keeping their forests intact instead of cutting them down." (highlighted by the author).

## **Regions**

"Region" has been an important, but diverging, category of analysis for geographers since the 19th century, but according to Paasi (2009), the subject's became more prominent after the 89's. Regions are portions of land with common aspects in a continuous terrain with territoriality-based subsystems.

According to Paasi (2009) "it brings together both material and 'virtual' elements, as well as very diverging social practices and discourses." and differentiates what are formal or geographical (classification of human and physical features) regions from the functional (based in an administrative unit) one.

They might have different dimensions and are not given concepts because of the already mentioned highlights as the "creation and recreation" of them: "Region is thus not a fixed 'scale'; rather it is a perpetual and dynamic process of scaling the practices and discourses through which the previous shapes are produced and reproduced" Paasi (2009).

Many of the aspects that define a region are geographical and so, generically stable, but others are political and social. One of the most notable, that acts as a glue for the unity of a region, is culture. Cultural proximity has the power to create symbols to express identity, as defended by Wrober and Steiner cited by Paasi (2009). Painter, also cited by the author,

questions about the possibility of the regional cultural roles to weaken the links between national identities and citizenships. According to Godinho (2021), the modern national states goal was guaranteeing loyalty from their inhabitants to their centres, instead of their local realities and the national identity implies in understanding the neighbours as “others”, as “enemies”. This fact will be confirmed in the third chapter, when the author will present the reasons there are two parks instead of a binational one.

Going in the same direction, Cury (2010) claims that "Nas questões fronteiriças, a formação do Estado-Nação e a força das redes estabelecidas nas áreas de fronteira geram um novo ordenamento, mais do que territorial, mas também social – um redesenhar do mapa do mundo num lugar escolhido por migrantes."<sup>1</sup>

Still according to Godinho (2021), the regional dynamics of our times are remarkable for the resurgence of the region itself. The rise of the region is paradoxical in a certain sense because since modernity the spatiality's been consolidated as state-centric. According to Paasi (2009), “The increasing power loaded in sub-state regions can also be seen in the fact that while the number of states has quadrupled since the end of World War II, the number of sub-national regional units has multiplied even more. This is the major background for the current tendency to both distinguish regions from each other (identity) and to bring them together (integration).”

Idea corroborated by Cury (2010), quoted at Marques (2017): “dinâmica interna das populações que vivem na fronteira, que estabelecem suas relações de vida, trabalho, cooperação e trocas. Firmam-se pelas dependências de ligações econômicas e dos fluxos socioambientais e culturais, que acabam gerando uma identidade de quem vive num espaço geográfico único, separado apenas por políticas públicas”<sup>2</sup>.

This time around, regions are being institutionalised (in most of the cases, regional borders are softer than national ones - but this is also not a strict rule), in a process named “territorial shaping”, by Paasi. Also, there's a dichotomy of the relation of the revalorization

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<sup>1</sup> In border issues, the formation of the nation-state and the strength of the networks established in the border areas generate a new order, more than territorial, but also social - a redesign of the world map in a place chosen by migrants.

<sup>2</sup> internal dynamics of the populations living on the border, who establish their relations of life, work, cooperation and exchanges. They are established by the dependencies of economic connections and socio-environmental and cultural flows, which end up generating an identity of those who live in a single geographic space, separated only by public policies

with regionalism, understood as the social and cultural processes that shape regional identities and boundaries, “forms of regionalisation of state spaces has led to the revival and emergence of regionalism but regionalisation may as well be a reaction to manage regionalist claims and may even strengthen regionalism.” (Paasi, 2009). This phenomenon can happen in the symbolic spectrum (as mentioned before, related to culture) as well as institutionally.

Institutional shaping refers to the development of institutions, both formally and informally, which “are needed to produce and reproduce other shapes”. Examples of institutions that corroborate with this idea are dialects, the regional way of doing things or more formal organisations such as the chamber of commerce, local authorities, financial institutions, a European Group of Territorial Cooperation (EGTC), etc. Depending on the number/sufficiency of those institutions and on their networking system, a region can have a thicker or thinner “institutional thickness” (Paasi, 2009).

The benefit of this approach is the possibility of creating a common agenda for the territory, defined by Paasi as a “cognitive map” of the region. All sorts of territorial aspects can be represented and better understood with mapping and modelling. When speaking specifically about cross-border regions and collaboration, it’s vital to harmonise the data from different national states to better visualise the deficiencies and potentialities of the group. The *b-solutions* thematic report “Border Regions for the European Green Deal: Obstacles and Solutions to cross-border Cooperation in the EU”, Brustia et al. (2021) identifies obstacles in different contexts and highlights the harmonisation of datasets, methods or technical environmental management standards as one of the most common solutions enlightened by their experts on their cases about the European Green Deal.

### **Borders and their Regions**

The Cambridge dictionary defines the noun "border" as simply "a line that has been agreed to divide one country from another" (Cambridge University Press, 2024). Although the idea of an agreement implies political activity, the Oxford Dictionary brings spatial dimension to the term, defining it as "the line that divides two countries or areas; *the land near this line*" (Oxford University Press, 2024). The political arbitrary division together with the land on the proximities are key elements for studying borders, but by themselves, they are not enough. The recognition of the limits are essential to the continuity of a territorial

group and it also obliges the reflection about separation, about what's together and what's sundered (Godinho, 2021).

The concept is historically related to phenomena such as colonisation and relative consolidation of national states borders, globalisation consequently (and its dichotomy of local-global events) and to other broader concepts like region, territorial space and associationism. For the framework of this dissertation the concepts presented in Rumford's, Cetolin et al. 's and Paasi's work are very useful.

According to the first author, borders are central to the social theory agenda. For him, the key elements are mobilities (based on Urry's call for the focus shift from societies to mobilities) and networks, under the influence of globalisation theories. Rumford (2006) cites Castell and Bauman's work as remarkable on the field, defending that the space of places, namely the national states, is being replaced with the space of flows. Paasi names some of those globalisation aspects:

“The rise of networks, flows of immigrants and refugees, internet, the borderless world thesis, and the post-structuralist or post-nationalist literature that have challenged the national state” (Paasi, 2009). Flows that, according to Cury (2010) are of goods (legal and illegal), communication networks, tourists, commuter workers (formal and informal), truck drivers, drug dealers, smugglers, and other agents that have their activities dependent on the borders.

One author who corroborates this idea is Katzenstein, who, according to Paasi (2009), suggests that globalisation and internationalisation create open or 'porous' regions. We tend to think of borders as solid structures, but they are actually dynamic: “Borders can be created, shifted, and deconstructed by a range of actors. In short, borderwork is no longer the exclusive preserve of the nation-state” (Rumford, 2006).

Paasi (2009) validates the idea of a dynamic nature of borders, explaining that “While territorial spaces are normally bounded and borders are key instruments in the operation of territoriality, such borders are not inevitably fixed”. The research of Cetolin et al. (2012) substantiates this perspective, defending the importance of territorial space is great when it comes to overcoming challenges which take place in more than one national state and should be valorised once again.

On the other hand, those exchanges can be perceived under different lenses, such as the approach presented by Latour (2020) on the permeability of the borders, instigating reflections about limits and invasions anchored on the New Climate Regime. He defends invasions on other's lands that are happening all the time when sharing resources and consequences in a globalised world, but they're not visible yet.

Region, as defined by Cury (2010) is not a scientific concept, but is open to many interpretations, with fluid meanings but often related to the territory and, more specifically, spatial frameworks. The idea of a region is associated with the location of a certain domain (of species, of relations, of regulation, etc) and according to Lencioni (2003), as mentioned by Cury (2010), also addresses the social mystification and political manipulation for constructing the idea of a region.

This same author defines the International Border Zone as being an established distance of 150 km from the traced limit. Despite the width defined by the *Programa de Desenvolvimento de Faixa de Fronteira brasileiro*, of 2005, he addresses that the Border Zone doesn't have precise boundaries, shaping itself inside a country territory according to potentialities available.

The programme just mentioned proposed coordinated actions between 21 Ministries and Secretariats to boost the economy, promote education, health and safety, in addition to encouraging cooperation and investments in infrastructure and guaranteeing citizenship rights to residents of municipalities that are up to 150 kilometres from the borders of Brazil with 10 South American countries, demonstrating political action and special planning for the border regions and identifying twin cities - and their offshore zones - as the geographic formations which better express border realities. The Triple border is a rare case of "triplets".

### **Regional Identity/Cultura de Orla**

Often people identify themselves with their home region. It seems like common knowledge and Paasi (2009) affirms it is confirmed by different studies. Personal and family history are very frequently mentioned as reasons for the sense of belonging.

As discussed above, the globalisation dynamics have introduced new components to daily lives in most regional contexts. Since the colonial period the number of families displaced and, consequently, less bonded to their territory has rapidly increased. Those

displacements happen for many reasons, but Paasi (2009) defends this detachment is maximised among immigrants and especially refugees. Consequently, it's an imprint of our times to have fewer bonds with our homelands. Latour (2020) also observes this phenomenon, perceiving that modernisation demanded from people escaping their lands:

“Pertencer a um solo, querer nele permanecer, cuidar da terra, criar vínculos com esse lugar, só se tornou “reacionário”, como vimos, por contraste com a fuga adiante exigida pela modernização.”<sup>3</sup> Latour (2020, pp. 66-67).

On the social sense of belonging, the question of “where do we belong?” depends strictly on the subject. Who are we? Identification, according to Paasi (2009) may represent more a feeling than necessarily the knowledge of the language or participation in social activities. The author continues, “certain continuity over time and social and spatial differentiation from others are often key elements of identity” (Paasi, 2009), also highlighting the time dimension of identification, basing his ideas on Guibernau's (2007).

Border regions studies, according to Driessen (2005) - quoted by Godinho (2021) -, include local peripheral identities that are, paradoxically, the centre of an interest group, worries and activities. According to her, in any identification process core there's always a border, the separation between “us” and “them”. Along the same lines, Hissa (2006), as quoted by Cury (2010), confirms “o limite é algo que insinua entre dois ou mais mundos, buscando a sua divisão, procurando anunciar a diferença e apartar o que não está ligado”<sup>4</sup>.

Of course, as noted by Godinho (2021), spatial identity is only one aspect of people's identity and sense of belonging. People vary in all other categories such as gender, age, class, social groups, but territory identification creates a common ground, especially in times of crisis.

“As identidades tornaram-se o cais de partida e a gare de chegada de múltiplas investigações, num tempo em que os processos de globalização, longe de esbaterem as fronteiras entre as culturas,

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<sup>3</sup> To belong to a piece of land, to want to stay in it, to take care of the land, to create connections with that place, has only become "reactionary", as we have seen, in contrast to the flight required by modernisation. – this sentence was translated by the author, the source was the version of the book translated in Portuguese, as references show.

<sup>4</sup> the limit (border) is something that insinuates between two or more worlds, seeking their division, attempting to announce the difference and to separate what is not connected

são concomitantes de uma afirmação das diferenças e acentuação das suas manifestações”<sup>5</sup> (Godinho, 2021, p).

### **Colonisation, globalisation**

Marques (2017) starts his writings about integration and cooperation on the triple border characterising them as multifactorial, as well as globalisation process. They create and modify political, cultural, social and economic aspects in uneven processes around the globe and manifest governmental and peoples' interests. He claims there are disagreements among authors about globalisation origin, but many authors trace it back to the beginning of the XX century as a capitalist stage.

The contemporary notion of borders, frontiers, connectivity and international communication has its roots in industrial processes hosted in the European continent. The Industrial Revolution marked the beginning of big-scale production and a big transformation in the labour market, relying on the extraction of goods and exploitation of other lands. Those historical events are intimately related to the great navigations period - when Spain and Portugal were two of the main players in territorial expansion and consequently, imposition of cultural and religious homogenization. According to Godinho (2021), relations between colonies and metropolises are local-based events with similar ones all around the globe: in the last 500 years, almost all cultures were affected by European expansion effects and colonialism. The author mentions Wolf (1982) to claim that “a worldwide sample of isolated cases is just an illusion”, instigating something bigger is behind colonial cultural encounters.

Latour (2020) was pragmatic when defining as criminal the European colonisation of faraway lands. The mindset of the period was the elimination of local cultures (and I add here, forms of living and political organisations) and the forced replacement of non-European lifestyles for a “civilised” one. Marques (2017) who writes about integration and cooperation in the Argentinian, Paraguayan and Brazilian triple border claims the deconstruction of the Guarani peoples' territory happened under capital interests, motivated by foreigner's philosophies. National States institutions imposed the political, social, economic and cultural

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<sup>5</sup> Identities have become the point of departure and the gate of arrival of multiple investigations, at a time when globalisation processes, far from blurring the boundaries between cultures, are concomitant with an affirmation of differences and accentuation of their manifestations.

rules imposing obligations against the Indigenous power and territorial organisation, subjects which will be discussed more in-depth in the next chapter.

The terms glocalisation and its adjective, glocal were first introduced in the 80s, according to Khonder (2004) in the Japanese business field and turned into a buzzword. The concept slowly became broader, being used in other areas. The definition available in Encyclopedia Britannica describes it as “simultaneous occurrence of both universalizing and particularising tendencies in contemporary social, political, and economic systems”. Glocal, consequently, can be understood as something “Reflecting or *characterized* by both local and global considerations.” (Oxford Dictionary). The concepts are, by definition, linked to globalised networks and make sense just after the historical events which culminated in globalisation itself, such as the colonial period. In the colonial context, the relationship between metropole and colony can become very interesting under glocal optics.

Latour (2020), writes about the capacity to register, keep and respect the greater number of possibilities of belonging to the world - globalisation securely introduced new ones to numerous groups of people. This affirmation is corroborated by Paasi (2009), who suggests people’s awareness of globalisation processes “generates new orientation points” affirming old and simultaneously creating new boundaries - regional identity and searching for roots.

Marques’ (2017) dissertation brings the global-local panorama to the border studied for this work: “The problem leads us to respond if the Triple Border is part of a globalising process with glocalised and interrelated implications for the circuits of territorial integration and cooperation, and which governmental acts prove this integration and cooperation in the territory of the Triple Border.”. His conclusion is positive. Although globalisation processes indeed affect territories in different ways and intensity - politically, socially, culturally and economically - populations are not under its effects in a uniform pattern. To understand the globalising-local dynamics, it's convenient, in regional studies, to consider their actions on all levels of governance. Still, according to the same author, “Dessarte, inseparável daquele processo, convém citar a integração e a cooperação entre os povos.<sup>6</sup>”

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<sup>6</sup> Being so, inseparable from those processes, one should mention the integration and cooperation between peoples.



The globalisation phenomena, marked by the final and post-Second World War historical moment and its agreements, brought changes to diverse areas. According to Marques (2017), the Marshall Plan for recovery of Europe and the US, the soviet origin of COMECON, the political division of East and West Germany, among other events, culminated in the reintegration of a global market, segmented previously by the national states.

Martin (2017) claims it can be observed by the arial of liberal ideals in the post-war moment, implicating not only in a free circulation of goods, services and money, meaning a decrease on the barriers among countries, “a exemplo do Mercosul, que concretiza a compatibilidade do processo de globalização aos circuitos integradores e cooperadores com repercussões locais, como no caso específico da Tríplice Fronteira.”<sup>7</sup> (Marques, 2017)

Those ideas culminated in the creation of Mercosur, part of a broad strategy of geopolitical agreements aiming at integration and cooperation in the political, social and economic fields. Cury (2010) claims Mercosur generates new territorialities and a new form of union, cooperation and better quality of life for peoples in Latin America. The author also cites other authors' concepts such as Milton Santos' (2010) who defines globalisation as the internationalisation of the capitalist world or Beck (1999) who defines it as the daily experiences of borderless actions in the economy, information, ecology, technic, transcultural conflicts and civil societies fields.

“As interpenetrações populacionais com dependências das cidades trigêmeas de Foz do Iguaçu, Puerto Iguazú e Ciudad del Este são comprovações do binômio Global-Local.”<sup>8</sup> (Marques, 2017)

### **Territorial Associationism and Cooperation**

Corroborating with the already presented definition, Cetolin et al. (2012) define “territorial space” based on Raud (1998) as an integration space in which social actors favour the emergence of collective dynamics of sustainable development. The authors defend the revalorization of it in the context of joint decision-making, under a border-networked

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<sup>7</sup> Such as the Mercosur, which makes the globalisation process compatible with the integration circuits and cooperators with local repercussions, as in the specific case of the Triple Border.

<sup>8</sup> Population interpenetrations with dependencies of the triplet cities of Foz do Iguaçu, Puerto Iguazú and Ciudad del Este are evidence of the Global-Local binomial.

governance. According to them, the territory should be central in the concrete actions and relations stemming from it and, more importantly, the protagonism of territorial associationism - with roots older than globalisation processes - and local power on those dynamics.

Paasi (2009) goes in the same direction when distinguishing levels of hardness of boundaries in a territorial shaping subject, referred to as “institutionalisation of regions”, phenomena directly related to AEBR and its programmes. The spatial Eurostat division of European territory in NUTS - *Nomenclature des unités territoriales statistiques* in French is also evidence of it. Those units are for statistics, but their smallest scales often overlap with local power institutions. There are evident confluences between Cetolin et al. (2012) and Paasi (2009) approaches to regions/territory and associationism.

Cross-border cooperation converges with territorial associationism in the aspects elected by Abrucio (2011), also mentioned by Cetolin et al. (2012), being: respect to states or entities’ autonomy and integrity; their interdependence, diversity of alternatives of cooperation; patterns that foster, promote, regulate and assist the governments and the society to produce intergovernmental arrangements for the territory. According to Paasi (2009), The cross-border region policy in the EU has striven actively to reduce internal borders precisely by making new regions.

Marques (2017) claims that the creation of integration and cooperation between peoples and glocalisation discussed above are inseparable phenomena. Cooperation and integration processes act simultaneously on the political, social, cultural and economic fields. They're often subject in territorial planning discussions and border studies as well, and in policy when it comes to cohesion in the European continent.

Of course, this is also a discussion in Latin America. To exemplify the local power that arises in the institutional framework, Cetolin et al. use the case of the Brazilian public healthcare system and elementary schools, which have been “municipalised”, having their functioning based on replicable practices. Cetolin et al. (2012), cites Souza’s perspective on the Brazilian way of funding and managing those services, claiming the Brazilian experience shows us that inducing policies and federal resources is fundamental for the local governments to play their roles as social services providers for everyone.

Under Haesbaert, as mentioned in Cetolin et al. (2012), globalisation processes with higher or lower influence, can implement themselves locally and generate new spatialities created by territorial aspects - for instance after a migration period. These people may share politically, socially, culturally and economically more with their neighbours than with their compatriots - meaning the necessity of jointly determining horizons under new configurations.

Contemporary public management, according to Cetolin et al (2012), results from complex historical processes under different conceptual and ideological sources. State actors and, more recently, non-state ones as well, participate in planning and managing public space. The New Public Management started to be present in the Brazilian context from the 90's on, and intends on favouring cooperation between public and private agents, individuals or institutions, to formulate and implement public policies - especially those leading to sustainable territorial development.

Some caution is needed when analysing those political processes under the new public management optics, but Cetolin et al. (2012) seem optimistic about its' goals and functioning under the capitalistic sphere: "É possível que a abordagem da NAP (Nova Administração Pública) contemple as dimensões do desenvolvimento sustentável entendido como aquele capaz de compatibilizar eficiência econômica, prudência ecológica e justiça social"<sup>9</sup> (Cetolin et al, 2012).

### **Sustainable Development Goals**

Not exclusive for border studies, but this framework is useful when it comes to analysing bi/international matters. The so-called SDGs (or Agenda 2030) are a set of 17 interconnected global objectives established by the United Nations in 2015 and since then have been a valuable framework for setting goals and evaluating the state of play of certain measures.

Derived from extensive international consultations, the SDGs encapsulate a comprehensive framework addressing various dimensions of sustainable development,

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<sup>9</sup> It is possible that the NPM (New Public Management\*) approach contemplates the dimensions of sustainable development understood as one capable of reconciling economic efficiency, ecological prudence and social justice - \*the author explains the approach was imported in Brazil in the 1990's, under the name of *Nova Administração Pública*.

including economic, social, and environmental aspects. These goals aim to tackle pressing global challenges such as poverty, inequality, climate change, environmental degradation, and peace and justice by 2030. They are based on inclusivity and equality.

As stressed at the European Committee of Regions event, namely 2024 EU SDGs Dialogue with Regions and Cities: Financing SDGs territorialisation which took part in Brussels, on 4th June 2024, by Clucas (2024), territorial matters and climate matters are indivisible and the SDGs are a useful framework for balancing governance, capacity building, education and enterprises and funding forces for what she called interterritorial goals.

Moreover, Kampus (2024) emphasises the need to integrate SDGs into local policies as a tool for electing priorities, targets and indicators, keeping in mind the indivisible aspects of them. She advocates for experiential approaches for filling the governance gaps between what needs to be improved and how, in a holistic approach to the territory, in line with STeDe's methodology.

## **The Triple Border Region**

### **Geological/Geomorphological aspects**

The triple border region is located on an ancient substrate called Brazilian Shield or Brasilia Massif, which originated in the Precambrian times. The border itself (and the parks) are situated on basalt rocks from the Serra Geral Formation, which, according to Rapanelli, Feger & Fernandes (2021), are part of the rock formations filling the Paraná Sedimentary Basin. These basaltic rocks were formed approximately 130 million years ago during the Lower Cretaceous period of the Mesozoic era, originating from the consolidation of non-explosive lavas on the Earth's surface. The magma extruded through large crustal fissures created during the breakup of the Gondwana supercontinent, leading to the separation of the South American and African plates and the formation of the Atlantic Ocean.

These volcanic eruptions occurred on a continental scale. Within the parks' area, the basaltic lava flows form tabular strata, stacked with a total thickness ranging from 750 to 800 metres. Typical features include well-defined tabular layering corresponding to the lava flows, along with parallel fracture systems, influencing the regional topography characterised by gently undulating hills with flat-topped profiles, common in basaltic terrain and influenced by current climatic processes shaping the landscape (Rapanelli et. al, 2021).

### **Iguaçu River and Hydrography Aspects**

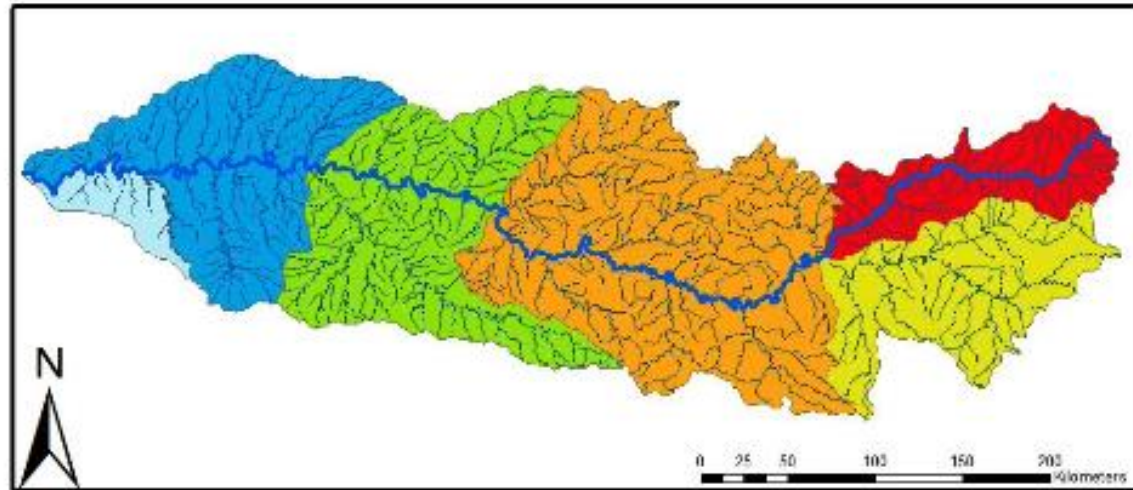
According to Fabri (2002), as explained in the last Management Plan of Parque Nacional Iguazú (2017), the Brazilian Shield underwent deep and successive transformations, product of tectonic movements, marine ingress and regressions and alternations of dry and humid periods with evidence of glacial actions.

The Parks - and the Border - are located on the third one, where numerous erosion processes culminated in a dense draining network, which after many erosive cycles worked the basaltic substrate forming valleys with encased springs. Being so, the Parks are surrounded by one of the biggest and most significant water systems on Earth, crossing five different nations (Argentina, Bolivia, Brazil, Paraguay, and Uruguay), namely the Plata Basin (Fabri, 2002, as mentioned in PNI-AR Management Plan), which is thought to be the second biggest basin in South America, with a total area of roughly 3,100,000 km<sup>2</sup> (IARH, 2002, as mentioned at PNI-AR Management Plan).



Source: Food and Agriculture Organization of the United Nations, 2016

The main water collectors in the Basin are the Paraná and Uruguay rivers, which flow into the La Plata River. The Paranaíba and Grande rivers in Brazil combine to form the Paraná River, which gets water from many significant tributaries, the most notable one being the Iguazú River basin. The Triple Border is marked by the flowing of the Iguazú River into Paraná River, transforming the water joint into an important landmark - less than 6 km away from the PNI-AR. The map below was gathered from the management plan of the Argentinian park and shows the Iguazú River - which draws the border with Brazil and plays an essential role in the parks - and the subbasins.



**Legend**

1:2.500.000



**Mapa 6 - Subcuencas de la cuenca del río Iguazú**

Fuente: Heisch y Raymundi (2013)

Source: Management Plan of Parque Nacional Iguazú, 2017

Iguaçu means “big water” in the Guaraní language and the river starts in proximity to the Atlantic Ocean, close to the capital of Brazilian State Paraná, Curitiba. The river crosses the whole state and flows into the Paraná River. Iguazú River changes during its course, the river's characteristics vary, and the upper and lower parts of the river are well differentiated, changing the activities in the surroundings - the parks are at its lower portion. Additionally, it holds mythological meaning in Guaraní culture - aspects that will be more developed in the following chapters.

This river boasts the largest hydrographic basin in Paraná, with the parks situated in the Lower Iguazú basin and La Plata basin, as introduced. The river in this area forms canyons and small sandy-silty beaches downstream from the waterfalls, at altitudes ranging from 205 to 90 meters. The drainage pattern is generally rectangular to sub-rectangular, with some sub-dendritic details. The Iguazú River plays a significant role in shaping the regional landscape, with basalt soils giving rise to classes such as purple latosol, red soil, and gley soils. (Rapanelli et. al, 2021).

## **Climate and Weather**

The climate is warm and wet, typical of the Atlantic Forest environment. In Portuguese, this forest is named *Mata Atlântica* and in Spanish, *Selva Misionera* - referring to the Misiones province, where the PNI-AR is located. According to Kropf & Eleuterio (2017) and confirmed by Schipper's (2021) text on the website OneEarth, there is between 1,200 and 1,600 mm of precipitation per year in this subtropical environment. Frosts are common throughout the dry season, which occurs from April through September. He also mentions the region's soils range from the lush latosols - known commonly in Brazil as *Terra Roxa* to the destitute podzols - the typical soil of eucalypts. From river plains to middle-level plateaus up to an altitude of 800 metres above sea level, forests are present.

Big-scale climate events are present, such as the El Niño-Southern Oscillation (ENSO) cycle, which causes extraordinary floods and drains on the Iguazu River. The text of the Management Plan of the Argentinian park gives an overview of this phenomenon:

“De Azevedo et al. (2006) analizaron la relación de las crecientes y sequías con los eventos del Niño y la Niña, pudiendo observar que los caudales máximos en los puestos fluviométricos de la cuenca ocurrieron en los años 1957, 1982, 1983, 1986, 1987, 1995, 1997 y 1998 y los caudales mínimos en 1951, 1968, 1978, 1985, 1988, 2000 y 2001.”<sup>10</sup> (PNI-AR Management Plan, 2017, p.48)

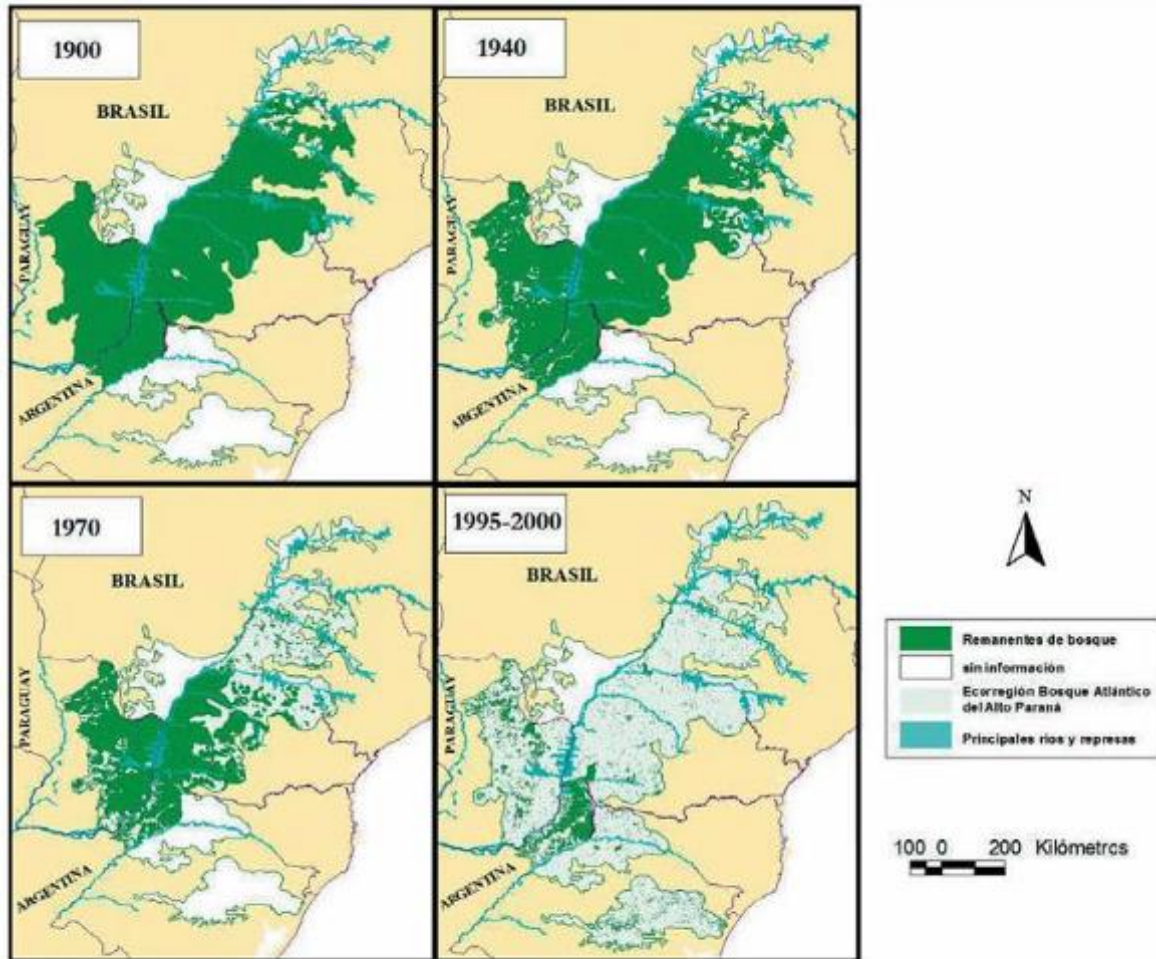
## **Atlantic Forest – Species and Gaps**

The Brazilian States Paraná, Santa Catarina and the north portion of Rio Grande do Sul, together with the Paraguayan eastern portion and the Argentinian provinces of Misiones and the northeast portion of Corrientes are categorised on the PNI-AR Management Plan as a unique bioregion named *Bosque Atlantico*, having its original extension of more than 400 thousand square kilometres. Unfortunately, only 7,8% of this territory remains forest, according to Di Bitetti et al., (2003), as mentioned in the plan. This author worked with satellite images in order to visualise the deforestation and drew the map below (gathered from the plan mentioned) where we can see that most part of the reminiscent forest is located in Argentinian territory:

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<sup>10</sup> De Azevedo et al. (2006) analyzed the relationship of the increasing and droughts with the events of El Niño and La Niña, observing that the maximum flows in the fluviometric positions of the basin occurred in the years 1957, 1982, 1983, 1986, 1987, 1995, 1997 and 1998 and minimum flows in 1951, 1968, 1978, 1985, 1988, 2000 and 2001.





**Figura 5 - Proceso de destrucción del BAAP**

Fuente: Placci y Di Bitetti, 2006

Source: Management Plan of Parque Nacional Iguazú, 2017

Schipper (2021) summarises the reasons for this big decay: “The Alto Paraná Atlantic Forests ecoregion has suffered from human actions such as overexploitation, clearing of land for agriculture, and burning of biomass, with profound impacts upon terrestrial and aquatic ecosystems — including the loss of biodiversity and the degradation of soil and water quality of small and large international rivers. Timber extraction, agriculture, and hunting represent continuous threats to the biodiversity of the Alto Paraná Atlantic Forests. Such activities will increase the pressure on timber trees, game species, and large carnivores.”

Going in the same direction, according to EMGC (2016), much of the Guarani territory - the forest - has been destroyed or threatened by industrial cultivation of soy, sugarcane, and reforestation with exotic species like eucalyptus and pine. The authors also claim the introduction of foreign species of grasses from Africa and Asia has also been

disastrous, invading Guarani fields and facilitating the spread of fire, further complicating traditional agriculture.

The flora present in the area is incredibly diverse, comprising a wide variety of plant species adapted to the region's humid subtropical climate, diverse topography, and rich soils like the already mentioned *terra roxa*. According to Morellato & Haddad (2000) some key features of its flora are the Canopy Trees (with species such as Brazilian Pine or Parana pine (*Araucaria angustifolia*), a culturally important tree at the region and symbol of Paraná State), Epiphytes and Orchids, Understory Plants, Bromeliads and Tillandsias and medicinal and economically valuable plants (examples include the *yerba mate* (*Ilex paraguariensis*), a traditional indigenous medicinal plant which entered the local culture and is often drunk in community, also named *chimarrão* on Brazilian territory).

Other species worth mentioning are the *Palmito de Juçara* (*Euterpe edulis*), characterised as having special value in the Parque Nacional Iguazú at the Management Plan but not mentioned on the Brazilian one - although palm hearts are commonly consumed. The plant is also considered a key specie in the plan because of its nutritional potential, “Según resultados obtenidos por Placci et al. (1992), se puede considerar al palmito como “especie clave”, ya que produce una gran cantidad de frutos comestibles, en forma sincrónica y en época de escasez de recursos. En este aspecto, juega un papel importante para especies frugívoras ya que provee de alimento fácilmente disponible en épocas críticas.” (PNI-AR Management Plan, 2017).

When it comes to the fauna, the biodiversity of this portion of the Atlantic Forest is also very rich, including mammals (more than 250 species), birds (being the biggest group, with almost 550 species counted), reptiles (114 species), amphibians (66 species), fishes (234 species) and insects (189 species). Some notable species found in the park and their surroundings include the jaguar, tapirs, ocelots, howler monkeys, toucans, parrots, caimans, and a variety of colourful butterflies.

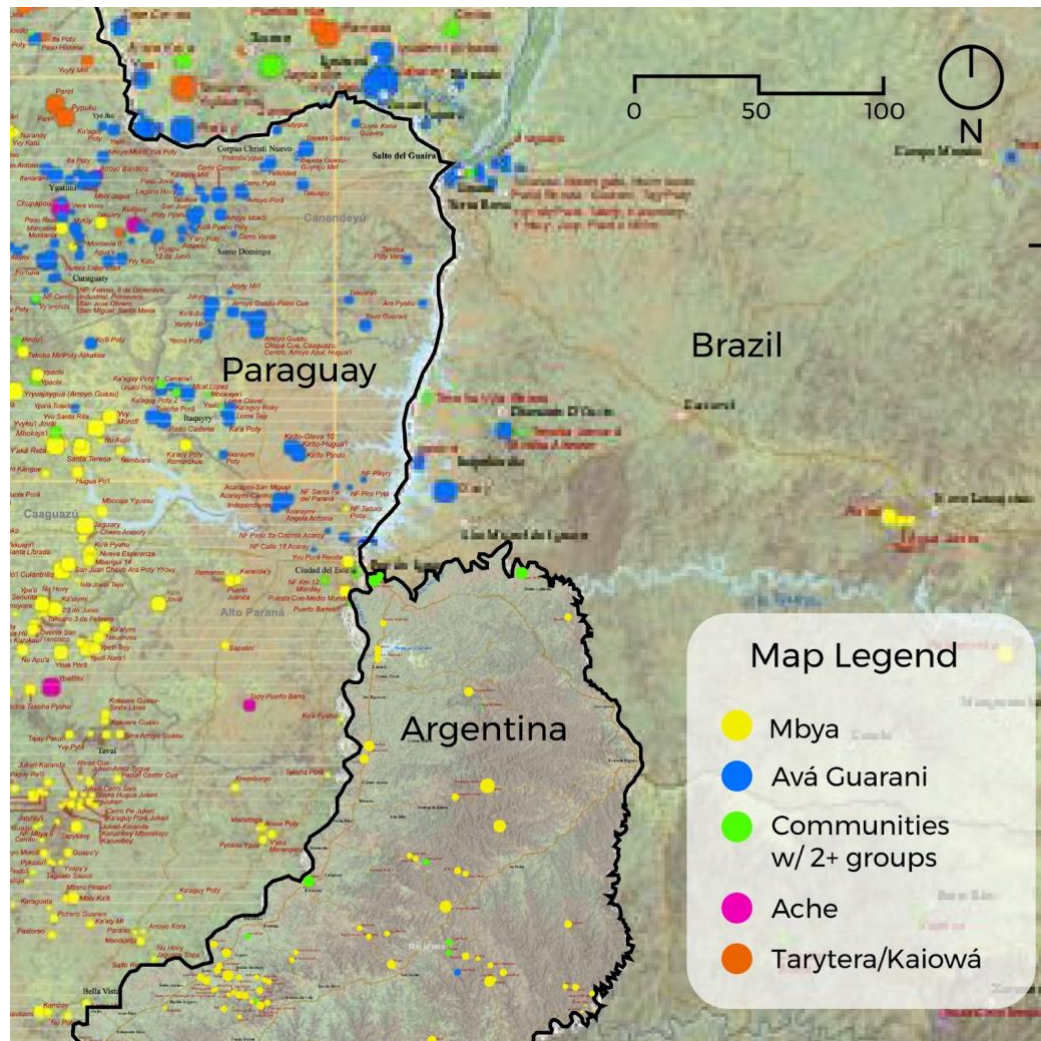
These species play crucial roles in the ecosystem. Efforts to protect these key species are essential for maintaining the ecological balance and health of the remaining forest.

## History of Human Occupation

Martins (2017) starts writing about the transboundary territoriality of the triple border relating it to the first contact between native Americans (Guaranis, in this case) with European colonists, but its history should start to be told from before this encounter. The territory has signs of human presence from 10 thousand years ago, according to the Management Plan of Parque Nacional Iguazu.

About 1 thousand years ago, the occupants of these lands were hunters, fishers and collectors named *Kainguás*, who were displaced by *Guarani* people around the end of the XV century. The *Guarani* had a different lifestyle, practising agriculture and navigation in addition to collection, fishing and hunting activities. They named this region *Tekoa Guassu*, meaning “large group of villages” or “big *Guarani* territory” (Martins, 2017). Ladeira & Faria (2016) disagree about this timing, claiming *Guarani* occupation of the Plata basin is prior than 2 thousand years.

According to Martins (2017), citing Carvalho (2013), this territory englobes the south and southeast portions of Paraguay actual limits, the northeast portion of Argentina and portions of the states of Paraná and Mato Grosso do Sul, in Brazil. Differing from the information on the Argentinian park management plan, these two authors claim the region had been occupied by the *Guarani* population since the first century d.C. The following map was done by the author, adapting three of the *Mapa Guarani Continental* (EMGC, 2016) by uniting the Paraguayan, Argentinian and Brazilian ones, focusing on the region of the Triple Border. Its goal is to illustrate the different *Guarani* groups on the territory, but because it is made out of different scale maps, should be taken in consideration only the location and distribution of the groups, not the size of the icons.



Source: author, using EMGC national maps (2016) as base.

Although Guaraní is the biggest indigenous group in Latin America, the amount of land demarcated for their use is negligible (Navarra, 2019) - this is a factor related to the way settlement was planned and practised by Europeans occupiers.

Indigenous borders concept, according to Martins (2017) is often not rigid, or fixed as established by the National States. For them, there's a constant creation and disruption of the borders, in a dynamic process connected to ecological boundaries and limits agreed upon because of the presence or lack of social bonds. "Com uma apropriação fluida e dinâmica do espaço, os guarani tradicionalmente estiveram presentes na região fronteiriça, dada a intensa mobilidade social em função das redes de parentesco"<sup>11</sup> (Navarra, 2019). Ladeira & Faria

<sup>11</sup> Existing in a fluid and dynamic occupation of space, the Guaraní have traditionally been present in the border region, given the intense social mobility due to kinship networks

(2016) explain the dynamics of the *tekoa*: the bonds of consanguinity and affinity interconnecting villages shaping a complex territory.

Until the year 1880, despite the presence of European colonists, the occupation of *Tekoa Guassu* was only indigenous, safeguarded by Jesuit villages. Those were threatened and destroyed by *Bandeirantes* - explorers from São Paulo with the mission of colonising interior lands of Brazil, known for being violent and slaving indigenous populations. They were not the only threat, though. Martins (2017) quotes the historian Wachowicz (1972) naming similar conquerors under the Spanish domain named *adelantados*.

According to this author, their goals were to impose Guaranis catholic religion and teach them a job. In return, they'd be forced to pay a tax - a system which was corrupted and the indigenous population was transformed into slaves. Those relations are not shallow, though. According to Martins (2017), the relationship between *Bandeirantes* and the Jesuit priests was not a friendly one, representing the Spanish and Portuguese dispute for the region, which culminated in the disrespect of their land division treaty, namely the *Tratado de Tordesilhas*. This first and other treaties will be mentioned in the next chapter.

On the other hand, Haesbaert (2006), as cited by Cury (2010), claims a territory inhabited by "primitive" people which was subsequently divided by the National States and consequently changing the condition of this territory into being two or more national ones, continue to be a unity due to its territoriality - it doesn't stop existing.

In 1542 the Spanish explorer or *adelantado* Álvar Núñez Cabeza de Vaca arrived at the waterfall's region - in the company of Guarani indigenous people and encountering others of them on their arrival as well, really close to the actual borders of the mentioned countries (Chagas e Mota, 2011 and Vallejos e González, 2014; as cited by Martins, 2017), followed by other colonisers and kicking off a series of land and power disputes. This phenomenon started drawing the actual political borders between those countries and, according to the *Comissão Estadual da Verdade do Estado do Paraná*, law 17362, of 27/11/2012, as mentioned by Navarra (2019), this arrival marks the first registered and documented violence against the local population.

Navarra (2019) explains the importance of studying and trying to comprehend different cosmologies, especially when it comes to understanding the violence against the native: "Compreender o sentido, a natureza e a extensão das violações sofridas sob a

perspectiva da própria vítima faz do trabalho da/o antropóloga/o ainda mais importante, na qualificação etnográfica a tentar entender todas as nuances acerca das violações cometidas nestes casos."<sup>12</sup>

The new occupation unfolded adverse conditions for the Guarani people, generating conflicts and problems related to insufficiency of land such as not enough food - agricultural space, and proper living conditions - living space. Often, the meeting of indigenous and European populations was violent, described by Chagas & Mota (2011), quoted at Martins (2017) as being bloody and with many conflicts. The conquest of the territory “foi feita palmo a palmo, com o uso da espada, do arcabuz, da besta, da cruz, de doenças e de acordos.”<sup>13</sup> (Chagas & Motta, 2011).

“Podemos apontar que o território Guarani passou por inúmeras retaliações a partir da chegada dos povos europeus na “conquista” da América. Passando pelo Tratado de Tordesilhas, de Madri e o de Santo Ildefonso, a região que compreende o antigo território dos Guarani foi sistematicamente dividida por limites territoriais, sem contudo levar em consideração a autonomia desse povo”<sup>14</sup> (Horii, 2014, p. 97, as quoted by Marques, 2017, p.61).

Cury (2010) writes about the strategy behind territorial explorations/expansions missions, following the course of Paraná and Paraguay Rivers, in the centuries XVII, XVIII e XIX, founding cities and occupying the axe of the mining economy of Buenos Aires - Paraguay, claiming they were linked to commercial exploitation and transport.

Adding to this idea, Navarra (2019) highlights the justifications for occupying this "demographic void", which were used again in the north of Brazil, in the Amazon region, in the military dictatorship which started in 1964, some years later. The dehumanisation of Guarani and other indigenous populations is endorsed on the official non-consideration of many indigenous lands owned and occupied.

At the beginning of the XIX century, a war took place between Paraguay versus Brazil, Argentina and Uruguay (Triple Alliance), being the largest international armed conflict in Latin America. This war annexed the Province of Misiones and Formosa to

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<sup>12</sup> Understanding the meaning, the nature and extent of the violations suffered from the victim's own perspective makes the anthropologist's work even more important, attempting, under ethnographic qualification, to understand all the nuances about the violations committed in these cases.

<sup>13</sup> Was done inch by inch, with the use of the sword, of the ark, of the crossbow, the cross, diseases and agreements

<sup>14</sup> One can point out that the Guarani territory has undergone numerous retaliations since the arrival of the European peoples in the "conquest" of America. Passing through the Treaty of Tordesillas, the Treaty of Madrid and The Treaty of Santo Ildefonso, the region comprising the former territory of the Guarani was systematically divided by territorial boundaries, without however taking into consideration the autonomy of this people



Argentinian territory and the lands north of Apa River to Brazilian territory, composing part of the actual State of Mato Grosso do Sul. The period after the Triple Alliance War was particularly devastating for the Guarani population in the Brazilian States of Mato Grosso and Paraná:

“O final da guerra consolidou a ocupação continuada no interior do país por sucessivas frentes de exploração econômica, como a extração da erva-mate nativa, projetos agropecuários e de colonização, cujos ritmos passaram a marcar a vida dos Guarani.”<sup>15</sup>  
(EMGC, 2017)

According to Carneiro Filho (2014), as quoted by Martins (2017), two years after the end of the war, in 1872, Brazil and Paraguay signed a treaty firming the new limits and in 1898 Brazil and Argentina signed the *Tratado dos Limites*, complemented by *Artigos Declaratórios* in 1910 and a complementary convention in 1927, tracing finally the political limits we are under nowadays.

Having in mind the *Tekoa Guassu* predates these phenomena, the imposed limits by the national states were not recognised by the indigenous population - similar to the unrecognition of the occupation of the land by the national states. According to Martins (2017), they hold the right of freely transpassing those boundaries supported by The Geneva International Convention 169/1989 of the International Labour Organisation (ILO), which Brazil ratified by Legislative Decree 143/2002 and Presidential Decree 5051/2004 (Martins, 2017). Interestingly enough, the centre of *Tekoa Guassu* was located exactly where today is the Triple Border region.

The author quotes the United Nations Declaration on the Rights of Indigenous Peoples, supporting the Geneva Convention:

“Os povos indígenas, em particular os que estão divididos por fronteiras internacionais, têm o direito de manter e desenvolver os contatos, relações e cooperação, incluindo atividades de caráter espiritual, cultural, político, econômico e social, com seus próprios membros, assim como com outros povos através das fronteiras. Os Estados, em consulta e cooperação com os povos indígenas, adotarão medidas eficazes para facilitar o exercício e garantir a aplicação desse direito”<sup>16</sup>(Declaração das Nações Unidas Sobre os Direitos dos Povos Indígenas, 2008, art. 36).

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<sup>15</sup> The end of the war consolidated the continued occupation in the country's interior by successive fronts of economic exploitation, such as the extraction of native yerba-mate, agricultural and colonization projects, which rhythms started to leave marks in the lives of Guarani people

<sup>16</sup> Indigenous peoples, in particular those who are divided by international borders, have the right to maintain and develop bonds, relations and cooperation, including activities of a spiritual, cultural, political, economic and social nature, with their own members, as with other people across borders. States, in consultation and cooperation with indigenous peoples, shall take effective measures to facilitate the exercise and ensure the application of this right

Carvalho (2013), as indicated by Martins (2017) claims the deconstruction of *Tekoa Guassu* happened under capital interests claiming that Spanish people, Jesuits and *bandeirantes* were motivated by strategic interests of conquest and enrichment to the detriment of the Guarani culture. The institution of National States cherished the borders and power of indigenous peoples by defining new territories and establishing political, social, cultural and economic rules that imposed obligations on them.

Elaine Brum (2021), the Brazilian journalist and activist for the Amazonian Rainforest, exposes similar processes even nowadays - but instead of transforming indigenous into slaves, the imposed non-indigenous way of living transforms forest people into poor people, highlighting this is not an issue of a remote past. Corroborating with this idea, Angileli et. al (2022) declares: "No caso da Região Trinacional, pelo significativo número de indígenas fixados, essa movimentação – da aldeia para a favela – deve ser alvo de especial atenção."<sup>17</sup>

The indigenous population never stopped defending their territories, moving their hamlets when a certain area was claimed by a state. Between the decades of 1940 and 1980, there were 32 indigenous villages in the area of the Triple Border, with a population persisting on their cross-border relations.

From 1888 on, as already discussed, the non-indigenous population started occupying the Triple Border region according to Gomes (2008), as mentioned by Martins (2017), but it's important to note that in each country the occupation took place at a different moment:

“A Argentina, com a lei de Federalização que institui a Província de Misiones, de 1881, e mais tarde, em 1902, com a criação da cidade fronteiriça de Puerto Iguazú, inicia um povoamento do território, sobretudo com imigrantes europeus, especialmente poloneses, italianos e alemães. No Brasil, é criada a Colônia Militar do Iguassu, em 1889, e em 1914 é instituído o município de Vila Iguaçú, que quatro anos mais tarde, 1918, passou a ser chamado de Foz do Iguaçú. No Paraguai, em 1945, é criado o Departamento do Alto Paraná, e em 1957 foi fundada a cidade de Puerto Presidente Stroessner. Alguns anos depois, em 1989, o município passa a chamar-se de Ciudad del Este.”<sup>18</sup> (Marques, 2017, p.62)

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<sup>17</sup> In the case of the Triple Border Region, due to the significant number of fix indigenous peoples, this movement - from the village to the favela - should be the target of special attention.

<sup>18</sup> in Argentina, with the Federalization Law establishing the Province of Misiones, of 1881, and later, in 1902, with the creation of the border city of Puerto Iguazú, begins a settlement of the territory, especially with European immigrants, especially Polish, Italians and Germans. In Brazil, the Military Colony of Iguaçú was created in 1889, and in 1914 the municipality of Vila Iguaçú was established, which four years later, in 1918, started to be called Foz do Iguaçú. In Paraguay, the Department of Alto Paraná was created in 1945, and in 1957 the city of Puerto Presidente Stroessner was founded. A few years later, in 1989, the municipality was renamed Ciudad del Este



During the year 1888, the just mentioned military colony was installed by lieutenant Antônio Baptista da Costa Júnior and sergeant José Maria de Brito. In this period, there were 324 people inhabiting the land, more than 200 of them from Paraguay, 95 from Argentina and only 9 Brazilians. Later, in 1910, it became a village (Vila Iguassu), belonging to Guarapuava municipality. Finally, in 1914, the territory was separated from the city, becoming the municipality of Vila Iguassu. Only in 1918 the city started being called Foz do Iguaçu.

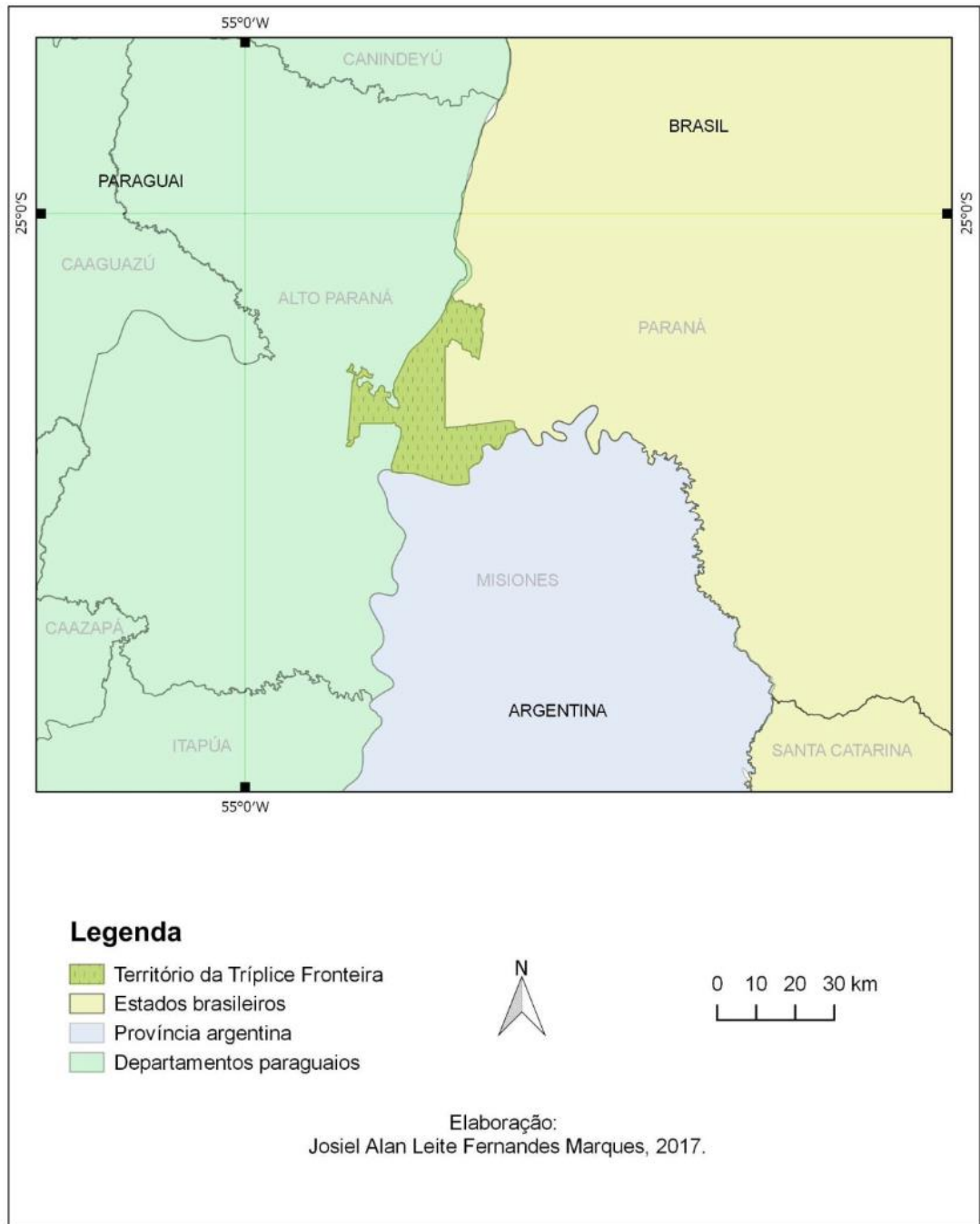
During the mentioned periods, public policies of occupation of remote lands were taking place in Brazil, under Getúlio Vargas' government and in Paraguay, by the dictator Alfredo Stroessner, leading to a discrete increase of the population on the Triple Border region until the 50's. The main economic activities were *yerba mate* and wood exploitation. As well summarised by Cury (2010) "Era, então, o fim de um mundo relativamente livre, que passou a conviver com o advento de modernidades tecnológicas – a entrada do capitalismo em si."<sup>19</sup>

Between the years 1960 and 1980, according to Silva (2014), as mentioned at Martins (2017) the population increased more significantly because of structural changes on the territory. Roads integration with bridges such as *Ponte da Amizade* connecting Brazil and Paraguay and *Ponte Tancredo Neves*, connecting Brazil and Argentina, as well as the construction of the binational Itaipu hydroelectric power plant in Paraná River, and the creation of Ciudad del Este free trade zone. Not only Argentinians, Brazilians and Paraguayans were attracted by those new scenarios, the region received immigrants from Lebanon, Siria, Palestine, Jordan, Egypt and also China. (Marques, 2017)

The nomenclature used commonly to refer to this region, Triple Border, with capital "T", has an interesting background story. Marques (2017) claims, backed up by other authors such as Silva (2014), Montenegro e Béliveau (2006) e Rabossi (2004), the border started to be referred to as *Tríplica Fronteira* on the United States suspicion of terrorism, a testimony of bias connecting Arab populations - present in this region - to terrorist activity after terrorist attacks on Israel embassy in Buenos Aires, in 1992 and *Asociación de Mutuales Israelitas Argentinas* em 1994.

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<sup>19</sup> There was, then, the end of a relatively free world, which came to live with the advent of technological modernities - the entry of capitalism itself



FONTE: Josiel Alan Leite Fernandes Marques, 2017.

Source: Marques (2017)

Cury (2010) goes through the development of the relationship between the triple border countries since their arise on the XIX century, calling attention for colonial heritage also on social aspects:

"As condições mencionadas são mais claras quando se observam as realidades de países subdesenvolvidos, como os três em questão, que possuem uma herança

colonial de exploração e que estiveram historicamente influenciados pela dominação econômica e também social portuguesa e espanhola. A partir das suas libertações no século XIX, então, herdaram a rivalidade das duas nações mencionadas. Devem-se ainda acrescentar a influência e o domínio econômico britânicos, que ampliaram tais rivalidades no subcontinente." <sup>20</sup> (Cury, 2010, p.19)

It's interesting to note that, although having been removed forcibly, Guarani's broader territory, *Guarani-Retã* - predates the current national borders and is recognized by constitutions, in 1988 by the Constitution of the Federative Republic of Brazil, the 1992 by the Constitution of the Paraguayan Republic, the 1994 Constitution of the Argentine Nation and the 2009 Constitution of Bolivia. (EMGC, 2016)

Also, according to Cury (2010), there are approximately 15,650 Guarani individuals living in the region, being roundabout 6,300 in Brazil, 9,000 in Paraguay, and close to 350 in Argentina. The same author defends that protected areas such as reserves or, more importantly to this text, parks, are portions of land which remain as samples of the original nature, referring to the natural landscape in which the Guarani people lived.

### **International Relations, Territorial Disputes, Binational Itaipu Power Plant and Treaties**

As mentioned by Kropf & Eleuterio (2017), both Brazil and Argentina have adhered to multilateral treaties with conservation goals such as the 2030 Agenda for Sustainable Development from the United Nations - the SDGs introduced in the Key Concepts chapter - , to the Aichi Biodiversity Targets and the Convention on Biological Diversity. Although they do not relate directly to the management of the parks, they compose the legal framework for cross-border cooperation for conservation, especially when it comes to internationally protected areas. But to understand the relationship between these two countries and the possibilities of cooperation, we have to go back in time.

According to Cotrim (1999), as indicated by Espósito Neto (2013), in 1962 the Brazilian government started some viability studies for the construction of a big hydroelectric power plant in the region. Stroessner, president of Paraguay in that period, claimed the area was under Paraguayan authority - interpreting two treaties (*Tratado de Fronteiras*, from 1872

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<sup>20</sup> The conditions mentioned are clearer when observing the realities of underdeveloped countries, such as the three in question, which have a colonial heritage of exploitation and have historically been influenced by economic and also social Portuguese and Spanish domination. From their emancipation in the 19th century, they inherited the rivalry of the two nations mentioned. Further British influence and economic dominance must be added into the account, which expanded such rivalries in the subcontinent.

and the *Tratado Complementar*, of 1927, which trace the border between the two nations), culminating in military movement from Brazil's army. In 1966 both countries ended up deciding not to involve international actors in solving the disagreement.

Governments and populations express their intentions through signing administrative or juridic documents such as minutes and statements, according to Martins (2017). He mentions the *Ata de Iguacu*, signed in 1966 by Brazil and Paraguay - putting an end to the disagreement just mentioned and deciding on a binational power plant in the Plata watershed - Paraná River before the influx of Iguacu. Espósito Neto (2013) declares that from this agreement the Itaipu treaty (1973) was developed as well as the creation of a binational company responsible for the mega-project. Still, according to the same author, the treaties with Paraguay created tension between Brazil and Argentina, fearing the power plant would make the latter country lose relevance in the international scenario.

“En orden a esta relación y la situación presente muchos problemas que derivan del desequilibrio operado a favor del Brasil como consecuencia de la relativa ausencia de la Argentina en la Cuenca del Plata durante los últimos años, motivada, en particular, por su falta de capacidad negociadora y por una política exterior que equivocó la alta prioridad que el área requería”<sup>21</sup>(Gugliamelli, 2007, p.185, as quoted by Espósito Neto, 2013, p. 73)

The matter was solved only in 1979, according to Guerreiro (1992), as mentioned by Espósito Neto (2013) with the so-called *Tratado Tripartite*.

Espósito Neto (2013) references the middle of the 80s – a period of re-democratisation of both countries after impactful years of military dictatorship - as a period noticeable by the rise of the idea of integration. Changes in the international scenario - such as the fall of the Berlin Wall and the political strengthening of the United States of America changed the nature of Brazil-Argentina's project from being purely political to economic, referencing local events with globalised impact and unfolding.

This context - immediately prior to and during the military dictatorships, is the subject of Naomi Klein's book "The Shock Doctrine" (2007). It provides an examination of how the so-called shock doctrine - violent progressions of the economic politics born in the Chicago School of Economics, under the guidance of Milton Friedman - manifested in “the most

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<sup>21</sup> Regarding this relationship and the present situation, there are many problems arising from the imbalance in favour of Brazil as a result of the relative absence of Argentina in the Plata Basin in recent years, motivated in particular by a lack of negotiating capacity and for a foreign policy that misplaced the high priority that the area required

advanced laboratory of developmentalism was the southern tip of Latin America, known as the Southern Cone: Chile, Argentina, Uruguay and parts of Brazil”, in the late 20th century, when their developmentist governments were boosting public initiatives, threatening liberal economic points of view.

In Argentina, the military junta led by General Jorge Rafael Videla (1976-1981) used brutal repression and the guise of combating leftist insurgency to implement neoliberal economic policies. This included privatisation, deregulation, and austerity measures, disproportionately benefiting the wealthy while exacerbating socioeconomic disparities - cooperativism. Similarly, in Brazil, the military dictatorship (1964-1985) collaborated with economic elites and multinational corporations to pursue pro-business reforms. These governments implemented neoliberal policies by taking advantage of political unrest and terror, which fueled a cycle of inequality and exploitation, not to mention the extreme violence which became common in those periods (Klein, 2007).

Moreover, Klein's analysis highlights the main role of the United States in influencing the shaping of Latin American politics by supporting dictatorships while advancing just mentioned neoliberal economic policies. The USA supported and often actively facilitated military coups and authoritarian regimes across the region, under the justification of threats of communism. Through organisations like the CIA and economic institutions like the International Monetary Fund (IMF), the U.S. demonstrated considerable influence in promoting neoliberalism as the preferred economic model for Latin American nations. This influence extended beyond mere ideological alignment, as evidenced by direct involvement in training security forces and providing economic assistance to regimes willing to implement neoliberal reforms. Thus, Klein (2007) underscores the intricate web of power dynamics wherein Latin American dictatorships and U.S. interests converged, perpetuating cycles of exploitation and socioeconomic inequality.

Espósito Neto (2013) notes political discussions between Brazil and Argentina in common matters such as establishing joint committees for bilateral issues - for instance, energy -, exploring investment feasibility for Brazilian imports of Argentine natural gas, studying nuclear cooperation - sensitive for both militaries, in logistics, in integration by the ideal of ALADI (*Associação Latino-Americana de Integração*, aiming also to slowly implement a Latin American single market), and starting material interconnection

construction between Brazil and Argentina (Brasil, 1980) in this period. In 1980, according to the same author, Brazil and Argentina signed 23 bilateral agreements. This number decayed over time but it's noticeable the years 1986, with 10 agreements signed, and 1990, with a total of 11.

Martins (2017) also remarks on the *Declaração do Iguaçu*, signed by Argentina and Brazil in 1985. According to Espósito Neto (2013) and Klein (2007), this period is known for, politically speaking, the conversion of interests and presidential visits from both parties. Resulting of those meetings, the two countries signed agreements for nuclear cooperation, for sharing water resources (in portions of Uruguay Pepiri-Guaçu rivers), and for interconnecting the electrical systems of Brazil and Argentina. Martins (2017) highlights the importance of technical bodies such as councils, commissions, working groups, committees and forums as mechanisms of integration and cooperation.

In March of 1975, there was the opening of *Ponte Internacional da Amizade*, the bridge that connects Foz do Iguaçu (BR) to Ciudad del Este (PY) was made possible due to a bilateral treaty between the two countries signed previously by the presidents Kubitschek (BR) and the dictator Stroessner (PY). This connection made it possible for Paraguayans to access the Atlantic Ocean independently from Argentina (Cury, 2010), an important channel for export production.

Some years before, in 1973, the just mentioned treaty was signed between Brazil and Paraguay for the construction of a binational power plant. It was ratified by the Decree n. 72.707 and in the following year the impactful construction work already started, creating a period of economic development and job creation. More than 40 thousand people worked on the construction of the power plant, directly or indirectly, making the population multiply four times in just ten years. (Martins, 2017).

The binational power plant is present in the big majority of papers and other academic material consulted for this dissertation, not only for its economic and environmental impact but also as a cause of migration and demographic transformations in the territory. Iguaçu Binational Power Plant is the most iconic among big projects defined by Angileli et al. (2022) as a cause of socio-environmental unbalances:

"a Região Trinacional do Iguaçu (...) se encontra em plena reestruturação urbana, ambiental e social, decorrente da implantação de grandes projetos urbanos e de infraestrutura sobre áreas sensíveis do ponto de vista socioambiental, o que a caracteriza



Navarra (2019) remarks there was already, in the period of the construction of the Power Plant, a legal need for previous environmental impact studies for large enterprises since 1965, but Itaipu was free of all the conditions imposed by licensing because of its strategic relevance to the military regime exempting the work from civil, environmental and criminal responsibilities. The violence applied is confirmed by pictures of 1981, where we can see the servants of the so-called "expropriation sector" of the *Instituto Nacional de Colonização e Reforma Agrária* INCRA pose for the camera while setting fire to Guarani houses to expel them from the site.



Imagem 6: Imagens foram entregues à Comissão da Verdade por um ex-funcionário de Itaipu, mas não foram incluídas no relatório final. Fotos: Acervo Comissão da Verdade do Paraná

Source: Navarra (2019)

Brazilian *Fundação Nacional do Indígena* FUNAI got subordinated to the interests of the *Instituto Nacional de Colonização e Reforma Agrária* INCRA - created in Military Dictatorship period - over the occupation of the Guarani, not applying the current Indigenist legislation, in alignment with orientation from the military regime, as mentioned earlier. FUNAI, consequently, did not demarcate indigenous lands within the Border Strip, following INCRA's guidelines. As a result, the organ permitted INCRA to create two colonisation projects (PIC-Ocof I and II) inside the Guarani territory with the goal of resettling inhabitants



expelled from the interior of the Iguazu National Park PNI-BR and from areas that the Itaipu Power Plant reservoir would eventually flood.

From 1991 to 2000, advocacy for reparation and justice through legal and international channels started. The following decade was marked by sustained mobilisation with human rights defenders for territorial acknowledgement and restitution. Since 2011, a persistent campaign has been pursuing land rights and cultural conservation through dialogue with government and civil society, highlighting Guarani's quest for justice and sustainable development (Navarra, 2019).

Another important historical event for this contextualization also takes place in the beginning of the 80s, the Falkland War - or, in Spanish as it makes more sense for the context of this text, the *Guerra de las Malvinas*. It took place between Argentina and Great Britain on the Atlantic islands. The conflict brought Brazil and Argentina together - the first supporting their neighbours with weapons (Neto, 2013). According to the same author, mentioning Espósito (2006), the support of the USA to Great Britain, among other factors, created the perception for the Latin American countries that the United States played a big role in their difficulties in developing, marking the end of an “American illusion” for those nations.

The war was critical for the end of military dictatorship in the losing country, which happened at a similar timing as in other Latin American ones. Espósito Neto (2013) analyses the conflict under Brazilian-Argentine relations optics and describes the background in South America as a multifactorial crisis related to the increase in oil prices, the increase in interest rates in the international monetary system together with the South American "tendency of financing their development through international debts". Klein (2007), as presented formerly, perceives the development-guided politics of Latin American countries as a threat “The Southern Cone began to look more like Europe and North America than the rest of Latin America”.

Once the dictatorship periods ended, the re-democratisation processes of countries in Latin America were taking place in a difficult economic framework, since the developmentalism in the region was strongly tackled (Klein, 2007). Radicalism, according to Velasco e Cruz (2001), as quoted by Espósito Neto (2013), was finally ending with the

new voices of the Brazilian Ministry of Foreign Affairs already building the core of their long-lasting international politics.

In Argentina, on the other hand, the processes for transitioning to a democracy were more challenging. According to Espósito Neto (2013), the country counted once again with Brazil as a partner to overcome the external difficulties and internal instabilities. Facing these new challenges, both countries agreed on the goal of building a common political and economic agenda.

“Os aumentos dos contatos bilaterais entre Brasília e Buenos Aires redundaram em ações conjuntas, como o Consenso de Cartagena de 1984 e o Grupo do Rio de 1986, e em marcos importantes, como a Declaração de Iguazu de 1985 e o Tratado de Integração com a Argentina de 1988. Dessa forma, o rumo da integração regional como projeto político-econômico foi sendo traçado.”<sup>24</sup> (Neto, 2013, p.86).

This author quotes parts of *Declaração do Iguazu* and the Argentinian integration treaty highlighting the bilateral integration goals, common economic space as well as broader efforts for regional development. In theory, their goals were aligned, but as well described by Klein (2007), liberal tendencies were arising around the globe after the symbolic end of the Soviet bloc. During Collor and Menem’s governments, liberal economic plans promised an end to inflation, corruption and other malfunctioning of the political systems.

According to Cervo (2000), as quoted by Espósito Neto (2013), these phenomena changed the philosophy of Mercosur, shifting from an integrating tool to a uniquely commercial one. After what the last author defines as a “weakening” of the presidential figure due to the failure of the economic plan, Brazilian diplomacy structured itself once again - this time around jointly with Uruguay’s and Paraguay’s interest in integration. Consequently, the perspective shifted from being bilateral to multilateral. In 1991 the *Tratado de Assunção* made it possible for a South American regionalism to arise, aiming for an adequate international insertion of those countries.

This treaty is defined by Espósito Neto (2013) as the moment of greatest proximity and cooperation between Argentinian and Brazilian authorities and pinpoints this post-cold War historical moment as understanding the regional integration as purely economic and a

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<sup>24</sup> The increase in bilateral contacts between Brasília and Buenos Aires resulted in joint actions, such as the 1984 Cartagena Consensus and the 1986 Grupo do Rio, and important milestones, such as the 1985 Declaração do Iguazu and the 1988 Treaty of Integration with Argentina. Thus, the direction of regional integration as a political-economic project was being traced.

way of boosting productive sectors to a globalised economy. It becomes a testimonial of the economic focus of cooperation in this second moment.

"Entre os anos de 1979 e 1989, o crescimento esteve concentrado nas atividades de hospitalidade, serviços de lazer e recreação. Ao observar tal afirmação, percebe-se que a atividade turística abarca uma série de serviços que compõem o produto turístico composto dos atrativos (oferta e a infraestrutura geralmente urbana), o que permite lançar um olhar sobre os processos que configuram e explicam as TTI, como será discutida a oferta de serviços para o *turismo* após o término da UHIB"<sup>25</sup> (Cury, 2010, p.67).

The economic crisis and the ineffective monetary stabilisation plans led to Alfonsín's - President of Argentina (1983-1989) downfall. Carlos Menem's election marked a shift towards neoliberal policies. This new faction prioritised market forces over government intervention and viewed regional integration as a strategy to modernise the economy in line with the liberal international order championed by Washington. Alfonsín's failure to address the economic crisis paved the way for Menem's administration, which embraced neoliberalism and market-driven solutions (Neto, 2013).

The work of those authors traces an overview of the cooperation history and the common challenges faced by the two nations in similar historic moments and political formation. "Consideradas, entretanto, as histórias regionais do Brasil, Argentina e Paraguai, as territorialidades analisadas contam com certa autonomia de existência no decorrer temporal, talvez herdada do território Guarani e do território Jesuítico até o presente"<sup>26</sup>(Cury, 2010).

This territory is still under dispute after numerous injustices practised against the Guarani people, which advocate for a multifaceted approach to address historical injustices, encompassing several key demands. Primarily, they call for the demarcation and protection of their ancestral lands to safeguard territorial rights and preserve their cultural heritage. They also pursue formal recognition of their indigenous status and rights within both national and international legal frameworks. Restitution for past wrongs, including forced displacements,

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<sup>25</sup> Between 1979 and 1989, the growth was concentrated in hospitality, leisure services and recreation activities. When analysing this statement, it is noticeable that the tourist activity encompasses a series of services that compose the tourist product constituted of attractions (their offer and the infrastructure, generally urban), which allows a perception of the processes that configure and explain the TTI(...) and the discussions about provision of services for tourism after the end of UHIB construction.

<sup>26</sup> Considering, however, the regional histories of Brazil, Argentina and Paraguay, the analyzed territorialities have a certain autonomy of existence in the temporal course, perhaps inherited from the Guarani territory and the Jesuit territory until the present

environmental harm, and human rights violations, is also paramount in their demands (Navarro, 2019).

Additionally, there's the need for formal apologies from responsible parties and acknowledgement of the harm inflicted on their communities are further sought to facilitate healing and reconciliation (Navarro, 2019). Furthermore, the Guarani people emphasise the need for capacity-building initiatives, including support for community development, healthcare, education, and sustainable livelihoods, to enhance their overall well-being and autonomy (Navarro, 2019).

Masuzaki (2016) agrees the relationship between indigenous and non-indigenous populations in the territory is characterized by ongoing conflicts and tensions. Key actors involved in this dynamic include ruralists, politicians (such as deputies, senators, and mayors), local media, and anti-indigenous movements at the national level.

The indigenous populations face defamation, misinformation, and prejudice perpetuated by dominant sectors, hindering their efforts to reclaim their ancestral lands. Despite efforts to organize politically and revitalize their traditional territories, the Avá-Guarani continue to be marginalized and portrayed as obstacles to progress and development. This complex interplay between different groups reflects deeper historical and social dynamics that shape the contemporary landscape of indigenous-non-indigenous relations in the region.

These demands epitomise the Guarani people's aspirations for justice, reconciliation, and empowerment, encapsulating their determined pursuit of redress in the face of historical and ongoing injustices and, as the next chapters will discuss, some of them can be incorporated into the PNIs agendas.

They are an example of a glocal phenomenon, as summarised by WHOEVER:

“The resulting land grabbing is happening virtually everywhere Indigenous Peoples live and is driven by a number of powerful forces, including governments, businesses and dominant elites, that are pushing projects of all sizes – from small artisanal mining operations to mega development/infrastructure projects – without respecting the rights of Indigenous Peoples.” (Mamo, D., 2024, p.7)

### **Overview of Key Cities**

As introduced in the first chapter, border regions are porous and host interchange of people, goods and public policies. These territories are often marked by disputes and are

especially important for guaranteeing national sovereignty. Cury (2010), provides a good summary of the actors dynamising the Triple Border Region:

"A presença das Aduanas, das forças do Exército na Argentina e no Paraguai e da Polícia Federal no Brasil (além do Exército, instalado em Foz do Iguaçu como força de segurança desde 1888), dos controles de tributos e bens que chegam a cada país demarcam a soberania nacional." <sup>27</sup>(Cury, 2010, p.61)

Having in mind that the scope of this text are confluences for joint projects or actions for the parks, Cury (2010)'s framework comprising not only tourism, but analysing migratory flows, border matters, and socio-environmental, political, cultural and economic issues that confirm the transboundary territoriality of Iguaçu comes in hand. Additionally, Angileli et al. (2022)'s perspective on the formation of this territory, converging their needs of development - anchored on the SDGs, preservation and recovery of protected areas, valorisation of material and immaterial heritage while overcoming processes leading to climatically unfair scenarios - using the "Climate Justice" concept made famous some years ago by Mary Robbins.

This overview is structured based on Cury's (2010) studies - the author researches various key topics about the three cities making parallels among them and retrieves cartography registers from *Departamento Nacional de Infraestrutura de Transportes* – DNIT, and *Departamento de Estradas de Rodagem* – DER/PR as tool for visualising demographic and landscape changes overtime, Angileli et al.'s data - including interviews with experts for understanding sensible topics - and planning directives for the Triple Border together with data from *Instituto Brasileiro de Geografia e Estatística* IBGE, *Instituto Nacional de Estadística y Censos* INDEC and *Instituto Nacional de Estadística* INE.

Territorial dimension is flexible and can be categorised on local, regional, national and even global scales. There are three determining factors for dimensioning the one holding Iguaçu Transboundary Identity, according to Cury (2010), being the Binational Iguaçu Power Plant and its related economic activities, the PNI-BR and its twin, the PNI-AR changing tourism dynamics, and finally the agriculture and livestock activities structures and their necessity of connection, plus the consequent movement of peoples in the area - internally and internationally.

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<sup>27</sup> The presence of the Customs, of the Army forces in Argentina and in Paraguay and the Federal Police in Brazil (in addition to the Army, installed in Foz do Iguaçu as a security force since 1888), the controls of taxes and goods that reach each country demarcate national sovereignty

“Tanto as frentes colonizadoras como a instalação de Itaipu impuseram a fuga para locais de difícil acesso em fragmentos de matas, no Brasil, Paraguai e Argentina, ou a transferência para Reservas Indígenas no MS, PR e SC. Posteriormente, várias famílias voltaram à região dos municípios de Foz de Iguaçu, Guaíra e Terra Roxa, no oeste do Paraná.”<sup>28</sup>(EMGC, 2017)

Angileli et al. (2022) advocate for participative urban planning, which demands socio-environmental risk identification. They cite Rabechini (2006) and Oliveira (2021) for basing the claim, highlighting that only known risks can be equated. These authors selected as their framework 6 municipalities identified as potentially becoming the  *futura Metrópole Trinacional*, through conurbation. Cury (2010), on the other hand, focused his work on the three "triplets" cities around the border landmark. For this paper's focus - the twin parks - the selected cities to analyse are the ones where the entrances of the parks are located, Foz do Iguaçu (BR) and Puerto Iguazú (AR), plus Ciudad del Este (PY) which does not comprise the parks but plays important roles on those demographic changes mentioned earlier.

"Na fronteira com Brasil e Argentina, existe certo distanciamento urbano, presente pela ligação da Ponte Internacional Tancredo Neves e o controle do fluxo de pessoas que atravessam essa "barreira". Já na fronteira do Brasil com Paraguai, é notável uma contínua urbanização e um fluxo elevado de pessoas, tornando quase uma fronteira aberta – onde o rio que separa também une em muitas situações."<sup>29</sup> (Cury, 2010).

a) Foz do Iguaçu

This author highlights the strategic location of Foz do Iguaçu in the Triple Border, a point of convergence of different economic, social and cultural flows. The city is defined as an important tourist hub, especially due to the Iguaçu Falls and the already discussed Itaipu binational hydroelectric power plant, which, as mentioned in the former chapter, boosted the demographic and urban growth of the region. At the end of the 1990s, the city was requalified for tourism, receiving big hotel companies (which impacted local ones) and restructuring the visiting infrastructure of PNI-BR, reaffirming tourism as an essential part of Foz do Iguaçu and its surroundings (Cury, 2010).

The last census of IBGE (2022) positions the city as the 7th biggest in the State of Paraná, with a little over 285 thousand inhabitants, which according to the age pyramid

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<sup>28</sup> Both the colonising fronts and the installation of Itaipu Power Plant imposed the escape to places of difficult access in fragments of forests in Brazil, Paraguay and Argentina, or the transfer to Indigenous Reserves in the MS, PR and SC. Later, several families returned to the region of the municipalities of Foz de Iguaçu, Guaíra and Terra Roxa, in the west of Paraná.

<sup>29</sup> On the border with Brazil and Argentina, there is a certain urban distance, present by the connection of the Tancredo Neves International Bridge and the control of the flow of people who cross this "barrier". Already on the border of Brazil with Paraguay, continuous urbanization is remarkable and a high flow of people, making it almost an open border - where the river that separate them also unites them in many situations.

graphic has proportionally more young adults (20-34 years old) than the country's average (IBGE, 2022). In 2021, the average income in Foz do Iguacu was 2,7 minimum wage, and the GDP/person occupies the 29th position in the region. A little over 30% of the population was considered "occupied", meaning in professional exercise registered or not and with monetary gain or not – making evident the informality of labour.

As mentioned previously, occupation took place in this area in a succession of arrivals of diverse groups, driven by different motivations, creating a diverse territorial puzzle populational-wise. One good side for those families is the access to school in Foz do Iguacu, where 96,4% of children from 6-14 years old attend school (IBGE, 2010). Note that the last IBGE consultation available is older than other data because 2020's planned survey was delayed (G1, 2021).

As introduced in the Key Concepts chapter, fluxes of people are a common aspect in border regions, together with trade. Adding to those fluxes, there's the international tourist interest - the falls are considered one of the 7 wonders of the natural world since 2012 by UNESCO and interest in visiting them was also boosted in Brazilian territory by the national media after the sign of the Iguacu Treaty, popularising the destination even more (Cury, 2010).

Data available at IBGE Cidades portal related to urbanisation is also from 2010, showing 75,3% of the urban area had appropriate sewage treatment, 86,9% of the public roads were arborised, but there were almost 3 thousand inhabitants exposed to risk. Angileli et al. (2022) elaborated a table updating some of this data. According to this in-site research systemised table, elaborated by Álvarez (2021), the city has around 6500 families living in inappropriate places, under non-ideal spatial conditions, namely in 65 favelas or slums (Cohapar, 2019).

Current territorial challenges of the city were listed by Haralan Mucelini, technical advisor of the Municipal Planning Department of Foz do Iguacu (from 2018 to 2020), and they are multi-sectorial (Angileli et al., 2022). He mentions real estate speculations due to new infrastructure, sewage treatment non-available in consolidated areas, floods vulnerability in some zones - specifically the ones with greater construction density - due to the rich water systems already introduced, inadequate living conditions construction-wise, regular and irregular urban expansion - including in areas too close to water bodies, as well

as non-implementation of elaborated plans such as the *Plano Municipal de Gerenciamento de Recursos Hídricos*, made in 2019 presenting an extensive diagnose - but not fully executed by Foz do Iguazu city hall or plans developed non aligned with local obstacles like the recent revisions of the city's Master Plan.

Angileli et. al (2022) classified, through interviews with inhabitants, challenges related to goals set for the 2030 Agenda for Sustainable Development. In Foz do Iguazu, they were commonly related to tackling poverty (SDG 01) and to promoting the sustainable use of terrestrial ecosystems, from sustainable forest management to land degradation and biodiversity loss - life on land goal (SDG 15), an aspect that cannot be isolated from surroundings nor is separable from Argentina or Paraguay territory.

#### b) Puerto Iguazú

The Argentinian city at the Triple Border, Puerto Iguazú, had 32 038 inhabitants in 2001, according to INDEC (2001) and a tourism-based economy, connected to its neighbour Foz do Iguazu through the international bridge Tancredo Neves, linking the routes Ruta Nacional No12 and the BR-469. INDEC Department census - more recent than the last counting of inhabitants of the city available, identifies an estimated population of 107.400 people in the whole Iguazú department for the year 2025, - increasing 7% in comparison to the 2020 index and 29% in comparison to 2010.

In an interview for the newspaper El Territorio, Carolina Ocar, provincial coordinator of the Census, clarified that there are still no specific statistics by locality. The numbers handled by INDEC are at the departmental, provincial and national levels. Ocar (2023) claimed 76.1% of the population of the *tierra colorada* land declared that the dwelling is their own, exceeding the percentage at the national level, of 68.9%. She adds "un 89,7 de población en viviendas particulares tiene agua por cañería dentro de la vivienda, que en relación a lo que son censos anteriores se ve un crecimiento en este indicador"<sup>30</sup>. Of the houses, 78.5% have water supply by public network, which reflects the importance of infrastructure works that guarantee access to services that are basic for the population.

Adding to the data presented in the table by Angieli et al. (2022) about current territorial challenges, Puerto Iguazú counts 16 informal settlements, housing about 2100

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<sup>30</sup> 89.7 of the population in private homes has piped water in the houses which, in relation to what are previous censuses shows, is a growth in this indicator



families in vulnerability (Techo Argentina, 2016). Despite the improvement of indicators like the number of houses with piped water, it's estimated that 50% of the housing is not in minimal conditions, especially in the peripheral areas where settlements in public areas are more common.

Arturo Garcia, current director of the private works at Puerto Iguazú, in an interview with Angieli et al. (2022) listed obstacles in the area, starting out with real estate speculation and big-scale projects - explained by the plan of new access to the city and implementation of new activities in the surrounding area, water supply - which unlike Foz do Iguazú is not widely available in good quality. Puerto Iguazú gets water from different sources - the Iguazú River, directly from aquifero Guarani, wells in other neighbourhoods, and more recently, from Paraná River as well - and distributes it in a non-efficient way, lacking pressure and connection between the networks. Sewage treatment and rain collection are available only in 12% of the city - at its centre and in the hotels sector, risking aquifero contamination.

Due to big touristic activity, it's predictable that this sector would have priority on urban planning. Ironically, electricity is also not widely available (although it comprises the whole city, the expert claims the wires are old and the supply is often interrupted in some areas), having underground installations only in the hotels sector. Connectivity is not only a problem for energy supply. Transport also faces interruptions and shortens, being insufficient in numbers, in connections and in frequency (Garcia, 2021).

Also, urban expansion is possible only towards the south - the city is limited by Iguazú and Paraná Rivers and for PNI-AR in all other directions - where a 2000 hectares sector is traced. Informal building is common in the city, informs Garcia, and urban infrastructure is built according to occupied areas. There are plans for a water treatment station at Paraná River, improvement of sidewalks and streets and expansion of energy distribution.

Going back to data gathered from *Censo Nacional de Población, Hogares y Viviendas* (2022), Ocar (2023) highlighted 8.3% of the older adult population, which means "an increase in the improvement in the living conditions of the population", compared to the 2010 census, where this age group reached 6.3%. On the other hand, the census showed that Misiones is the province with the lowest average age in the country - 28 years old.

Only in this department, there are more than 10 thousand Guarani (over 78% of those are younger than 30), distributed in 120 *Tekohas*, being mostly - as the map of the distribution of this population shows - Mbyá-Guarani with a close relationship with the Mbyá of Brazil and Paraguay (EMGC, 2016), highlighting the territorial unity despite political limits.

Education-wise, the Argentinian Census consults people from 5-29 years old and, for the purposes of this study, we will consider the similar age gap as the Brazilian one (6-14). 97% of the population of Misiones (lacking data about the city) from 6 to 11 years old attend school, while this index declines for 93% when the target group is aged 11-14, showing a similar, but slightly lower attendance level in Argentina.

According to EMGC (2016), bilingual education for indigenous populations is foreseen in Argentina, but not widespread - the offer is concentrated in rural areas and for initial levels. On top of that, the school system often does not offer inclusiveness for the Guarani:

“Cada vez mais, crianças e jovens indígenas ingressam no sistema educativo oficial, buscando encontrar soluções para as dificuldades que sofrem. Mas, até agora, a escola mais colabora com a fragilização do sistema em vez de favorecê-lo, ao não dar-lhes espaços de participação na elaboração dos Planos de Ensino que efetivamente contemplem metodologias e conteúdos de acordo com a visão guarani-mbyá, que é a sua”<sup>31</sup> (EMGC, 2017)

When it comes to accomplishing the goals set in the 2030 Agenda for Sustainable Development, Angieli et al. (2022) identified most obstacles In Puerto Iguazú had emphasis on the challenges of sustainable cities and communities - becoming more inclusive, safe, resilient and sustainable (SDG 11), and, similarly to Foz do Iguazu’s interviews, promoting the sustainable use of terrestrial ecosystems, life on land goal (SDG 15).

#### c. Ciudad del Este

Ciudad del Este is the capital of the department of Alto Paraná, in Paraguay, and is located 327 km away from the country’s capital, Asunción. It connects to Brazilian territory through the already mentioned *Ponte Internacional da Amizade* over the Paraná River. It is the largest city in the region known as the Triple Border having 311.216 people (INE, 2023)

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<sup>31</sup> Increasingly, Indigenous children and young people join the official education system, seeking solutions to the difficulties they suffer. But, so far, the school collaborates with the system weakening instead of favouring it, by not giving them participation spaces in the elaboration of the Teaching Plans that effectively contemplate methodologies and contents according to the guarani-Mbyá cosmovision, which is theirs.

and projections of over 315 thousand for 2025. The three cities selected for this chapter, the Triple Border region constitute a transnational agglomeration of almost a million inhabitants.

It is located in the region (the oriental portion of the country) with the greatest amount of indigenous population and, as the map of the distribution of Guarani groups shows, most of them are from the group Ava-Guarani, being the Mbya and Kaiowa also present. The original Guarani territory on this country was dismantled by the fluxes so commonly seen in border regions:

“A entrada de um novo contingente populacional brasileiro, os chamados *brasiguaios*, que ocupam grande parte dos territórios tradicionais guarani, e de outros proprietários de terras que se dedicam ao agronegócio (...). De fato, estes cultivos obrigam ao desmatamento completo da área, acompanhado da expulsão de seus habitantes tradicionais. Assim, o *tekohá* dos Guarani foi destruído definitivamente.”<sup>32</sup>  
(EMGC, 2017)

The document stresses this is an on-going process, being one of the greatest violences against the population of the east portion of Paraguay, under national legislation. From the total area owned by guarani population in the departments of anindeyú, Alto Paraná, Caaguazú and Caazapá (34.320 ha), 48% is rented for other ethnic groups, mostly from Paraguay but also in great number from Brazil and few Germans - although renting indigenous land is forbidden by Paraguayan Constitution.

INE (2015) census counted 308 983 inhabitants in Ciudad del Este. Similarly to Argentina, Paraguay's statistics institution provides data not about the city, but related to the department and nation. Alto Paraná, with a population of 711.902 in 2010, had 71.616 occupied people in the same year, corresponding to a percentage of 10% (INE, 2010), way lower than its neighbour Foz do Iguacu. The most recent count of Alto Paraná population is 775.924 people, an increase of 8,99% (INE, 2022). ENI makes education data available only at the national level and for Paraguay, although the comparison is not ideal, has 97,7% of children from 6-9 and 86% of children from 10-14 attend school (INE, 2022).

According to the previously mentioned table at Angieli et al. (2022), Ciudad del Este has the greatest number among them when it comes to informal settlements - 125. Those

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<sup>32</sup> The entry of a new Brazilian population contingent, the so-called *brasiguaios*, who occupy much of the traditional Guarani territories, and other landowners who are dedicated to agribusiness (...). In fact, these crops require complete deforestation of the area, accompanied by the expulsion of its traditional inhabitants. Thus, the Guarani *tekohá* was completely destroyed.

slums are home for 15.400 families. Data retrieved from Techo Paraguay (2020), by Angieli et al. (2022) shows a worrying scenario in other Paraguayan cities in the surroundings.

Angieli et al. (2022) collected Mario Uzeda's perspective on key challenges for Ciudad del Este. He is the research director of the Faculdade de Arquitetura da Universidad Privada del Este (UPE) and points out the urban and landscaping revitalisation of the *Largo da República*, the linear park at Sector 1 and the *Acaray Ñande Roa* lake as big-scale projects imposing real estate speculation and other challenges to the city. Mobility-wise he criticises the big amount of non-paved roads. Additionally, he points out the problems originated from lack of urban planning - like voids in the urban mesh.

Sewage collection and treatment in Ciudad del Este is far from ideal. The authors claim 90% of the sewage is eliminated in regions close to wells - risking serious groundwater contamination. The plan of a new water treatment station at Paraná River was also mentioned by Uzeda, showing the international impact of such an enterprise. Improvements on the roads and sidewalks and expansion on the electric distribution are predicted.

Among the studied cities, Ciudad del Este was considered by Angieli et al. (2022) as the most vulnerable one to the urban/climatic transformations, because it aggregates the largest number of precarious settlements in the region. This fragility needs to be tackled in scales greater than the local - guaranteeing the continuity of vegetation areas and the balance of the surrounding forest that, as already distressed, interferes with rain cycles and stability of the soil.

According to the report *Construindo Desenvolvimento Resiliente ao Clima na Tríplice Fronteira* (SAKAI et al, 2018, as mentioned by Angieli et al, 2022), a series of factors were identified in the area that, when associated, reduce the adaptability and resilience of the territory. In this study the following factors of concern were highlighted: the precariousness of part of the urban mesh; the lack of proper urban planning and basic infrastructures, such as urban drain; the cost of the inability to manage extreme weather situations. On this last point, the study shows a loss of more than 40 million dollars during the period 2013-2017 in the cities of Ciudad del Este, Foz do Iguazu and Puerto Iguazú (SAKAI et al, 2018, as mentioned by Angieli et al, 2022). This situation, according to the report, is aggravated because of the lack of integrated plans between countries, from diagnostic to proactive actions for risk management in the Region.

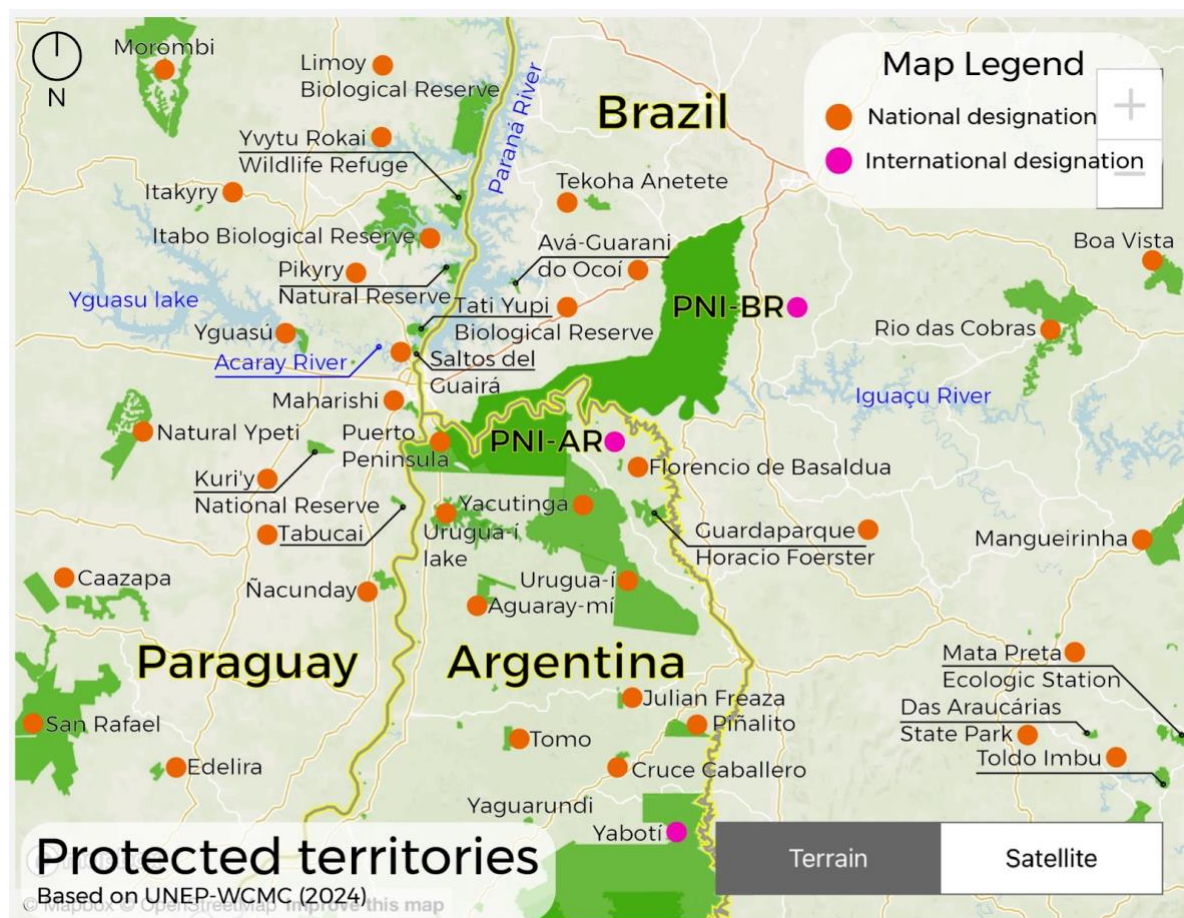
The emphasis of the information collected in interviews with inhabitants was on, similarly to the bordering cities, eradication of poverty (SDG 01) and for the implementation of global partnerships for sustainable development (SDG 17), particularly important in border studies. Other cities encompassed in the scope of Angieli et al (2022)'s research in Paraguay add other difficulties to the Triple Border Region, such as needs in good health and wellbeing (SDG 03), gender equality (SDG 05), and climate action (SDG 13).

### **Protected Areas**

The following map was gathered from the website *ProtectedPlanet.net* - linked by the World Database on Protected Areas (WDPA), which gathered information about land and sea protection around the globe. WDPA is the most comprehensive global database on terrestrial and marine protected areas. The initiative started in 1981 and it systematises data from sources all around the globe when it comes to land and water protection.

This specific map uses data from *Departamento de Áreas Protegidas, Secretaria de Biodiversidade and Florestas, Ministério do Meio Ambiente* on Brazilian territory, from *Administración de Parques Nacionales APN* on Argentinian lands and from *Secretaria del Ambiente* on Paraguayan ones.

The data is updated, being the oldest from 2018 (PY) and it is a valuable instrument to visualise the (lack of) continuity of protected areas. On the left we can see Paraguay, on the right, Brazil and in the middle a portion of Argentina.



Source: the author, based on UNEP-WCMC (2024)

The two central contiguous marked areas are the twin parks. It's important to notice that in their immediate surroundings there are not many contiguous protected areas, except for the south-eastern portion of the Argentinian Parque Nacional Iguazú, namely the *Parque Provincial Urugua-í* - part of the protected areas network known as *Corredor Verde Misionero* in the vicinity of the Parque Nacional Iguazú, highlighting the efforts of interconnectedness of conservation efforts in the area. On its left there is an irregular shape, namely Urugua-i lake and, going even southern, there's the Aguaray-mí protected area. Discontinuity in forest is one of the issues the management plans identify and will be discussed in more depth in the next chapter.

On this portion, there's another hydroelectric power plant named Urugua-i, managed by the Argentinian company Electricidad de Misiones S.A. This is only one of the five power

plants in the border region impacting the watershed. From them, 5 are over Iguazu River (plus the project for opening a 6th one).

In Brazilian territory, we can see there are not many spots, but one calls attention - on the north part of Parque Nacional do Iguazu. There's a *Guarani* village named *Tekoha Anetete* and also a protected area - another testimonial of vast *Guarani* pre-European occupation.

Although Paraguay has no parks in the region, there are some protected areas on the border of the country with Brazil. Those are reserves and are not contiguous territories but follow the left margins of Paraná river - overall with smaller areas than the protected areas of their neighbours. They are *Maharishi*, *Reserva Biológica Itabo*, *Reserva Natural Pikyry*, *Refugio de Vida Silvestre Yvytu Rokai*, and *Reserva Biológica Limoy*.

These paragraphs aimed for tracing a general panorama of the protected areas in the surroundings of the park, highlighting focuses of biodiversity maintenance and the goals, specially expressed by the Argentinians, of making a network of conservation. In the following chapters, the categories of land protection of the parks are going to be described in more depth.

## The Parks

Two portions of land classified by UNESCO as World's Heritage since 1984 (in Argentina) and 1986 (in Brazil), are the contiguous natural protected areas in the border region between Argentina and Brazil, located close to the border with Paraguay - the Triple Border described in the former chapter -, the two adjacent National parks known worldwide mainly for their aggregate unique waterfalls. To differentiate them, this text assumes PNI-AR for referring to the Argentinian park *Parque Nacional Iguazú* and, following the same logic borrowed from Cury (2010)'s dissertation, PNI-BR when speaking about the Brazilian one, namely *Parque Nacional do Iguaçu*. On UNESCO's website, there's a good description of the landscape and importance for protection:

“The park (PNI-BR) shares with Iguazú National Park in Argentina one of the world's largest and most impressive waterfalls, extending over some 2,700 m. It is home to many rare and endangered species of flora and fauna, among them the giant otter and the giant anteater. The clouds of spray produced by the waterfall are conducive to the growth of lush vegetation.”

The place, according to IPHAN (2014), gained recognition after Santos Dumont (Brazilian aeronaut and inventor of the aeroplane) visited the region in 1916 and got mesmerised by the landscape. Together with the governor of Paraná State, they claimed for expropriation of the area. Just three months after the visit Decree 653 of 28 July 1916 was approved, which declared an area of 1,008 hectares of public utility.

Among their qualities, the criteria of UNESCO for categorising the parks as holding outstanding universal value highlights the already mentioned Iguaçu River waterfalls - a collection of 275 falls, according to the touristic map available at PNI-BR website - and the protected remnants of the *Mata Atlântica/Selva Misionera* forest, belonging to the interior Atlantic Forest - and holding fauna and flora-wise last individuals of some species, as mentioned on the former chapter.

Kropf & Euleterio (2017) provide a quick panorama of both parks, highlighting their touristic, scientific and biological importance: the biome of the area is named differently on each national state - *Mata Atlântica* at the Brazilian side and *Selva Misionera* on the Argentinian one. The first one, PN-BR, is located in the Brazilian west portion - with its main



entrance in the city of Foz do Iguacu, State of Paraná - and has a total area of about 185 thousand hectares, crossing 14 different municipalities. The PNI-AR is in the Argentinian northeast portion, occupying a smaller area of about 36% of the Brazilian park size. On this side of the border, the park is located mostly at Puerto Iguazú, province of Misiones, less than 6 km from Paraguay's border.

Both parks have point lookouts for the *Garganta do Diabo/del Diablo* falls – an important visual connection point between them -, tracking paths, airports, toilets, eating facilities, among other essential service structures. During the writing of this dissertation, the water level in the Iguacu River rose enough for the PNI-AR administration to close the circuit temporarily.

They also offer very similar activities - trails, guided and group visits, boat trips, and helicopter trips. According to information on their websites, night visits are foreseen at the same period of the year and the guests can buy tickets for visiting PNI-BR at PNI-AR's website. Each park has a track with the same name Macuco, also the name of a river, honouring the *Tinamus solitarius*, a species categorised by IUCN (2019) as nearly threatened and decreasing.

According to Cury (2010), the parks express the nature of the *Iguassu* Transboundary Identity, the focus of his dissertation. The author analysed, among other subjects, the relationship between the increase in tourist activity in the region together with the population increase due to the construction of the Hydroelectric Binational Power Plant, whose impact was previously discussed.

In 2023, data from ICMBio of the number of visitors in Brazilian National Parks showed there was a peak of interest. PNI-BR was the second most visited national park in Brazilian territory, reaching the mark of more than 1,8 million visitors. In the same year, PNI-AR celebrated its visitor number 1.000.000 in August, earlier than the year before - according to the Argentine Republic's official website, which reported big infrastructure improvements in February of the same year.

They were not an exception. Still, according to ICMBio (2023), the number of visitors in every category of protected areas had an increase of 11%, indicating a greater interest of the general public in experiences connected with nature. Those data give us a good indication of the actual natural touristic trends.



Touristic map – PNI-BR (2020) – retrieved from the official website: [https://cataratasdoiguacu.com.br/wp-content/uploads/2020/09/mapa\\_digital\\_portugues.pdf](https://cataratasdoiguacu.com.br/wp-content/uploads/2020/09/mapa_digital_portugues.pdf)



Touristic map – PNI-AR (2020) – retrieved from the official website: <https://iguazuargentina.com/pdf/MAPA-IGUAZU.pdf>

## Categories of Protection and Functioning

The PNI-BR is regulated by the National System of Nature Conservation Units (MMA-SNUC, 2000), categorised as *Unidade de Conservação de Proteção Integral* having as objectives preservation of natural ecosystems holding ecological relevance and landscape beauty, enabling scientific research, environmental education and interpretation activities, promoting ecological tourism. PNI-BR management is under federal responsibility through the Chico Mendes Institute for Biodiversity Conservation (ICMBio), linked to the Ministry of Environment.

SNUC category means, according to their official website, that scientific research activities, environmental education and interpretation activities and nature-related and ecological tourism activities are possible. The public visiting area is conditioned to specific restrictions of the zoning plan.

As stressed by Kropf & Eleuterio (2017), administration was divided in the following sectors: the head of the park, the administration, research, management and conservation, environmental education, protection and public use. Each sector is headed by an ICMBio environmental analyst, who coordinates teams of outsourced professionals. In addition, the institute has a partnership with the Environmental Police for actions of protection of the unit. The management is regulated by the Management Plan, prepared in 1986, first reviewed in 2002 and, the most recent one, 2018 being the main source of challenges faced by the PNI-BR of this text.

The Management Plan establishes the zoning plan of the park, according to ecological characteristics and allowed activities. The extensive use zone is intended for tourism. In comparison with the Argentinian one, the most recent management plan of PNI-BR is shorter, less detailed, but structured along similar lines. The development, operation and maintenance of public use is done by concession-holders. Pieroni (2022) highlights the obligations within the concession: "A implementação de políticas públicas que potencializem a função social do parque, seja no âmbito da conservação da biodiversidade ou do desenvolvimento local, também integra o rol de obrigações da concessionária"<sup>33</sup>

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<sup>33</sup> The implementation of public policies that enhance the social function of the park, whether in the context of biodiversity conservation or local development, also integrates the list of obligations of the concessionaire

The PNI-AR falls within the *Sistema Federal de Áreas Protegidas* (SIFAP) and, as explained by Marques (2017), comprises two categories of management:

The first one is the *Parque Nacional per se*, with goals related to the natural state conservation of specific areas, representative of a phytogeographic region and with great attraction for the landscapes or scientific interest. These areas are maintained with minimum interference for control and attention to the visitors and safety, being allowed economic exploitation only through tourism;

The second one, *Reserva Nacional*, corresponds to areas for conservation of ecological systems, maintenance of adjacent national park protection zones or creation of independent conservation zones. Human settlements are permitted as long as they are compatible with the specific and priority purposes stated.

The protected area is under federal responsibility, whose responsible body is the National Parks Administration (APN), linked to the Ministry of Tourism of Argentina. The administrative sectors, as explained by Kropf & Eleuterio (2017), include the head of the park, environmental management and education, public use and conservation, and the *Guarda Parques*. Each one of them is managed by a technical responsible with the exception of the last, which is composed of the National Park Guards Corps, responsible for protection.

Management is regulated by the 1988 Management Plan, which's last version, of 2017 is an important source of this text. Similarly to the Brazilian one, the sectors of the park obey the ecological characteristics and establish, from these, allowed activities. The zone of intensive public use is directed toward tourism. The development, operation and maintenance of public use are also done by concession-holders.

As Kropf & Eulerio (2017) concluded, the national park regulation regimes of different countries vary, as does the authority granted to states (in Brazil) or provinces (in Argentina). But the goals are the same - protecting the environment and biodiversity while promoting nature-related tourism. The parks' budgets are comparable because they receive government payments; but, in Argentina, the minimum annual transfer amount is stipulated.

Having in mind there may be informal or ad-hoc collaborations between the park administrations, the absence of a formal cooperation framework has hindered effective joint conservation efforts (Correa et al., 2020). These authors highlight the necessity of formal cooperation between the PNIs due to their shared ecosystem and interdependent

environmental challenges. Despite the absence of an official policy of cooperation, their work has an emphasis on the legal obligations and international commitments that should compel Brazil to collaborate with Argentina for the preservation of the fauna and flora of the parks.

The authors underscore the importance of converting these international obligations into practical actions to ensure effective conservation efforts and emphasise the need for a structured cooperation framework to overcome the existing challenges and enhance the preservation of the shared ecosystem.

	PNI-BR	PNI-AR
Year of foundation	1939	1934
Area	185.000 ha	67.720 ha
Management Structure	head of the park, administration, research, management and conservation, environmental education, protection and public use.	head of the park, environmental management and education, public use and conservation, protection.
Head of each strand	ICMBio environmental analyst/each	technical responsible/each + National Park Guards Corps (protection)
UNESCO's recognition as Human Natural Heritage	1986	1984
Categories of protection	UC Proteção Integral (SNUC)	Reserva Nacional + Parque Nacional (SIFAP)
Management	ICMBio - Ministry of Environment of Brazil*	APN - Ministry of Tourism of Argentina
Concession-holder - public use	Consórcio Novo PNI (Grupo Cataratas do Iguazu + Construcap)	Iguazú Argentina (company)

\*this ministry changed name and since 2023 is called Ministério do Meio Ambiente e das Mudanças do Clima – Source: the author

## The creation of the National Parks

Cury (2010) starts his paragraphs about the PNIs with the trips aiming for exploration of national territories, mentioned in former chapters:

“Na mesma década de 1930, em que colonos marcharam para o Oeste e fundaram numerosas cidades nesta porção do Sul do Brasil, mediados por questões mais estratégicas do que ambientais, a Argentina e Brasil estabeleceram oficialmente seus Parques Nacionais com objetivos de proteção, integridade e soberania nacional no limite com as Cataratas do Iguaçu, respectivamente nos anos de 1934 e 1939, e elas serviram de “tampão” geopolítico entre essas nações.”<sup>34</sup> (Cury, 2010, p. 26)

Navarra (2019) describes the unfolding of colonisation efforts, making clear that the power plant construction was not the only territorial dispute subject. During the 1970s, the inauguration of the Iguaçu National Park (Law No. 1035/39) consolidated the expulsion of several villages and small rural owners in the region. 12 thousand hectares of land considered vacant were used for resettlement of expropriated settlers from the PNI-BR and Guaranis were considered as "mestizos" or Paraguayans by the *Instituto Nacional de Colonização de Reforma Agrária*, acting notoriously at the expense of these communities, not only denying their right to the land but their identities as well.

Dias & Palagano (2016) confirm these violences, mentioning the document “*Violação dos direitos humanos e territoriais dos Guaranis no Oeste do Paraná (1946-1988): Subsídio para a Comissão Nacional da Verdade (Centro de Trabalho Indigenista, 2013)*” which explains the forced removal of the original population from the land "aliada a usual negação de identidade dos indígenas, comumente chamado de paraguaios ou bugres"<sup>35</sup>. Those authors emphasise not only the violence of denying access to their ancestral land but also the violence of erasing identity and stopping cultural and religious manifestation - since the arrival of the Jesuits.

The parks are named the same as the Iguaçu River, which divides the parks and countries. According to Cury (2010), the lower and upper parts of the river have distinct tourism aptitudes, being the Iguaçu Falls their most visited attraction. Both PNIs are among the most visited destinations in both countries.

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<sup>34</sup> In the same decade, 1930, in which settlers marched to the West and founded numerous cities in this southern portion of Brazil, mediated by more strategic than environmental issues, Argentina and Brazil officially established their National Parks with protection, integrity and national sovereignty objectives, on the border with the Iguaçu Falls, respectively in 1934 and 1939, and they served as a geopolitical "buffer" between these nations.

<sup>35</sup> combined with the usual denial of identity of indigenous people, commonly called Paraguayans or *bugres*

According to Marques (2017), the recognition of both parks as World Natural Heritage can be seen as an important move for cooperation and conservation in a cross-border context. The expectation of the World Heritage Commission was the creation of a unique Cross-Border Heritage Site, named *Parques Nacionais Iguazú/Iguaçu*. Brazilian authorities manifested their will in listing the parks independently, disassociating the PNI-BR to a cross-border context, which was accepted. (Marques, 2017).

Despite agreeing with separate listing conditions asked, the UNESCO Commission stimulated cooperation with bordering countries when it comes to conservation (UNESCO, 1989) and reinforced the recommendation on other occasions, such as the Conservation Report (UNESCO, 2023) discussed in the following paragraphs.

Due to their geographical proximity and similar history, the PNI-AR and the PNI-BR face similar problems associated with the activities carried out in their limits, control and surveillance, conservation of endangered species, and control of exotic species, among others. For this reason, according to the annexe present at the PNI-AR Management Plan (2017) Brazil and Argentina have adhered to three bilateral agreements and programs, which influence the management of the parks.

In 1991, both countries signed a Cooperation and Exchange Agreement for Goods Used in Defence and Environmental Protection, which aimed to stimulate the exchange of goods to comply with environmental protection and facilitate, in emergencies, temporary admission of goods and persons. In the next year, the governors of the state of Paraná and the province of Misiones signed a joint declaration in 1992. It is a memorandum of intent to advise national governments on the establishment of joint actions.

Four years later, in 96, an Agreement on Cooperation in the Field of Environmental Protection was signed, listing priorities for mutual assistance between border areas and the parks, to improve mutual awareness of their policies and promote the eventual development of integrated policies for the sector.

As introduced, the parks share functioning similarities but, unfortunately, 28 years after the last agreement was signed, both parks still face similar difficulties according to their management plans. They will be analysed in the next chapter. Both parks have projects in different fields – presenting distinct expertise - and involve different actors in them. They

respond to different demands and, except for one, do not include the park on the other side of the Iguazu River.

The following table shows the ongoing projects mentioned in each one of the Management Plans, their fields and whether they're developed jointly or not. Some of them are related to environmental education, others to research and monitoring of biodiversity and also cultural projects are mentioned in the Management Plan of PNI-AR (2017).

<b>Park</b>	<b>Project</b>	<b>Field</b>	<b>Cooperation with other Park</b>
PNI- BR	Conhecendo os Rios do Parque	Environmental Education (water)	no
	Aves Iguazu	Monitoring/Research/Conservation	yes*
	Carnívoros Iguazu	Monitoring/Research/Conservation	yes
	Monitoramento de Atropelamentos	Monitoring	no
	AquaIguazu	Monitoring	no
	Proyecto Yaguareté	Monitoring/Research/Conservation	yes
PNI- AR	Programa Conservación y Uso Sustentable del Patrimonio Natural y Cultural	Monitoring/Research/Conservation	no
	La Historia Oral	Culture/Research/Conservation	no
	La Feria Artesanal Yhary	Culture/Conservation	no
	Coro de Niños	Culture/Conservation	no

\*Parque das Aves, Foz do Iguazu – Source: the author

### **Resources and Fundamental Values**

At the PNI-AR Management Plan (2017), we can find a list of the so-called *Valores de conservación e integridad del PNI*, understood as a collection of characteristics or processes (natural, cultural or socioeconomic) of importance to the Park and its surroundings. They can include broader elements such as landscapes, ecosystems, communities, species, as well as natural, social, cultural and historical processes. The elected interest points hold



scientific, educational, recreational-tourist, spiritual, cultural, social, conservation, historical, emotional and creative value, subjects of national, regional or local scope.

The values, naturally, are related to the goals of creation of a National Park, discussed in some paragraphs above, and are representative of the cultural practices of a region, area or community, as well as of different scales of biodiversity organisation, communities, ecosystems and landscapes. The plan presents the following values, identified in internal workshops, and also describes each one of them:

1. *Paraná forest* and its biodiversity
2. Threatened species in the Park and their habitats
3. Waterfalls and Islands System
4. *Yguaraté*
5. Cultural diversity and its sustainable relationship with the PNI surroundings
6. Water systems and associated endemic/special communities.
7. Section of *terra colorada* on the RN101.
8. Special communities (particular biological associations).
9. Cultural heritage associated with the history of the PNI

Akin, the PNI-BR Management Plan also has assets identified as fundamental for the well-functioning and keeping of the park. The explanation of the choice of those resources is similar to the PNI-AR's: they are essential for the purpose of the conservation unit and keeping its meaningfulness. Those means can also be environmental aspects (species, ecosystems or ecological processes) as well as social, historical, geological, landscape or other sorts of aspects and must be taken into account for any planned activity by the management of the Park.

PNI-BR Management Plan presents a list of them, organised in a table containing their current situation (threats, trends and necessity of data), diagnosed by a 3-step methodology applied when writing the plan: Analysis of resources and core values (RVF), including data needs and planning; identification of key issues and data needs and planning to solve them; prioritisation of planning and data needs related to the values and key areas.

They are listed as follows:

1. Iguaçu Waterfalls
2. Key species for conservation actions

3. *Onça-Pintada*
4. Water grid/systems
5. Experience of connection with nature
6. Environmental education and space for production of knowledge
7. Historical and Cultural Heritage

When comparing the values listed, it becomes clear that the parks have similar goals and could, as suggested by UNESCO, benefit from coordination and cooperation. This chapter aims to find common challenges described by the plans by grouping their similar values, comparing the diagnosis to their management plans, and identifying ongoing initiatives to tackle them.

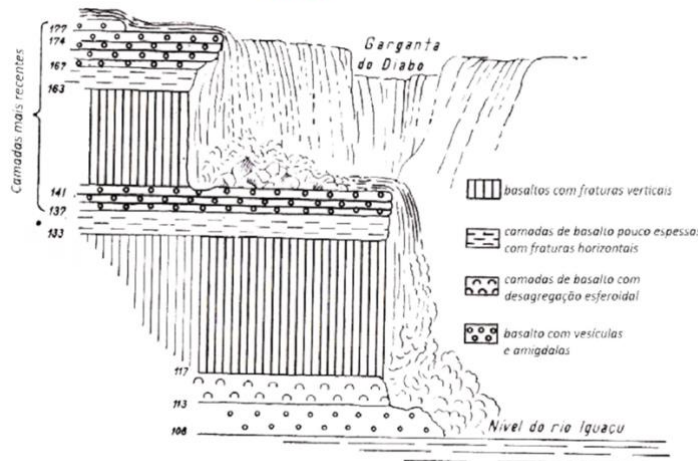
The text from now on focuses on confluences, grouping the values identified in common on the plans. It first summarises the characteristics described in the PNI-AR Management Plan, for being longer and more descriptive, and adds information contained in the PNI-BR Management Plan's analysis of resources. The difference in size and description level of both plans is the main reason for this choice of presentation.

- a. The Iguaçu/Iguazú Falls and Islands

The Iguaçu/Iguazú Falls, located within the homonymous River basin, are well-known for their beauty as well as for their geological, hydrological, and scenic significance, representing a remarkable natural formation shaped by phenomena described in former chapters. This basaltic marvel, stretching over 3,600 metres in a U-shaped curve, is shared with Brazil's Iguaçu National Park, underscoring its transboundary importance in conservation efforts.

According to Rapanelli et. al (2021) the Iguaçu Falls are the most renowned geomorphological feature in the region, comprising around 270 cascades with a total drop of 115 metres, including the prominent 90-metre-high Devil's Throat. These waterfalls and canyons are outcomes of climatic processes from the Quaternary period and chemical weathering due to the vegetation cover remnants of the Atlantic Forest biome.

Figura 4 - Os derrames



Fonte: autores, ilustração modificada de Maack (1968).

Source: Rapanelli et. al (2021)

In 2011 the Iguazu Falls were elected one of the seven wonders of the natural world by the Swiss foundation New7Wonders. (VisitIguassu, 2022) It's importance is also cultural, being the stage of one of the most known stories of the region: the Legend of Iguazu Falls. According to Martins (2023), the legend is tracked back to the indigenous communities of the region and is a mythological explanation of the origin of the falls.

Figura 5 - Exemplos da geodiversidade das Cataratas



(a) Cataracts geomorphological feature, tabuliform appearance, common in areas of basaltic spills; (b,c) dark colour characteristic of basalts, due to the presence of volcanic ash and iron oxides in its composition; fractures and vertical joints that define entablature, sub-horizontal, plane-parallel fractures due to the

differential movement between a highly viscous upper portion already cooled and the core still liquid (Licht & Arioli, 2020); (d) aerial photo - the Iguazu River forms a semicircle that can reach 2,700m wide above the falls (Salamuni et al., 2002), narrowing up to 65 to 100m in the tectonic rift (Maack, 1968). Photos from 2017 - Source: Rapanelli et. al, 2021.

The author also reminds us that mythological explanations passed through orally are a common ground for many indigenous communities, being part of their cultural heritage. The so-called *Lenda das Cataratas* is present in many hotels and tourist points and has an official version available by Foz do Iguazu City Hall - which was translated and is also told in Argentina (Martins, 2023). A longer version of the story, written in 1997 by Hardy Guedes, is studied in schools of Paraná State, linking the natural heritage, culture and education. The first written version of the legend dates to 1914 and was written by Silveira Neto based on what he heard from an old man named Yaru. Some claim this is a direct translation of the version written by Basaldúa, in 1901, also based on a story from an indigenous man in his service (Martins, 2023). The legend is not the focus of this analysis, but it's an important marker of the cultural importance of the falls as a cultural bond, a factor of union between the countries and the unicity of Iguazu territory.

The PNI-AR Management Plan highlights the importance of the area preceding the falls, characterised by basaltic islands and unique flow dynamics, it fosters a distinctive environment supporting diverse biological communities with a high prevalence of endemic species, contributing to the site's exceptional natural value.

The falls create a microclimate that supports the presence of flora and fauna species not commonly found in other regions of the country or within the National Parks, therefore the importance of them for biodiversity preservation is to be taken into consideration. The area is the habitat of a diverse array of plant and animal species, some of them, listed in former chapters.

The basalt cliffs and the river landscape are part of the recognition of UNESCO World Heritage Site in 1984. Additionally, the Waterfalls were considered one of the Seven Natural Wonders of the World in 2011, attracting a significant influx of visitors. Additionally, in 2001 the Iguazu waterfalls were elected one of the Seven Wonders of the Natural World by the *New7wonders* Foundation, which's official website also presents a short version of Indigenous legend explaining the origin of the falls:

“Legend has it that a deity planned to marry a beautiful woman named Naipí, who fled with her mortal lover Tarobá in a canoe. In a rage, the deity sliced the river, creating the waterfalls and condemning the lovers to an eternal fall.” (*New7Wonders* Foundation, 2016)

b. *Yguareté/Onça Pintada*, Threatened Species & their Habitats

The Jaguar, known as *Onça Pintada* in Brazil and *Yguareté* in Argentina is the top predator in the *Paranense/Mata Atlântica* Forest. It holds significant conservation importance as a flagship species, serving as an indicator of the environmental health of its habitat and playing a crucial role in the ecosystem (PNI-AR Management Plan, 2017; PNI-BR Management Plan, 2018). The fate of the Jaguar in the *Paranaense* Forest reflects the overall well-being of the entire ecoregion, underlining its pivotal ecological role, according to the PNI-AR Management Plan. Moreover, the Jaguar carries immense cultural value in the region.

Due to the drastic decline of Jaguar populations in Argentina caused by their habitat transformation and hunting, the animal has been designated as a National Natural Monument, entrusting the PNI-AR Administration through the *Proyecto Yguarate* with a direct responsibility for its conservation. *Proyecto Yguarete* acts directly in research, conservation and environmental education about those felines. Additionally, this big cat has been recognized as a Provincial Natural Monument in the province of Misiones.

On the Brazilian side of the border, the PNI-BR institutional project *Onças do Iguaçu* jointly with *Proyecto Yguarete* monitors continuously - every two years - the population in park limits. The project is a part of the NGO *Pró-Carnívoros* Institute. According to their official website, together with *Proyecto Yguaraté*, they are the world's largest jaguar monitoring effort - covering about 600,000 hectares sampled since 2009 and demonstrating the potential of cooperation.

The historical panorama of species maintenance is described in the PNI-AR Management Plan: (2017) as

"Los últimos reportes de investigadores del Proyecto Yguareté, que trabajan hace más de 10 años en zona y cuentan con el respaldo de la APN, indicaron que si se enfoca en los límites del PNI, los individuos registrados van en aumento, pasando de 7 individuos en el 2006, 7 en el 2008, 9 en el 2010 y 13 en el 2014. De acuerdo a estas nuevas estimaciones la población de yguaretés del Corredor Verde de la Argentina y Brasil sería de 71 individuos adultos. Hasta el año 2008, los investigadores estimaban

que la población rondaba entre 33 y 54 individuos."<sup>36</sup> (PNI-AR Management Plan, 2017, p.150)

The panorama has presented good changes according to more recent data from the collaboration project: the current estimated number of individuals is 105, according to data from the Pró-Carnívoro Institute (2024).

They gather information about this feline tracking data from camera traps, satellite tracking, footprints, excrement, and views by park rangers, technicians, and visitors highlighting a significant presence of Jaguars in the PNI-AR, emphasising the area's importance for the species.

The *Paranaense* Forest, characterised by lush vegetation in a warm and rainy region and home of many species, is part of the Atlantic Forest bioregion. Today, only 7.8% of the original forest area remains, with Misiones province conserving about 40% in good condition (PNI-AR Management Plan, 2017).

Known for its exceptional biodiversity, the bioregion is considered the most diverse ecoregion in Argentina and the second in Brazil after the Amazonian Forest, making the importance of preservation evident. Misiones, according to the PNI-AR Management Plan, hosts half of Argentina's species and subspecies, with the park alone harbouring over 1,000 plant species, 83 mammals, 456 birds, 51 reptiles, 24 amphibians, and 100 fish species.

The parks play a critical role in conserving species that are either extinct or on the brink of extinction, evidenced by the lack of confirmed sightings of some species for several decades reported in the PNI-AR Management Plan (2017). These species, including mammals mentioned in former chapters, like the Giant Otter *Pteronura brasiliensis* (endangered, according to the IUCN, 2021 red list), Bush Dog *Speothos venaticus* (near threatened), Giant Anteater *Myrmecophaga tridactyl* (vulnerable), and Lesser Grison *Galactis cuja* (least concern), are mentioned as being of significant conservation concern. The parks' status as a World Heritage Site is justified by its preservation of essential habitats that support a diverse array of species with exceptional universal value from both scientific and conservation perspectives.

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<sup>36</sup> The latest reports by researchers of the Yaguareté Project, who have been working in the area for more than 10 years supported by the APN, indicated that if one focuses on the limits of the PNI, the registered individuals are increasing, growing from a total of 7 individuals in 2006, 7 in 2008, 9 in 2010 and 13 in 2014. According to these new estimates, the population of jaguars in the Green Corridor of Argentina and Brazil would be of 71 adult individuals. Until the year of 2008, researchers estimated a population of between 33 and 54 individuals.

In terms of avifauna, the parks are home to a variety of threatened bird species – as expressed in former chapters -, such as the Harpy Eagle *Harpia harpyja* - considered in vulnerable condition (IUCN, 2021), Jabiru *Jabiru mycteria*, and Red-and-green Macaw *Ara chloropterus* - both raising least concern (IUCN, 2021), all of which are highly dependent on aquatic and humid environments. The presence of vulnerable species showcases the importance of the roles of the parks in safeguarding critical habitats for threatened wildlife. Additionally, the flora within them is equally noteworthy, with unique plant species playing a vital role in maintaining habitats that support threatened flora and fauna. Notably, the Falls area has a significant number of endemic plant species, including orchids, ferns, and bromeliads, exemplifying the parks' rich biodiversity and their crucial role in conservation efforts.

The PNIs play a pivotal role in regional conservation efforts, aiming to transform the geographical mosaic into an ecologically functional landscape through coordinated management among public institutions, private entities, and individual landowners, as suggested by UNESCO.

These efforts position the PNI-AR as the “Green Heart” of the *Paranaense/Mata Atlântica* Forest, aligning with Misiones Province's long-standing "Green Corridor" strategy for forest remnants, according to the PNI-AR Management Plan. The PNI-BR Management Plan claims their forest areas are well connected.

The biodiversity within the PNIs holds immense value at species, and ecological levels, emphasising the importance of conserving all facets for the system's optimal functioning. Despite facing significant local and global transformation threats, the parks' biodiversity remains a key attraction for tourists, offering aesthetic, recreational, cultural, educational, and scientific values. This rich biodiversity, coupled with the stunning flora and fauna present in the Falls area, underscores the significance of the parks as World Heritage Sites dedicated to conserving vital habitats and exceptional species of universal conservation value.

The current knowledge of the characterisation of plant communities in the PNI-AR allows for the classification and enumeration of a wide variety of well-defined environments. Initially, two communities were often mentioned by the permanent bibliography at PNI-AR

- Cabrera, 1976 and Martínez Croveto, 1963 - the palm heart, the rosewood forest, and the laurel and *guatambú* forest, were mentioned as the largest in terms of area within the park.

However, subsequent research revealed two distinct environments in the conservation area (1995): coupay and curupay forest and *selva de ribeira*. Further detailed surveys identified around twenty additional environments. These newly identified environments, mostly associated with water bodies, are classified as wetlands. Their conservation significance lies in their limited relative surface area within the park and the high level of endemism they harbour, providing a crucial refuge for numerous plant and animal endemics.

c. Cultural diversity and its sustainable relationship with the PNI surroundings

The history of the occupation of the parks' regions and their surroundings, as introduced formerly in this text, is not linear. The PNI-AR Management Plan starts the chapter about cultural diversity and the park surroundings with an introduction about Misiones' occupation.

As the Human Occupation chapter describes, colonisation policies in the late 19th and early 20th centuries arrived in Misiones (and region), attracting diverse European and Asian communities to settle in a territory inhabited by indigenous peoples from Jê (Kaingang) and Tupi Guaraní (Mbyá Guaraní, Paí Tavyterá, Avá Chiripá) ethnolinguistic groups, according to Gallero y Krautstofl (2009), as mentioned at PNI-AR Management Plan (2017). On the map in the chapter about human occupation, we can see the diversity of Guaraní groups on the site. Note the forced and violent removal of Indigenous communities of the territory described earlier.

When it comes to the framework of this dissertation, this value is of high importance. As introduced previously, the indigenous culture and religion have intricate relations with the territory. As Benites (2020) explains in an episode of the journalistic podcast *O Joio e o Trigo*, which focuses on food consumption habits

"A gente não consegue viver conforme a nossa tradição e aí acaba gerando uma degradação em todos os aspectos da nossa sociedade – econômico, dignidade, aí cresce a questão do racismo, violência, suicídio, a violação dos direitos [humanos]... então tem "N" problemas sociais agravados pelo resultado da maneira em que a política pública de estado foi implementada ao longo do século XX e ao longo dos 5 séculos. Então, o que reflete essa falta da terra é justamente a dificuldade dos Guaraní-Kaiowá de viver



com a sua tradição, com sua dignidade, com a sua religiosidade." <sup>37</sup>(Benites, 2020, 27:33)

Although they are not from the same region - the Guarani-Kaiowá are more present in Mato Grosso do Sul, all Guaranis are culturally related, sharing values, language – one of the official languages of Paraguay and Bolivia - and broad cosmology (EMGC, 2016). As demonstrated by the Benites quote, they also share the same threat to their culture and way of living: colonisation and consequent globalisation and the exploitation culture which comes along with them.

Additionally, a historical and dynamic migratory flow of citizens from Paraguay and Brazil towards the Misiones territory has been significant, given that nearly 90% of its borders adjoin these countries.

The population surrounding the PNI-AR comprises residents of Puerto Iguazú, some Mbyá Guaraní villages, and the Comandante Andresito military colony on the eastern boundary. Mbyá Guaraní members near the PNI-AR sell handicrafts and present the children's choirs within the park, activities vital for their economy and attractive to tourists.

It is an opportunity to share cultural expressions and spiritual beliefs with visitors. As suggested by many authors and institutions like the IUCN-WCPA Task Force on OECMs, (2019), Krenak (2020) (2022), and Brum (2021) part of overcoming climate crises is listening to indigenous knowledge, their relationships with ecosystems and species and consequently, keeping the cultures alive.

PNI-AR is strategically located and was the first protected area in the Paranaense Forest. It serves as a central geographic hub connecting with other conservation areas like the PNI-BR, Puerto Península Provincial Park, Yacuy Provincial Park, Urugua-í Provincial Park, and San Jorge Reserve. The park facilitates faunal exchange with Brazilian counterparts through the Iguaçú/Iguazú River, acting as an effective corridor ensuring connectivity for other natural areas in the province. Among its values, there's the section of so-called *terra colorada* on the RN101.

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<sup>37</sup> We can not live according to our traditions, and then it ends up degrading all aspects of our society - economically, our dignity, then the issues of racism, violence, suicide, violation of [human] rights grow... then there are "N" social problems aggravated by the result of the way in which state public policy was implemented throughout the 20th century and over 5 centuries. So, what reflects this lack of access to the land is precisely the difficulty of the Guarani-Kaiowá to live with their tradition, with their dignity, with their religiosity.

The PNI-BR Management Plan mentions that the geographical micro-region of the Iguaçu National Park is composed of 14 municipalities, in the state of Paraná, located within a radius of 10 km of the park. These municipalities have influence or relationship with the Conservation Unit, to a greater or lesser degree. The socio-economic dynamics of the region can be divided into three major axes: food agroindustry, wood extraction activities and tourism. All of them hold the potential - and have proven to be harmful to biodiversity keeping and indigenous way of living.

Some of the municipalities around PNI-BR mentioned in the Management Plan are Foz do Iguaçu, Santa Terezinha de Itaipu, Medianeira, Ramilândia, Santa Tereza do Oeste, Vera Cruz do Oeste, Lindoeste, Santa Lúcia, Capitão Leônidas Marques, and others. The longstanding relationship between the park, villages and settlers is a valuable asset to be reinforced in the current PNI-AR management plan, aiming to enhance and promote sustainable connections between these social groups and the forest environment.

On the eastern boundary of the PNI-AR, settlers undertake productive and economic activities reflecting their cultural traits, very aligned with the ones taking place in Brazilian territory, in crop selection, technology use, and time management for production systems heavily reliant on land labour and family workforce. In both countries they have also embraced cooperative experiences in production and marketing processes, strengthening their sectoral commitment (PNI-AR Management Plan, 2017). Those aspects demonstrate the unicity of the Triple Border region - in economic and labour-related activities.

The *tramo de tierra colorada de la RN101* just mentioned is an important communication axis within the PNI-AR, connecting it from East to West and facilitating access to key areas such as the Iguaçu Falls and Puerto Iguazú. This 33 km dirt road, with a width of only 12 m including shoulders, passes significant landmarks of the APN's presence in the region, with key sections like Seccional Timbó and Seccional Yacuí. The route, crossing numerous streams that flow into the Río Iguazú, offers unique views and access to prime palm heart and rosewood areas. The conservation significance lies in its role as a habitat for various wildlife species, including the jaguar, pumas, and diverse bird species, making it a focal point for conservation efforts and a target for addressing illegal hunting and palm heart extraction activities.

This section of a road is another reminder of the intricate relation between the values of the parks - highlighting their codependency.

d. Water systems and associated endemic/special communities

As introduced, both parks are named after the Iguazu River, element of separation between both national states and, simultaneously, an element of union, according to Cury (2010). “El Iguazú Inferior es un río de perfil joven: profundo, torrentoso, angosto, ha sido rejuvenecido por una falla geológica producida en el Paraná, en cambio el Iguazú Superior tiene un perfil senil, ancho, poco profundo, formando meandros, por lo que se forman numerosas islas.”<sup>38</sup> (PNI-AR Management Plan, 2017).

As mentioned earlier, Iguazu river also holds symbolic/religious significance for the Guarani people, as described by Guedes (1997) "O Iguazu pertencia a M'Boi. Por isso, até hoje, as águas desse rio serpenteiam imitando os seus movimentos. Porque M'Boi é M'Boitatá, o deus-serpente e o Iguazu é, também, uma enorme serpente que vai se arrastando pelo chão do Paraná"<sup>39</sup>

PNI-BR is located entirely at the Iguazu River basin, more precisely, at the river's lower portion, with a drainage network consisting of tributaries on the right bank of this river. The PNI-BR Management Plan (2018) emphasises the Floriano River basin's importance for regional biodiversity maintenance and geographical protection. The park ensures the integrity of the Floriano River, supporting hydrological standards and sustaining the flow of Iguazu Falls.

PNI-AR, located immediately aside, comprises a partially the Argentine sector of the Iguazu River Basin and a small portion of the already mentioned Paraná River Basin. It has a dense network of springs, lowlands, streams – known as *correderas*, and deep pools, sometimes with waterfalls, as they navigate the terrain's variations. The Management Plan mentions over 120 watercourses originating in the Sierras de La Victoria and flowing into the San Antonio and Iguazu rivers, forming a dense network of streams that nourish the Mata

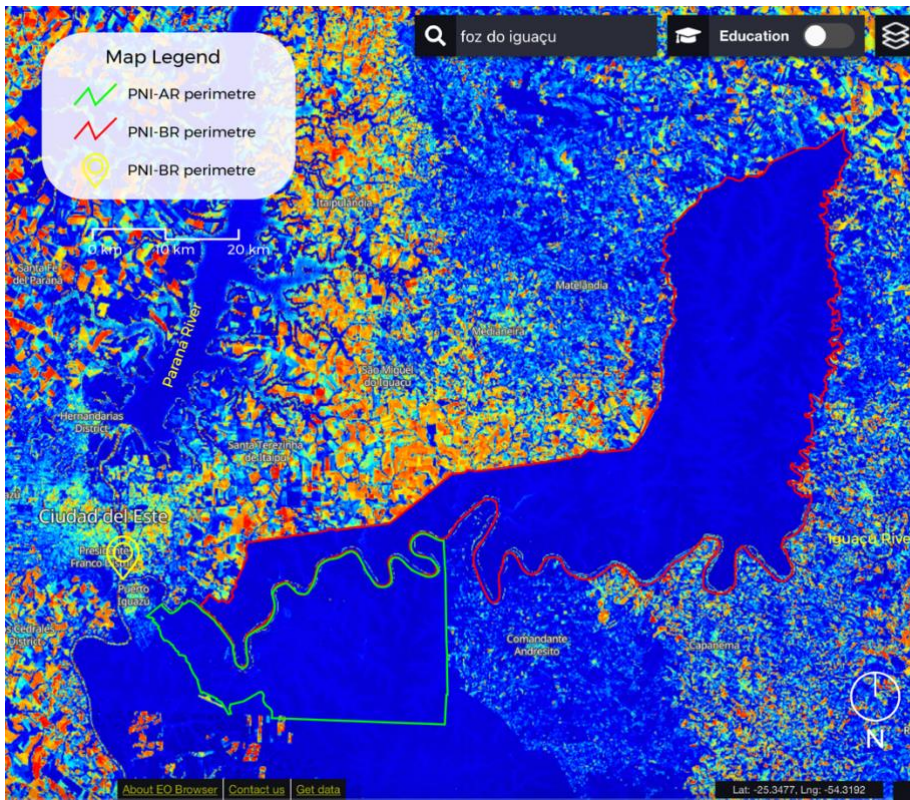
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<sup>38</sup> The Lower Iguazu is a river of young profile: deep, torrential, narrow, has been rejuvenated by a geological fault produced in the Paraná, whereas the Upper Iguazu has a senile profile, wide, shallow, forming meanders, so that numerous islands are formed.

<sup>39</sup> Iguazu belonged to M'Boi. So, until today, the waters of this river meander imitating its movements. Because M'Boi is M'Boitatá, the serpent-god and Iguazu is also a huge snake that crawls across the soil of Paraná

Atlântica/Paranaense Forest protecting the PNIs, and contributing to their environmental diversity.

The following images were made by the author, using satellite pictures, taken on 13 June 2024 by the satellite Sentinel-2, with the limits of both parks and the Triple Border itself marked for reference. The first one is a True Color filter, showing an approximation of the location “in reality” and the second one has the Moisture index filter applied, highlighting the difference in humidity in the limits of the parks and their surroundings.



Source: the author, using images from Sentinel Hub. (2024). EO Browser. Retrieved June 2024, from <https://apps.sentinel-hub.com/eo-browser/>



Both plans mention lagoons, but PNI-AR Management Plan (2017) describes unicity in the subject: “Se observan, por otro lado, lagunas que se desarrollan sobre suelos grises, muy arcillosos, aparentemente sin conexión con el sistema hídrico aledaño, cubiertas de pajonales de *Panicum* sp. con especies exclusivas o muy raras.”<sup>40</sup> This quote introduces the endemic communities, bonding water quality control with biodiversity keeping.

In its Brazilian portion, the Iguçu Basin houses ten hydroelectric plants, six on Iguçu River, significantly influencing the river's biological, chemical, and physical attributes and the region's precipitation regime. Despite the environmental impact, both plans qualify the quality of water as good.

The following map shows all the powerplants in the Iguçu Basin, categorised by size and production, and it was made overlapping two different ones – the basin and the hydroelectric enterprises, both retrieved from *Instituto Agua e Terra*.



Source: the author, using *Instituto Agua e Terra* maps (2021) as a base.

When it comes to conservation, the water system of the parks functions akin to a human circulatory system, providing good quality water, nutrients, habitats, and shelter for

<sup>40</sup> On the other hand, there are lagoons present on gray soils, very clayey, apparently with no connection with the adjacent water system, covered with *Panicum* sp. with exclusive or very rare species.

various species, while also draining excess water from the basin, as well associated in the text of PNI-AR Management Plan (2017). This analogy between water systems and the human circulatory system was exactly the one made by Peralta (2020), giving a hint of the inclusiveness of indigenous perspectives on the Argentinian's management plan.

Forest preservation is intimately linked to water quality, shaping diverse environments and housing rare species. As the water system symbiosis with forest preservation, which is linked to environmental education, the values of the parks are co-dependent.

e. Cultural heritage associated with the history of the PNI

The parks' early establishment, as formerly introduced, means a rich history of natural conservation policies within the national protected areas systems. The natural landscape, the history of land use, and the relationships between long-term and more-recently-arrived inhabitants contribute to the region's historical, sociocultural, and economic heritage that is now being emphasised for their value in both parks.

In terms of conservation, the PNI-AR Management Plan (2017) evaluates the historical and cultural heritage associated with the park, whether tangible or intangible, aiming to enhance understanding of the region's social, cultural, and natural aspects in the past, particularly the park's history. Aspects that can be assumed about PNI-BR since, as presented in the former chapter, the region presents territorial unity identity.

The Mbyá Guaraní communities exhibit a rich cultural heritage deeply intertwined with their environment, the Atlantic/Paranaense Forest. The PNI-AR Management Plan presents a panorama, relating their oral traditions, close relationship with nature, and spiritual practices that are central to their way of life. As expressed in former chapters, the Guaraní perceive themselves as part of the forest, relying on it for sustenance, materials, and spiritual expression. Traditionally nomadic, the Mbyá Guaraní have adapted to settled living due to environmental pressures and limited access to their ancestral lands.

Naturally, the territorialised lifestyle of the community enabled the development of profound knowledge of the forest's flora and fauna. Guaraní culture is known for forest-related food, medicine, and crafts. The Mbyá Guaraní's relationship with the PNI-AR has

been fostered through collaborative projects aimed at preserving their cultural heritage and promoting self-sufficiency. The management plan of the Brazilian park, on the other hand, rarely mentions indigenous communities.

Efforts in PNI-AR include initiatives to strengthen community organisation, traditional production methods, and artisanal skills. These interactions reflect a commitment to maintaining the cultural identity and well-being of the Mbyá Guaraní within the context of changing environmental and social dynamics.

The first one of those efforts is *La Feria Artesanal Yhary*, in the PNI-AR, where the community is welcome to sell crafts to the park's guests. The products express the cultural identity of the Guaraní people, including wood carvings, basketry, bows and arrows, blowguns, accessories, and musical instruments, among others. It is a strategy for promoting the preservation of artisanal traditions and knowledge and enhancement of and ways of living of the communities.

The *Coro de Niños* is another PNI-AR initiative for valuing cultural heritage. Since 2006, PNI-AR has hosted a choir, composed of members of the Yriapú and Ka'aguy Porã communities. This choir, of children and teenagers from 8 to 18 years old, performs typical songs that help spread the culture of the Mbyá Guaraní.

Furthermore, a project about the oral history of the PNI-AR was initiated around 2013, called *La Historia Oral*. Story-telling works as a tool in historical science for reconstructing the past through oral testimonies obtained from interviews and it is, as mentioned, an essential part of culture transmission for indigenous populations. The first Progress Report of the project, conducted in February 2015, aimed to reconstruct the history of the former entrance to the waterfalls and document human settlements between 1934 and 1984, a period of profound changes in the local scenario, telling narratives about this region from local perspectives.

The region, as stressed in former chapters, is characterised by a complex demographic history shaped by waves of immigration from Europe and migration between neighbouring countries. Immigrants from diverse backgrounds settled in a region with a markedly different environment from their homelands, establishing small-scale family farming as a key economic activity.



PNI-AR Management Plan (2017) takes into consideration this population diversity. It mentions the persistence of cultural traditions of immigrant colonies and the influence of the Brazilian-Paraguayan border. The retention of inherited languages varies among different immigrant groups, with Guarani, Portuguese, German, Ukrainian, and Polish being among the most spoken languages, and German being more strongly preserved.

### **Heritage in the surroundings of the Parks**

The Policy for the Management of Cultural Resources and the Regulations for the Conservation of Cultural Heritage within the jurisdiction of the *Administración de Parques Nacionales* (APN) was approved through Resolution No. 115/01. The regulations define Cultural Heritage as resources that reflect the diversity and variability of human activities and their interactions with the environment, representing aspects of human history and evolution. National parks, as distressed formerly, have the task of conserving cultural resources in protected areas through management programs focused on their conservation, research, and public use.

According to the PNI-AR Management Plan, in the year of 1963, Antonio Schimmel discovered traces in the area of the current park and Puerto Iguazú that indicated habitation by various cultural groups over time. These findings included remains of crafted material out of red quartzite and jasper. 21 years later, in 1984, new fragments of ceramic material, likely of Guarani origin, were found near the access bridge to the road connecting *Arroyo Ñandú* and the *Seccional Hidrómetro* inside the limits of the PNI-AR.

In 1990, the PNI-AR implemented the so-called *Ficha de Registros de Recursos del Patrimonio Cultural en Áreas Protegidas*. This form is used to communicate updates related to the existence, conservation status, and management of cultural resources, which are then included in the National Registry of Cultural Resources in Protected Areas. The document provides detailed information on the Cultural Resource Records of the PNI.

The cultural heritage in the area of PNI-AR, according to its Management Plan (2017), includes archaeological sites housing lithic remains, ceramic fragments of Guarani origin - such as jar mouths or urns, and historical sites like the former Montero farm and the former Hoppe inn and farm. These heritage sites represent the diverse and rich history of human activities and interactions with the environment in the region, being testimonials of indigenous knowledge and way of living.

The Montero farm refers to a historical agricultural estate or farmstead that existed in the vicinity of PNI-AR, being important due to its association with the early settlement in the region. *Chacra* Montero is not located inside the park limits, but its memory is part of the regional one and was frequent in testimonials collected at the *La Historia Oral* project mentioned in some paragraphs above.

The former Hoppe Inn and farm is another point of interest, it used to be a lodging establishment along with an associated farm operated by the Hoppe family in the region near what is today delimited as PNI-AR. Its importance is related to the use of the inn, an accommodation for travellers, traders, or locals passing through the area, contributing to the social and economic interactions of the region.

The PNI-AR Management Plan presents a list of the items of the Park's inventory in risky or vulnerable situations, putting Hoppe farm – described as in a regular state of conservation, but under imminent danger - together with items such as *la Urna* – pieces of a ceramic piece identified as a funerary urn in bad state of; *la Roca* – a carved rock from 1988, in regular state of conservation; *el Salto* – 2 lithic pieces in good conditions; *San Martin* - 5 smaller lithic pieces in good conditions; *Salto Arrechea* – a unique lithic piece, more detailed than the others and in regular conditions. Those pieces are testimonials of Guarani ancestral occupation and way of life.

The heritage in the area of PNI-BR includes historical and cultural landmarks such as a timeline of human occupation, the legend of the falls – also of Guarani culture -, the memory of pioneers, built structures like the Cataratas Hotel, and the Usina São João. Expressing other priorities, the heritage mentioned on PNI-BR Management Plan (2018) do not include any indigenous people heritage directly, but encompasses the presence of indigenous people in its text: “Na região estão presentes também comunidades tradicionais ou originárias como a Reserva Indígena Avá-Guaraní do Ocoí, da tribo Guarani Kaiowá e a comunidade remanescente Quilombola Apepú, localizada no município de São Miguel do Iguaçu.”<sup>41</sup>

The Cataratas Hotel is a historic structure, considered an important landmark in the region, with a rich history dating back to the old days of touristic activity in the Igraçu Falls.

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<sup>41</sup> In the region there are also traditional or indigenous communities such as the Avá-Guaraní Indigenous Reserve of Ocoí, the Guarani Kaiowá tribe and the remaining Quilombola Apepú community, located in the municipality of São Miguel do Iguaçu.

The hotel played a significant role in the development of tourism in the area and witnessed the evolution of the park over time. As part of the historical and cultural heritage of the region, the Cataratas Hotel is a place of interest both for visitors and for researchers investigating the history of tourism and environmental conservation in the area of the Falls.

*Usina São João* is a historic structure located within the Iguazu National Park. This plant is the first hydroelectric plant in the region that supplied the city of Foz do Iguazu. *Usina São João* witnesses the history of power generation in the region and has a pioneer role in local development. The following picture is the engine room of this power plant nowadays.



Source: Universidade Federal da Integração Latino-Americana. (2024). Acordo de cooperação permite identificar bens culturais do Parque Nacional do Iguazu. Retrieved from <https://portal.unila.edu.br/noticias/usina-sao-joao>

Although the preservation and conservation of the mentioned items are essential to keep alive the memory and the importance of this historical landmark in the region, PNI-BR Management Plan (2018) identifies the need to create a *Plano de resgate e preservação do patrimônio histórico-cultural, com resgate estratégico geológico e arqueológico em um espaço museu*, additionally, it identifies the need of gathering and systematising existing information about the heritage which hold historic-cultural value but also labels this necessity as having low priority among other tasks.

A technical cooperation agreement was signed between ICMBio and the Universidade Federal da Intergração Latino Americana. It was originated from an academic

research and extension project called “Museologia social no Parque Nacional do Iguaçu: levantamento, inventário e conservação dos bens culturais”, which started in 2021 and is coordinated by Pedro Louvain. The team found more than 500 pictures, the architectonic plans of historical buildings and maps dating back to 1940, additionally to the plans and of Usina São João.

“A usina é um bem cultural extraordinário que tem sua importância pela contribuição para o desenvolvimento do Parque e do município. Foz teve luz, por muito tempo, graças à Usina de São João (...), um patrimônio cultural contemporâneo e é necessário ter o reconhecimento oficial, o tombamento como patrimônio cultural”<sup>42</sup> (Louvain, 2024)

The working group formed after the agreement is coordinated by Professor Micael Alvino Silva and is composed of docents and technical-administrative servers of the PNI-BR, bringing the academic expertise for collecting, analysing and interpreting historical documents and objects. With the agreement, it will be possible to aggregate different research and extension projects related to the culture and history of the site.

### **Common challenges listed in their Management Plans**

#### **a. The Iguaçu/Iguazú Falls and Islands**

The presence of multiple dams in the upper Iguaçu River, in Brazilian territory, closer to the Atlantic Sea, introduces challenges such as fluctuating water levels that impact both biodiversity and infrastructure within the park (PNI-AR Management Plan, 2017). These fluctuations necessitate careful management strategies to mitigate their effects on biodiversity conservation and the overall visitor experience, highlighting the importance of sustainable practices in safeguarding this unique natural heritage.

Efforts to address the impacts of dam operations on the Iguaçu/Iguazú Falls ecosystem are crucial for maintaining the ecological integrity of the region and ensuring the long-term sustainability of this iconic natural wonder. By balancing conservation priorities with the need for sustainable development, stakeholders can work towards preserving the unique biodiversity and scenic beauty of the National Parks, safeguarding its status as a globally significant natural heritage site.

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<sup>42</sup> The Power Plant (São João) is an extraordinary cultural asset that is important for the contribution to the development of the Park and the municipality. Foz (do iguaçu) had electric energy, for a long time, thanks to the Usina de São João (...), a contemporary cultural heritage for which it is necessary to give official recognition, to have it listed as cultural heritage

They are also the most visited point in the parks, holding great tourist value. Although not listed in the Management Plans, accessibility should be the priority in places with such great tourist vocations. According to the website Iguazú Argentina Tours (2022), it is an aspect to be improved. The author claims that, although Iguazu Falls (BR) are promoted as “accessible” only the last stretch of the path, near the *Salto Floriano* and the access to the balcony that allows the view of the *Garganta do Diabo* falls are adapted for people with reduced mobility. On the other hand, on the Argentinean side of the border, accessibility is taken more seriously: PNI-AR has three circuits to enjoy the best views of the Falls. These are the *Garganta del Diablo*, Upper Circuit and Lower Circuit. In the first two, the possibility of moving with wheelchairs is total, as the map shows. The park also has trained the staff to communicate in Argentinian sign languages and along the various circuits there are also signs and Braille letters available.

b. Yguareté/Onça Pintada, Threatened Species & their Habitats

According to both management plans, one iconic fauna species present inside the conservation units limits - and surroundings - is the Jaguar (*Panthera onca*), *Onça Pintada* or *Yguareté*, which serves as a flagship species indicating the conservation status of the Paranaense Forest.

The ongoing initiative, *Proyecto Yguareté* in PNI-AR is in collaboration with PNI-BR *Projeto Onças do Iguazu* for counting the population of Jaguars. It is the world’s largest monitoring effort for the species, in an area of 600,000 hectares sampled. Data from their website shows that from 2009 to 2018 the estimated population of jaguars in PNI-BR went from 11 to 28 animals. Considering the Green Corridor (Brazil and Argentina, the current estimated population is 105 individuals.

The NGO monitors the population of Jaguars continuously using cameras and satellite-trackable collars, studies their diet, movement, behaviour and also stimulates the coexistence of humans and big felines. Working together with the local population to prevent predation, advise on safety, showcase best management practices and install anti-predation measures to reduce predation and increase people’s tolerance. Moreover, the NGO seeks to generate alternative sources of income associated with large felines beyond hunting, highlighting the essentiality of keeping them alive.

They develop actions in municipalities surrounding PNI-BR. Through constant visits and activities, exchange of knowledge, recognition and appreciation of residents, the project seeks to establish a bond of trust and involve residents and turn them into actors in the conservation of big cats in the region / and this connection with the community is valuable.

Recent reports from the *Proyecto Yaguareté* researchers, supported by the Administration of the Park for over a decade, indicate a rising trend in Jaguar numbers within the park boundaries - according to information on PNI-AR Management Plan. The population has increased from 7 individuals in 2006 to 13 in 2014, with estimations suggesting a total of 71 adult Jaguars in the Argentina-Brazil Green Corridor. Those numbers give good evidence that the approach of the group is effective. Bosa (2023) informs that between the years of 1990 and 1995, the total number of Jaguars was greater than 400 and hunting was the cause for such a great decay.

Other significant animal species in the territory include the Giant Otter (*Pteronura brasiliensis*) - *Lobo Gargantilla* in Spanish or *Ariranha* in Portuguese, endangered (IUCN, 2021); the Giant Anteater (*Myrmecophaga tridactyla*) - *Yurumí* for the Argentinian and *Tamanduá* for the Brazilians, vulnerable situation (IUCN, 2021); the Harpy Eagle (*Harpia harpyja*) - *Harpía* (ES) and *Harpia* (PT), also considered vulnerable (IUCN, 2021); and the Red-and-green Macaw (*Ara chloropterus*) - or *Guacamayo Rojo*, in Spanish and *Arara-vermelha* in Portuguese.

The analysis of the PNI-BR identifies a lack of data for the continuous monitoring of the species as well as treats unfolding planning necessities. They include sport and cultural hunting, visitation and human activities (claiming there are studies proving a fauna decrease related to human presence), the existence of roads and consequently car run-overs) and not enough area for some species such as the Jaguar, suggesting cooperation between the parks could relieve this threat.

Car hits do not only risk Jaguars' well-being and freedom of existence, they also risk other species. The trend at the PNI-BR plan is the decrease of animal species, highlighting the need for population status evaluation and monitoring of key species. Because of that, the roads BR-469, BR-277 and *Estrada Velha de Guarapuava* are also listed as threats to the species and habitat maintenance, mentioning the need to monitor the occurrence of animals run over.

PNI-AR and PNI-AR work together as an effective corridor for wildlife, in exchange through the Iguazu River, particularly for species like the jaguar, according to the PNI-AR Management Plan (2017), once again highlighting the importance of connectivity between the twin parks.

The current situation described in the PNI-BR Management Plan (2018) reassures a “good condition” of biodiversity conservation but calls attention to a massive border effect on the conservation unit. It categorises as a tendency for the restoration of riparian forests in permanent protected areas in Brazilian territory, stressing that it’s not well maintained. The table also mentioned the decrease in protected areas because of changes in the Forest Code implemented between 2010 and 2015.

According to the PNI-AR Management Plan (2017), the biodiversity of the park is valued at three levels: genetic diversity within species, species diversity, and ecological diversity. Ecological diversity is crucial for ecosystem functioning as it involves the interaction and interdependence of living beings with their environment. Biodiversity provides essential resources for human development and offers intangible values such as aesthetic, recreational, cultural, educational, and scientific benefits.

As threats, similarly to the Jaguar diagnosis, illegal hunting activity is a key one, as well as illegal wood extraction - the plan calls for a restructuring of existing protection plans and the need for an integrated data bank. Besides that, there is also the presence of invasive species, lacking mapping and evaluation for further action against them. There are historical records of species which are nowhere to be found inside parks limits, creating the necessity of in-site research to have a better understanding of their presence or not inside the parks limits.

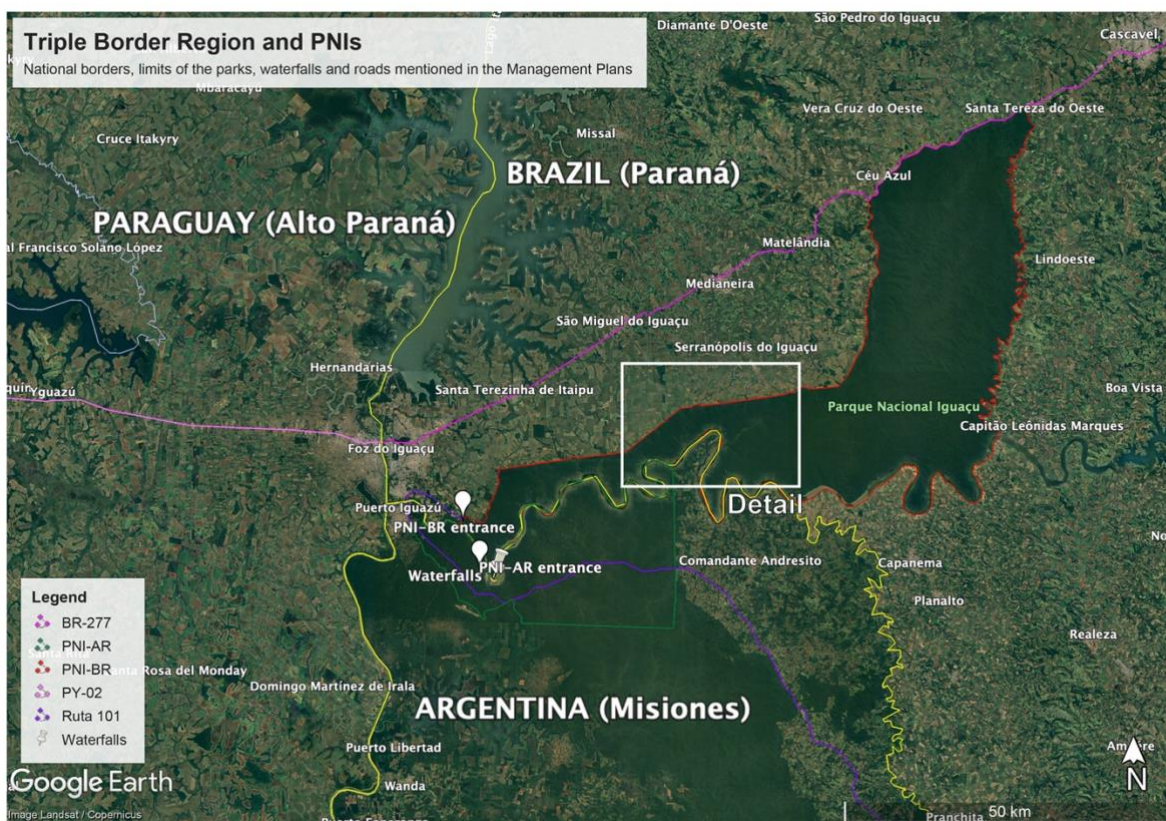
Another aspect that endangers the forest is the lack of connectivity between the national park and other forest areas on the Brazilian side of the border - an aspect already integrated into the PNI-AR plans and actions. In this subject, the PNI-BR Management Plan (2018) indicates the need to increase connectivity with other forest zones, with water basin management plans and, in the scope of this dissertation, with binational relations for research, management, protection and public use of the park. The area of the park is also listed as a threat for some species, calling for changes in territorial management.



Key species mentioned in former chapters such as the *Araucária* tree are also in the PNI-BR plan. They are present in small numbers, but in apparently stable conditions, lacking studies and mapping for tracing their tendencies. The plan suggests genetic studies as well for evaluating the viability of those plants.

Hunting, fishing and exploitation of vegetable species such as the *palmito* are big threats, creating the need to restructure the specific protection plan, as well as the environmental education plan and the surroundings involvement plan. The monetary compensation needed is also mentioned in the PNI-BR table, describing as planning necessity “Plano de envolvimento com o entorno, com alternativas de renda, como apoio ao combate às ameaças principais.”<sup>43</sup>

On the side of the habitat, the PNI-AR Management Plan (2018) described a so-called insular effect, isolating forest areas with degraded surroundings. It is visible in satellite images: the degradation of the forest, high levels of isolation in remaining forest sectors at a regional scale, and fragmentation with significant threats due to deforestation, the presence

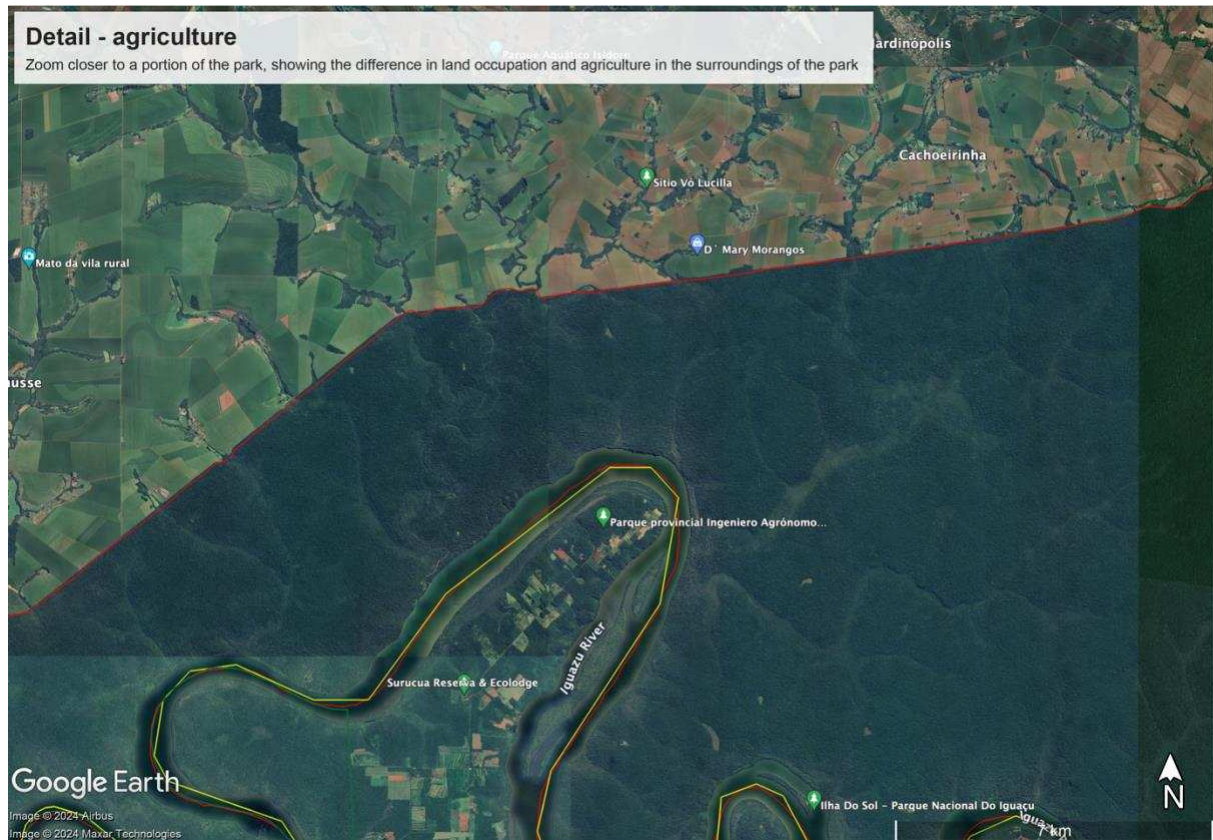


<sup>43</sup> Plan of involvement with the surroundings, with income alternatives, as a support to combat the main threats.



of roads, urban developments, and power plant chains, among other factors, are observed. This subject will be better developed in the next item and chapters.

Source: the author – note to the roads which are, according to the plans, threats to wild animals.



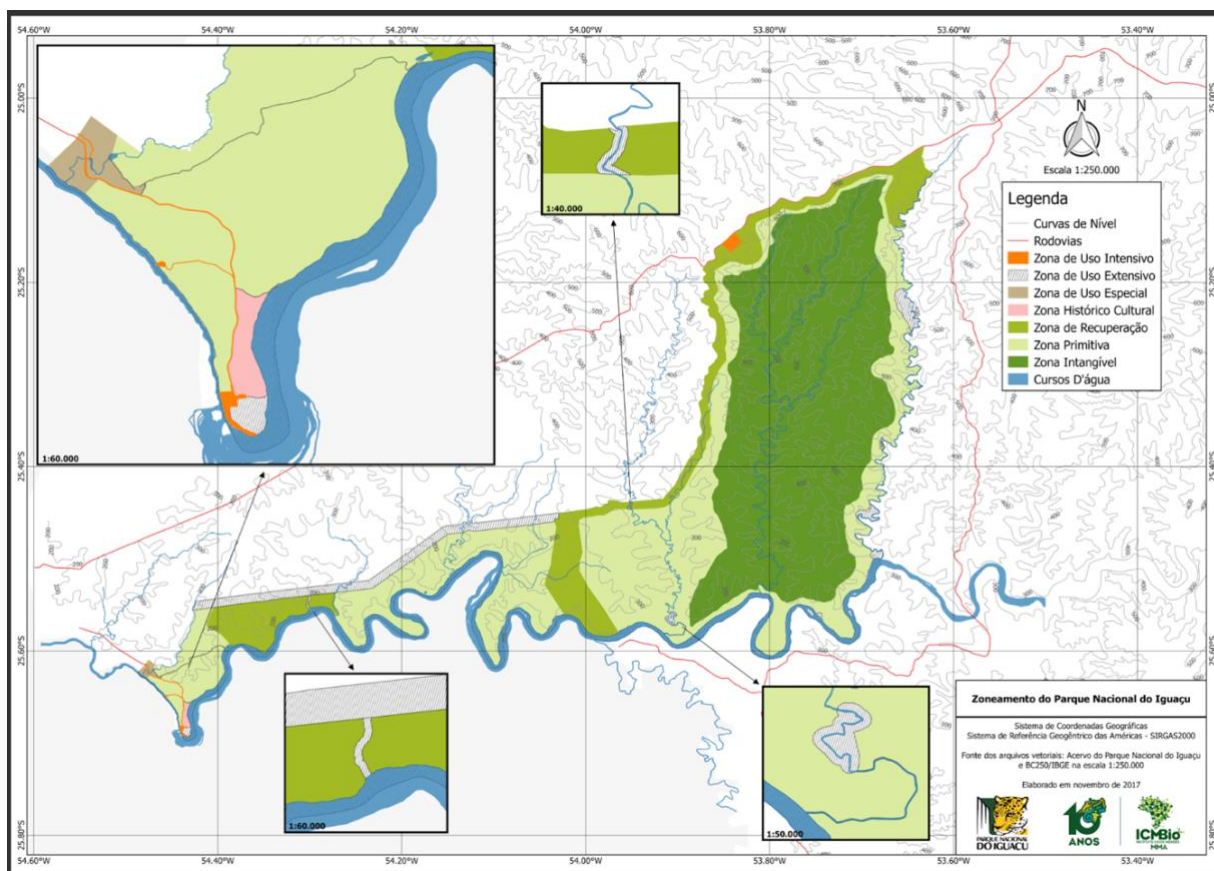
Source: the author

Systematised information for planning mitigation is the key factor of most of the threats to the forest and to its species. The list diagnoses the need for information about fishes, invasive species. The biodiversity of the parks, together with their natural formations, attract tourists from around the world, drawn to their rich flora and fauna that adorn the breathtaking landscape of the Iguaçu Falls. The region's high biodiversity, coupled with significant local and global transformation, highlights the urgent need for conservation actions to protect these biodiversity hotspots in Argentina and Brazil.

c. Cultural diversity and its sustainable relationship with the PNI surroundings

The threats listed at the PNI-BR Management Plan risking the experience of connection with nature elected as a value of the park are related to the access and areas of visitation. Price, seasonality and accessibility are listed.

According to the table, visitors concentrate in only half percent of the area of the PNI-BR – an insignificant area even when not taking the intangible zone in consideration - and the prohibition of entering the preserved area with cars is also mentioned as a factor of low numbers of visitors. Despite that, the number of visitors doesn't seem to be worrying for the parks. Numbers and interest are increasing, as presented in former chapters of this



research.

The map below, retrieved from the Zoning Map of PNI-BR shows the *Zona de Uso Extensivo*, in grey, where most of the visitors concentrate.

Zoning map of PNI-BR Source: ICMBio (2017)

It doesn't mean that the access of the population to the parks is guaranteed - as diagnosed at the PNI-BR plan, there are no free activities scheduled for the park. On the other hand, visiting the PNI-AR is not charged for inhabitants of Puerto Iguazú or underage students, and has different discounts for people from the province and for Argentinians. These measures demonstrate a bigger worry about democratisation of the access to the park and environmental education on the Argentinian side of the border. It's important to note that

PNI-BR offers *Passe Comunidade* - a discounted entrance for inhabitants of the 14 municipalities touching the park.

Difficulties of entrance control from Iguazu River and the inexistence of monitoring practices on touristic activities offered are other risk factors listed (PNI-BR, 2018). This is a difficulty the Argentinian Park apparently doesn't face, "las Disposiciones N° 056/94, 150/95 y 393/07 establecen la vestimenta obligatoria que deben usar los profesionales habilitados para poder ser identificado fácilmente como tales".<sup>44</sup> Additionally, the PNI-AR Management Plan (2017) identifies recreational activities in the Lower Iguazu River, such as jet skiing and motorboats with loud music, that result in significant negative impacts on the environment.

By looking at satellite images, such as the detail above, of the surroundings of the park, it becomes evident how modern agriculture has an unspeakable impact on the landscape. As mentioned before, there are human communities in symbiosis with the forest which need its protection outside of the limits of the park. Reduction of landscape quality is on the threats list of PNI-BR as well.

Protective buffer zones along watercourses and protected areas are not commonly present, according to the PNI-AR Management Plan. Unsustainable agriculture practices and forestry exploitation pose environmental and social sustainability challenges on both sides of the border.

The PNI-AR Management Plan (2017) mentions a substantial change in the adjacent areas to the PNI-AR (eastern, western, and southern boundaries) in land use, increased urbanisation and expansion of agricultural areas, impacting connectivity with other forest sectors. Additionally, the degradation of streams and low-lying areas due to livestock farming at the eastern boundary - is noted and worrying.

Lack of population involvement is also mentioned in the PNI-BR plan. As a measure for combating this, the PNI-BR Management Plan (2018) suggests reformulating the environmental education plan, correlating two values identified at the beginning of this chapter, as a testimonial of a holistic plan balancing out different needs and goals. It would be a nice opportunity to suggest developing educational material in different languages,

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<sup>44</sup> Provisions N° 056/94, 150/95 and 393/07 establish the compulsory clothing to be worn by qualified professionals in order to be easily identified as such

including indigenous, with tri-national distribution - reinforcing the historical and cultural bonds creating unity in the region - as it will be discussed in the next chapter.

On the other hand, the plan also lists visitors as factors for risking fauna, which needs to be taken in consideration when planning visiting paths. This value is inseparable from the former one, showing off the delicate balance between environmental protection and cultural protection.

d. Water systems and associated endemic/special communities

According to Kropf & Eleuterio (2017), the presence of hydroelectric power plants on the surroundings of the parks is one of the main concerns for the administration of both of them, since those constructions interfere with the natural flow of Iguazu River and the quantity of water flowing through the worldwide famous waterfalls.

PNI-BR identified the tendency for stricter control of chemical additives use in agriculture, as well as the need for a water quality database – which could be enriched with cooperation, and also the need for a better understanding of the socioeconomic impacts unfolded by the Baixo Iguazu Power Plant.

PNI-AR Management Plan (2017), though, emphasises the existence of other 12 power plants in Iguazu Basin, in Brazilian territory plus one planned. In the area of influence of this park, there's an Argentinian power plant, namely the *Complejo Hidroeléctrico Uruguayí*. Additionally, Paraguay also has power plants close to the Triple Border Region.

Consequently, the impact to take into consideration should be from the plants jointly - understanding their influence on the flow of the rivers, rain regimes, species presence, and other impacts. UNESCO's conservation report (2023), referencing the older monitoring reports, claims the dam operation is being conducted following conditions imposed by the Chico Mendes Institute for Biodiversity Conservation (ICMbio) and the Environmental Institute of Paraná (IAP).

The sustainability of the water bodies is deeply related to biodiversity maintenance. All the values of the parks are interconnected and joint planning - of the values and of the parks - is likely to unfold more viable-on-the-long-term responses.

The most recent UNESCO mission to the site, in 2015 happened after the World Heritage Committee asked the State Party of Brazil to invite an World Conservation Congress

IUCN reactive monitoring mission to evaluate the current and potential effects of the *Baixo Iguaçu* Power Plant project as well as the overall state of conservation of PNI-BR, which includes the areas formerly impacted by the *Estrada do Colono*. (

It also expresses pollution worries, despite the plans claiming water quality is good:

By way of response, the Park Management has established a programme of monitoring of water quality called the 'AquaIGUAÇU Programme'. Samples of water are taken from 11 effluent treatment plants in and near the Park, including two stations close to the waterfalls. Samples are also collected from receiving water bodies, for example the streams in the catchment area of the 'Represa Grande' river which runs from the agricultural zone into the Park. The water samples are tested for levels of acidity, phosphates, sulphates, nitrates, chlorine, dissolved oxygen and sediments. The results of the sampling are communicated to the concessionaire companies operating in the Park. However, pollution from the agricultural zone is a far more serious issue over which the Park management has little control. Park staff mentioned to the mission the possibility of exploring the feasibility and means of establishing with local farmers a certification and labelling system to promote more sustainable agricultural practices in the surrounding areas. (Osipova, E., & Newborne, P. 2015, p.20)

e. Cultural heritage associated with the history of the PNI

The fragmentation of Guarani territory and environmental degradation create significant challenges to cultural practices and the economic sustainability of indigenous communities. From the texts of the Management Plans, PNI-AR is more welcoming than PNI-BR for hosting cultural indigenous activities.

PNI-BR Management Plan (2018) identifies the low offer of activities valorising the culture and heritage of the park. The plan also identifies the abandoned condition of historical structures such as the dam and power plant in São João River – formerly introduced - and the old villages. São João power plant, in the limits of the park, was the first to supply Foz do Iguaçu with energy and was deactivated in the 80's after a flood destroyed the machinery within it. (Itaipu Binacional, 2013).

There was a project of reactivation of this power plant, done by Itaipu Binacional Power Plant in 2013, structured in four axes: recovery of an important historical heritage of the municipality; promotion of the concept of sustainable mobility; providing the national park with energy autonomy; and develop environmental education and technical-scientific tourism (Bley, 2013), but was never concretised.

They foresee losing the historical heritage due to abandonment or excessive use (for the ones close to *trilha das cataratas*, one of the most visited points of the park). The same

plan expresses the need for a "rescue plan" for the preservation of historic-cultural heritage, proposing a museum. As introduced earlier, initiatives in this direction are happening within the limits of PNI-BR, in partnership between ICMBio and Unila, but only on the PNI-BR.

<b>Value of the PNI</b>	<b>Broader Category</b>	<b>Challenges faced in common</b>	<b>Potentialities</b>
Waterfalls and Islands System (PNI-AR)	The Iguaçu/Iguazú Falls and Islands	dams (BR);	most visited spot of the parks - making the cultural project better known; harmonised data and joint studies
Iguaçu Waterfalls (PNI-BR)			
Parana forest and its biodiversity (PNI-AR)	Yguareté/Onça Pintada, Threatened Species & their Habitats	lack of data on endangered species; hunting; roads and run-overs; border/insular effect; illegal activities (hunting and wood extraction); discontinuity of the forest - not enough area (for some species);	replicability of on-going cooperation project in other fields. Strong points: joint actions and database, inclusiveness of the community
Threatened species in the Park and their habitats (PNI-AR)			
Special communities (particular biological associations) (PNI-AR)			
Ygaraté (PNI-AR)			
Key species for conservation actions (PNI-BR)			
Onça pintada (PNI-BR)			
Cultural diversity and its sustainable relationship with the PNI surroundings (PNI-AR)	Cultural diversity and its sustainable relationship with the PNI surroundings	hydroelectric power plants; lack of a water quality database;	officialising partnerships for building joint database and developing water level and quality studies, mirroring cultural projects from the PNI-AR in PNI-BR for including population from the Brazilian side of the border as well. propose a binational project celebrating guarani culture
Section of terra colorada on the RN101 (PNI-AR)			
Experience of connection with nature (PNI-BR)			

Environmental education and space for production of knowledge (PNI-BR)			and territorial relationship through traditional agriculture.
Water systems and associated endemic/special communities (PNI-AR)	Water systems and associated endemic/special communities	dams;	promoting Indigenous culture through legends
Water grid/systems (PI-BR)			
Cultural heritage associated with the history of the PNI (PNI-AR)	Cultural heritage associated with the history of the PNI	few activities culture-related (BR); abandoned historical structures; excessive visitors in other structures;	mirroring of cultural projects from PNI-AR on PNI-BR, including the Argentinians in the on-going partnership for reactivating the museum, using most visited areas for promoting projects.
Historical and Cultural Heritage (PN-BR)			

Source: the author

Numerous historical and modern causes have impacted the level of conservation of the property under review, as defined by UNESCO in different opportunities and by the Management Plans as well. The UNESCO conservation report from 2023 lists a number of important variables that influence the property, such as the infrastructure for land transportation, governance systems, tourism effects, and water resources. All of these elements have a part in the property's current state and are also present in the obstacles identified in the Management Plans.

The cooperation aspect is often mentioned and stimulated in UNESCO reports and on this last one (2023), the recent pandemic period was highlighted as a factor defining CBC. "Due to the COVID-19 pandemic, cooperation with the Argentine authorities of Iguazu National Park was suspended. Contact has since been resumed". Indeed, the borders became stricter during the health crisis period, making it harder for joint projects and actions to occur.

Furthermore, earlier studies from UNESCO, according to the PNI-BR dedicated page on their website, have brought attention to enduring problems like the negative impacts of tourism and leisure pursuits, difficulties with water infrastructure because of hydropower



dam construction, and governance shortcomings characterised by a lack of cross-border collaboration and disorganised development. One issue was mentioned as “resolved”, but is mentioned in the Management Plans, namely “Illegal logging and hunting”- further investigation is needed.

## **Cross-Border Cooperation**

When it comes to territorial protection and national parks as educational and leisure activity offers, the possibility of cross-border cooperation emerges as a valuable tool for fostering joint initiatives and conservation efforts in porous territories. As introduced in the first chapter, territorial cooperation is present in many border dynamics, born from territorial associationism, and bringing back together peripheral lands divided by national states’ impositions.

Territory - as a fundamental concept in border studies - together with territorial planning and protection, extends beyond mere geographical boundaries to encompass the web of ecological, social, and political interactions within a defined space (Cury, 2017). The establishment of protected areas such as the parks in question underscores the commitment to preserving biodiversity and promoting sustainable land occupation and practices across borders, creating a delimited “territorial space” (Cetolin et. al, 2012) with flexibility in its dimension (Cury, 2017). By transcending national territories, these parks exemplify the interconnectedness of regions and the shared responsibility for the Atlantic Forest and its species, as well as their cultural aspects of unification.

As the former chapters showcased, the social and environmental subjects overlap and are interdependent. The PNI-BR and PNI-AR stand as examples where cross-border cooperation showed good results in biodiversity preservation - protected areas that transcend political limits offer a possibility to jointly safeguard natural heritage. This chapter explores the potential advantages of cross-border cooperation projects within the context of these renowned national parks, taking into consideration their touristic attractiveness and vocation, the historical and socioeconomic background and the challenges presented commonly in management plans - as well as the ongoing activities.

Naturally, a dissertation cannot englobe all the issues of the territory nor deep-dive into all aspects. So, for tracing a framework, the idea is connecting the subjects and concepts



studied at STeDe and academic experiences during the course (such as the ongoing collaborative vegetable garden *Mãos na Terra*, under the coordination of professor Helder Spíndola Freitas at Universidade da Madeira) to the internship at the Association of European Border Regions (a first contact with management of European Programmes), the author will propose joint measures in ongoing activities and a culture-related cross-border cooperation project, inspired by the format commonly adopted by beneficiaries from Interreg<sup>45</sup> funds (defining partners, cycle, and expected results).

Colonisation and globalisation have left indelible imprints on the landscapes surrounding these national parks, transforming cultural identities and regional landscapes. *Tekoa Guassu* is the first social joint of the Triple Border Region, followed, as shown, by other populational confluences. The fusion of diverse cultural groups along the border regions has given rise to a unique sense of place, with their own *Cultura de Orla* (Godinho, 2021), or, more specifically, the *Iguassu Transboundary Identity* (Cury, 2010) which is reflected by the shared heritage and traditions of border communities and similarities on the rural and urban needs and conformations, as presented previously.

In light of these considerations, this chapter aims to explore possibilities in the framework of cross-border cooperation in the context of the PNIs. By attempting to visualise the interplay of the challenges found in both management plans, the cosmovision responsible for shaping the Atlantic Forest, historical legacies and valorisation of the sites, fluxes so characteristic of border regions, this study aims to find confluences and explore the potential of fostering partnerships when looking for solutions for common issues while enhancing the parks' spatial vocation of not only protecting biodiversity but also the cultural heritage of the same ecosystem.

Through cross-border cooperation inside the limits of the parks, cultural nuances can be celebrated and preserved, enriching the tapestry of regional identities in the same territory expropriated - violently - for existing today as parks. Moreover, this chapter invites a

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45 The term "Interregional Cooperation Program" (or "Interreg") refers to the tools used to improve collaboration amongst EU member states and their respective regions. According to their official website, Interreg is an essential component of the EU's Cohesion Policy, helping to reduce economic gaps and promote cohesion in the development of the regions. Interreg concentrates on tackling contemporary issues like social inclusion, digital transformation, and climate change.

reflection on the values present in different populations in the Triple Border Region: purposes of unity, balanced and cyclic use of the land and co-creation of the forest our contemporaries make such an effort to preserve, replaced, after the settlements and expel of Guarani people discussed formerly, for values of exploitation - of men, of water, of fauna, of flora and of the soil.

### **Actual Cooperation in the Limits of the Park**

As introduced, this chapter explores the potential advantages of cross-border cooperation actions within the context of these renowned national parks, taking into consideration their touristic attractiveness and vocation, the historical and socioeconomic background and the challenges presented commonly in the Management Plans. The Parque Nacional do Iguaçu (PNI-BR) and Parque Nacional Iguazu (PNI-AR), as formerly introduced, have a history of formal, but mostly informal cooperation that has played a pivotal role in preserving biodiversity and cultural heritage within these parks.

As the former chapter shows and Kropf & Eleuterio (2017) also concluded, it makes sense for the parks to come up with joint projects, considering they share

“1.elementos naturais e culturais caracterizando uma identidade comum insubstituível do patrimônio e da identidade dos povos de ambas as nações; 2.interesses e objetivos mútuos declarados na Convenção sobre a Proteção dos Sítios do Patrimônio Cultural e Natural da Humanidade, adotada em Paris, em 16 de novembro de 1972; 3.espécies importantes para a conservação que utilizam áreas dos dois parques e que poderiam ser beneficiadas com a formalização de políticas de cooperação transfronteiriça; 4.interesse na continuidade e fortalecimento da gestão e conservação dos parques nacionais fronteiriços para efeitos de conservação dos ecossistemas compartilhados, em especial através de ações conjuntas.”<sup>46</sup> (Kropf & Eleuterio, 2017, p.21)

Those authors also mention that often cooperation initiatives are done informally among the parks. They learnt about them by interviewing the managers of both parks and, according to the authors, those interviews validated the importance of themes UNESCO reports have pointed out as relevant for cooperation. “Vários exemplos de cooperação citados

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<sup>46</sup> 1.natural and cultural elements characterising an irreplaceable common identity of the heritage and identity of the peoples of both nations; 2.mutual interests and objectives declared in the Convention on the Protection of World Heritage Sites, adopted in Paris on 16 November 1972; 3.species important for conservation using areas of the two parks and which could benefit from the formalization of cross-border cooperation policies; 4.interest in the continuity and strengthening of the management and conservation of border national parks for the purposes of conservation of shared ecosystems, in particular through joint actions.

pelos gestores, principalmente em ações de patrulhamento e troca de informações, não estão evidenciados nos planos de manejo institucionais.”<sup>47</sup>

Similarly to UNESCO, the authors suggest formalising those instruments, as a measure to contribute to cross-border cooperation politics – which, according to them, would be useful not only for those specific protected areas but inspiring other conservation units in similar situations.

Harmonisation of data, according to Brustia et al (2021), was identified as one of the obstacles commonly found in borders when implementing the European Green Deal, together with different spatial dataset references for mapping and collecting data, different technical standards for environmental management criteria, the absence of an ad-hoc cross-border structure or entity in charge for the coordination of the natural site, and the absence of a joint mechanism to regulate the exchange of data.

Although this publication had a European framework, the comparison of the PNIs Management Plans together the UNESCO recommendations are evidences that those challenges also take place in this specific Latin American context. As for solutions, they also offer good inputs to be evaluated among the parks, being: set up of a joint management structure, creation of a single or unified command, harmonisation of datasets, methods and technical environmental management standards.

As mentioned previously, the Brazilian park denied being categorised as one unique transboundary protected unity, confirmed by the IUCN 2015 report:

Since the inscription of the property on the World heritage List, transboundary cooperation between the Iguaçu National Park and the neighbouring Iguazu National Park in Argentina has been subject to a number of Committee Decisions and requests. The position of the State Party of Brazil which was expressed to the World Heritage Committee at a number of sessions is that Iguaçu National Park should remain a separate World Heritage property and that creation of a joint transboundary property with the contiguous Iguazu National Park in Argentina was not desirable. (Osipova & Newborne, 2015, p.22)

Moreover, Correa et al (2020) argues that the Brazilian Federal Constitution, specifically in Article 4, item IX, provides a legal basis for cooperation between the Iguaçu and Iguazú National Parks. Additionally, the author emphasizes the international legal obligations assumed by Brazil, highlighting the indispensability of cooperation for the

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<sup>47</sup> Several examples of cooperation were mentioned by the managers, especially in patrolling and information exchange actions, but they're not evidenced in institutional management plans.

preservation of the fauna and flora of the parks as a justification for formal collaboration with Argentina.

So, setting up a joint management structure and creating a single or unified command was already rejected – but the other two suggestions - harmonisation of datasets, methods and technical environmental management standards – are potentially important tools for tackling the challenges found.

Formalising those solutions is particularly interesting for the obstacles observed in the group of values “Yguareté/Onça Pintada, Threatened Species & their Habitats” and “Water Systems and Associated Endemic/Special Species”, as suggested by UNESCO (2023), to issues such as the difficulties with water infrastructure because of hydropower dam construction. Joint studies about the impact of them should also be developed, keeping in mind the impact of Iguazu River also in Argentinian territory, after it flows into Paraná River and the worries expressed at the IUCN report by Osipova, E., & Newborne, P. (2015). Those values of the parks are intrinsically connected and depend on constant reporting and controlling.

### **Good Practices and Replicability**

As introduced, the Triple Border Region, as other border territories, share similar environments, economic activities, cultural aspects, interchange of goods and people and, as stressed by Kropf & Eleuterio (2017) and Godinho (2021), culture.

By analysing the Management Plans and comparing the ongoing projects within the limits of each park, it becomes evident that PNI-AR values the Indigenous culture more than PNI-BR. They're taken into consideration in many pieces of the PNI-AR Management Plan (2017) text and, more importantly, are the main players in two distinct cultural projects – the *La Feria Artesanal Yhary* and the *Coro de Niños*. Moreover, the plans rarely mention their neighbours and, as introduced formerly, cooperation takes place informally.

The *Proyecto Yguareté* is an excellent initiative. As mentioned earlier, it has proven its efficiency by increasing the number of Jaguar individuals (from 7 to 105 in 18 years) and, more importantly, it showcases the advantages of cooperating with the neighbours. By jointly reporting about the animals and their environment, as well as evaluating and mitigating threats, and – not less importantly – taking care of the project's management, communication and educational spheres, data is gathered already harmonised and the control takes place

under the same methodology and approach. It is a very good example of cooperation among institutions and NGOs and this approach could be replicated for other species. In consonance with this, the IUCN report from 2015 says:

Another field of cooperation where joint efforts could achieve significant results is monitoring of key species. A monitoring programme for key species within the property needs to be developed and expanding such a programme to the broader region in cooperation with the Iguazu National Park would increase its effectiveness. (Osipova & Newborne, 2015, p.22)

*La Feria Artesanal Yhary* takes place close to the entrance of the PNI-AR. The fair plays a fundamental role in the promotion of the cultural heritage of the Guaraní communities by providing a marketing space for traditional crafts made by the artisans of these communities. The fair not only serves as a place for sales but also as a meeting point where traditional craft techniques such as basketry, wood carving, the elaboration of musical instruments and traditional weapons are made known (Spaggiari, 2021).

According to the same author, it helps to revive and preserve the cultural traditions of those communities, orientating them towards the market and generating a space for enhancing their craft practices. In addition, the fair allows artisans to show their work to national and international visitors, which has provided them with tools to start other projects in their communities and in Puerto Iguazú.

The economic importance is also highlighted by Spaggiari (2021). According to the author, the fair plays a significant economic role for the Guaraní communities by providing them with a source of income through the commercialization of their traditional crafts. The sale of artisanal products at the fair constitutes an important part of the income of artisans, complementing other economic activities that they can perform.

The idea of mirroring this initiative in Brazilian territory has different goals: making PNI-BR more welcoming for the Indigenous populations rarely mentioned in the Management Plan (2018), creating a spot within the limits of the park for Brazilian-Indigenous crafters to sell their creations and, similarly to what happens in the PNI-AR, promoting cultural exchange to celebrate the cultural richness and unicity of the Triple Border Region, creating a cultural bond between both parks – the fairs should take place in consonance and, planning them together can also bring those populations closer.

By integrating a crafts fair in the PNI-BR programme, exchange with Argentinians should be encouraged. Inviting the group to sell also in Brazilian territory and exchange with

Brazilian crafters expands the sales opportunities, states the already mentioned Indigenous rights to maintain international bonds with their traditional communities and values the cultural value of crafting and the know-how.

But it's not all perfect about the fair – Spaggiari (2021) - drawing from their own experience as a professional anthropologist working within a national state agency focused on the conservation of natural and cultural heritage - claims the forest discontinuity makes the availability of raw material needed for crafting low, demonstrating the need for planning socioenvironmental measures in consonance. This aspect also demonstrates the already mentioned interdependency of the values of the parks and makes evident the need for joint actions.

When it comes to the *Coro de Niños* project, PNI-BR could invite the artists to perform in the Brazilian park – once again, creating connections and informing the visitors of the parks about the cultural bonds between the populations on both sides of the border. If well accepted, there is the possibility of an international choir, expanding the initiative and having artists from the three National States composing the region.

*Coro de Niños* is especially important for representing immaterial heritage in the Triple Border Region, being interesting for tourists and, more importantly, promoting the Guarani language through art and expression. By checking some presentations of them on *YouTube*, one learns that those children not only sing but also play instruments, being a cultural incentive for them. It also creates bonds between them and the valorisation of the Guarani culture from a young age.

As Maldaner (2016), a teacher at the Indigenous State School Teko Ñemoingo, highlights, Indigenous education should not be strict in School buildings, it's built daily. Both those projects serve educational purposes and are a good first contact opportunity for children and youth who have, on the PNIs, environmental educational possibilities.

### **Guarani relationship with the land**

As introduced in former chapters, the way of living existent pre-European settlers' arrival in the Triple Border Region was under a culture of exchange, respect and religious bond with the environment. Guarani peoples are, according to information present on the Caderno Mapa Guarani Continental (2016), one of the biggest indigenous populations in American lands.

Nowadays, they are divided into 5 major groups - Mbyá (Argentina, Brazil and Paraguay); Avá-Guarani (Argentina, Brazil and Paraguay); Kaiowá (Brazil and Paraguay); Ava-Guarani (Argentina, Bolivia and Paraguay); Aché (Argentina, Bolivia and Paraguay - all speaking their variations of the Guarani language and sharing not only the linguistic aspect but cultural ones as well.

As formerly mentioned, despite slight differences between the communities, all the Guaranis have a relationship with the territory that is integrated with religious and cultural aspects. The Caderno Mapa Guarani Continental (EMGC, 2016) offers a nice summary of this symbiotic relationship. For them, the Guarani, the land is primarily a space of life where they perform their way of living. The words "yvy" and "tekohá/tekhoa" can be translated to land and territory, respectively - note the difference in the written words from different authors. While the land holds importance as a means of production to sustain their community, it is not for the accumulation of wealth. The land is not a source of richness or exploitation.

Summarising, "Tekhoa" means a place of customs and way of life, intertwining cultural, social, and economic aspects – and that's why the word was chosen for naming the project. It represents the necessary conditions for being Guarani, integrating economic, social, and political-religious relations essential to their existence (Cury, 2010), (EMGC, 2016), (Martins, 2017) and in this context it's a concept important to be rescued - Tekhoa, as the challenges faced by the parks evokes an interdependence of subjects.

Because of Guarani's semi-nomadic lifestyle together with great agriculture skills and a non-exploitative relationship with the territory, they can be considered co-creators of the Atlantic Forest. As EMGC (2016) highlights, *their* lands and forests have caught the interest of European settlers for centuries and, more recently, from large agribusinesses and what is kept today at the conservation units is reminiscent of a forest cultivated by indigenous populations who had in the forest meanings to cultivate.

These enterprises changed the way of occupation and plantation in the Triple Border (and other Guarani territories), introducing mechanised agriculture and exploiting the Guarani people's workforce. Additionally, as the timeline of the human occupation chapter showed, many were expelled from their traditional lands (EMGC, 2016), (Navarra, 2019)

(Cury, 2010), (Marques, 2017) lacking formal apologies and mitigation of the effects of the forced leave (Navarra, 2019).

Moreover, the Guarani population emphasise the importance of cultural education, advocating for the incorporation of indigenous history and traditions into school curricula to foster understanding and respect (EMGC, 2016) (Maldaner, 2016). For the Guarani, the earth is not only a material resource, but a living and sacred element that sustains the life of their people and is intrinsically linked to their identity and cosmology, as well explained by Peralta (2020), in the already mentioned O Joio e o Trigo's podcast, Prato Cheio:

"Espiritualidade. Para nós tudo tem alma, tem vida, é um ser vivo. É da terra, é da mata, das frutas, das caças, tudo tem dono. E a água é o mais precioso, a água que corre por cima da terra é como o sangue em nossas veias. Então nós sem água não temos vida e é a água que fortalece todas as plantas. É através da água que quando a gente planta a semente, ela fica dormindo no berço da terra e quando cai a água ela acorda e começa a brotar a semente, germinar. E isso é a vida do Kaiowá."<sup>48</sup>. Peralta (2020, 11:27)

This quote summarises well the intricate relation of religiosity, agriculture and culture that the next paragraphs will attempt to valorise through a cross-border cooperation project. The idea is to draft the functioning of a cross-border cultural project of planting and involvement of the population.

### **Culture, land and agriculture – Project Tekhoa**

The occupation of the Guarani land used to be rotative and the plantation takes place in cycles – giving the impression of nomadic behaviour to the foreigners. Guarani people are distinct cultivators and had their plantation methods described in detail by Martinez-Crovetto in 1968 – specifically in the province of Misiones, AR. As already discussed, the Indigenous way of living was violently repressed – access to the land, religiosity, culture and identity was repeatedly denied.

Mamo, D. (2024) reminds us that the Indigenous populations are only 6% of the world's population and protect at least 28% of the global land surface. Their territories contain the vital ecosystems, biodiversity and carbon that are stored within. The book also quotes the Intergovernmental Panel on Climate Change (IPCC): "...securing and recognising

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<sup>48</sup> Spirituality. For us everything has a soul, has life, is a living being. They can be from the land, it is from the forest, the fruits, the preys, everything has an owner. And the water is the most precious, the water that flows over the earth is like the blood in our veins. So, we, without water, have no life and it is water that strengthens all plants. It is through water that when we plant the seed, it is sleeping in the cradle of the earth and when the water falls it wakes up and begins to sprout, to germinate. And that's Kaiowá's life.



tenure for Indigenous communities...has been shown to be highly cost-effective in reducing deforestation...and is therefore also apt to help improve Indigenous communities' ability to adapt to climate changes".

As mentioned, national parks have joint goals of fostering biodiversity, promoting environmental educational activities and offering leisure possibilities in contact with nature, promoting tourism as little harshly to the ecosystem as possible. The Management Plans of the PNIs expose some difficulties and, among them, PNI-BR's (2018) claims the visitors are interested in a small portion of the park and among the issues they face, there's the lack of involvement of the population. Additionally, when comparing the Indigenous culture-related activities offered, it becomes evident that the Brazilian side lacks initiative in this field.

Martinez-Crovetto (1968) writings are useful for having a sense of how the circularity of the plantations and the social organisation of the communities for this activity took place. Before summarising them, the spiritual character of agriculture for the Guarani should be reminded because both of those aspects will be taken into consideration for the project proposition. Additionally, as mentioned by Masuzaki (2016) and Navarra (2019) prejudice against Indigenous people is strong in the daily lives in the region. This project attempts to approximate the non-indigenous to Indigenous populations in a safe environment, where knowledge can be exchanged.

Quoting Peralta's (2020) participation in the Prato Cheio podcast once again, his explanation of the so-called "baptism of the corn" exemplifies well the deep connections among the subjects:

Nada estava pronto naqueles tempos, tinha tudo, mas não tinha alimentação. E aí veio a reza, através da reza que nasceu o milho. Com muita reza, nasceu o milho para alimentar nós – que é o milho branco, o saboró, que nós chama de acairá. Isso, passado um tempo, já teve alimentação. E o milho ele tem alma, tem vida, e é através disso que ele nos alimenta. Por isso que tem a reza também do *sutucu*, do batizado do milho, né? Porque todo ano ele vem e volta – e a reza é para ele voltar sempre, né? Pra nós sempre ter alimentação. E isso eu chamo de tecnologia espiritual<sup>49</sup>. (Peralta, 2020, 10:15)

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<sup>49</sup> Nothing was ready in those days, there was everything, but there was no food. And then the prayer started, through the prayer that the corn was born. With much prayer, corn was born to feed us - which is white corn, the *saboró*, which we call *acairá*. Then, after a while, there was already food. And the corn, it has soul, it has life, and it is through this that it feeds us. That's why there is also the prayer of the *sutucu*, the baptism of corn, right? Because every year it comes and it goes back - and the prayer is for it to always return, right? For us to always have food. And this I call spiritual technology.

Naturally, this is not the only example of religious and agriculture-related practices. Maldaner (2016) explains the importance of a Guarani sacred drink – named *Kavî* and the rituals surrounding its preparation. It highlights the role of the *Chamoi* (spiritual leader) and the participation of children and the professor in the process of making the sacred drink. The author emphasises the cultural significance of the drink and the educational aspects of involving students in traditional practices, inspiring the proposed project. It also touches upon the symbolic meanings and responsibilities associated with the preparation of the sacred drink within the Guarani community.

Melià (1990), as quoted by Maldaner (2016) highlighted that the social maintenance and reproduction of the Guarani are born from their bond with the land, functioning in a non-profit economy but a solidarity one, namely the *economia de reciprocidade mboray*. And indeed, Martinez-Crovetto (1968) claims the Guarani Harvest was not for sale – only for consumption and replanting. This aspect changed slightly recently, as Masuzaki points out

“Nota-se que a luta pela terra dos indígenas não tem como principal preocupação produzir para “alimentar a nação”. Por outro lado, em algumas ocupações, como na aldeia Tekohá Jevy, existe o cultivo da mandioca para a indústria local e na fala de lideranças de outras aldeias o interesse de desenvolver a agroecologia ou produção ecológica para subsistência. Cada uma das treze ocupações, tem sua própria forma de se organizar e pensar o uso da terra”.<sup>50</sup>(Masuzaki, 2016, p.10)

Martinez-Crovetto (1968) summarises the functioning of the *Potiro*, or the Guarani community garden system that involves prayer, singing, and baptism for plant growth, resembling a task force, highlighting the importance of land in culture, beliefs, and everyday life for these people (Zocchio & Mendes, 2020):

First, the author notes that despite adopting some globalised elements like foreign tools and Western dress, the Guarani have largely maintained traditional practices, particularly in agriculture. Martinez-Crovetto (1968) noted minimal external influence on their farming, which primarily involved adopting industrial tools and some foreign plants. The core practices, including organisation, cultivation systems, and plant varieties, reflect a long-standing cultural heritage.

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<sup>50</sup> One can tell that the struggle for indigenous land has not as main concern to produce "food for the nation". On the other hand, in some occupations, such as in the village Tekohá Jevy, there is the cultivation of cassava for local industry and in the speech of leaders of other villages the interest in developing agroecology or ecological production for subsistence. Each one of the thirteen occupations has its own way of organizing and thinking the use of land

Cultivation responsibilities such as deciding the place extent of the crop within the tribe are designated by the leader, the *cacique*, after consultations with military-ranked leaders, according to this author. Men handle the initial soil preparation, while women and children take on lighter tasks such as weeding, sowing, and harvesting. Agricultural work is a collective effort, and production is distributed according to the needs of each family.

Fields for cultivation are selected near the village, often separated by forest strips. As the crops are for consumption rather than sale, the cultivated areas are small, typically around five hectares per 100 individuals. Fields are used for four to five years before soil erosion pushes their abandonment and relocation, which may also involve moving the village. (Martinez-Crovetto, 1968) In the case of the project proposal, involve implementing it on the other park.

New plots for sowing involve girdling large trees and clearing vegetation with axes and machetes, avoiding fire to prevent damage. The process of *rozado* (grazing) occurs in May, with sowing planned for September to October. Weeds are cleared in early winter, and soil preparation takes place in August and September. Manual methods are used for weed removal and pest control. Harvesting is done by hand, with tuberous roots like *mandioca* extracted using shovels or hoes. Due to the lack of storage facilities, crops are collected as needed, with some corn and beans saved for future planting or dried for preservation. All of those aspects are intended to be integrated in the proposal.

Still on the time subject, Martinez-Crovetto (1968) explains the crop rotation system, which consists in sowing corn for two consecutive years on the same plot, followed by a year of rest and bean cultivation, and then returning to corn or tobacco. Those with dairy cows plant *kapi'i pe* grass to feed them, which helps control weeds and prevent soil erosion, with corn generally yielding better results than beans on new plots.

The Guarani cultivate a variety of plants for consumption and practical use, including several types of corn, squash, pumpkin, beans, manioc, sweet potatoes, watermelons, melons, peanuts, tobacco, and more rarely sugar cane, papaya, and bananas. Horticulture is limited to small plots of onions and chives, and gourds are grown for use as containers. (Martinez-Crovetto, 1968)

His writings are a good starting point for the cross-border project introduced at the beginning of the chapter: creating a cross-border cultural project, taking place in rotative and

participative vegetable gardens, similar to the ongoing project at Universidade da Madeira – Mãos na Terra – in the sense of involving the community, and universities and sharing agroecological knowledge – and different at the same time, taking place in the limits of national parks, having as goal promoting a specific culture and holding touristic interest.

a. Scope of the project

The project Tekhoa has as its main goal bringing more aspects of the cultural heritage and cosmovision of the Guarani population to the limits of the PNIs, seeking to fill this identified gap in the Brazilian park and collaboration among both PNIs in a shared field – the indigenous occupation of the region. The idea is to create cyclic vegetable gardens (one turn in each country) and to involve different publics while cultivating according to the traditions – consequently bringing crop-related rituals to the activities foreseen. The culture valorisation goal is not the only one of the project – it comes together with enlarging touristic activities offers, targeting groups of tourists more interested in local experiences as well as educational purposes – both in partnership with scholar institutions and the local inhabitants who might have lands of their own and hopefully, afterwards, implement less harmful types of agriculture and mitigating the forest insular effect on the parks.

b. Partners to Involve

The first and main actors are the administration authorities of both parks and, as the table of the management structure shows, the responsible for research, management and conservation and environmental education in the PNI-BR, plus those responsible for environmental management and education in the PNI-AR. Together, they should identify Indigenous communities to be involved in the initiative and formally invite their *caciques* – to compose a cross-border board for managing and adjusting this project.

For educational purposes, a study of the viability of involving schools – best age to invite, what should be done jointly – and include the neighbours from Paraguay as well. Still in the educational field, promoting the project among the local population – urban and especially rural – to join the vegetable garden activities, involving the population and creating a sense of community around the project. Last but not least, the board should identify Brazilian and Argentinian universities to firm partnerships – similarly to what PNI-BR and Unila are doing about built heritage mentioned in the former chapter – offering educational opportunities for many fields (for example: the courses of agronomy could jointly report the

soil quality on the vegetable gardens, unifying methodologies and created already harmonised database, the courses of design could create informational and dissemination material for the project, etc) and international working experience through internships or other extension programmes fostered at the project.

c. Where to Implement

As Martinez-Crovetto (1968) explains, the Guarani way of cultivating the soil is in cycles. He mentions a 5-year plantation cycle before moving on to the next plot. Because of that, the idea of Project Tekoa is to implement the project in phases of 5 years, being the first one in the PNI-BR area – justified by the issues identified: lack of cultural projects, visitors focused only on a small portion of the park and not enough engagement of them. After this period, the next vegetable garden should take place in PNI-AR.

Also, as mentioned, the leader of the community or *cacique* is entitled to choose the spot for the *potiro* – an aspect that the project intends to keep as long as respecting the use of soil directives, excluding the *Zonas de Uso Extensivo* – one of the goals is spreading more the visitors in other areas of the park - and not entering the *Zona Intangível* – zoning rules does not permit visitors (ICMBio, 2017). One idea is to locate it in one of the three portions of *Zona Primitiva* – which has as goal promoting environmental education and is present on the border, but the decision should be in the hands of the *caciques* (and approved, of course, by the head of the parks).

d. Phases and cycles

First, there's the need for a planning phase. The organs from both PNIs mentioned above should make a kick-off meeting to align expectations, discuss the roles and responsibilities and the budget. Then, the first actors to get involved are the Indigenous communities and their leaders – identifying and inviting them – they are the core of the project for holding the updated knowledge about cultivation methods and timelines. Naturally, they should be compensated financially for their work. At this point, the piece of land can be chosen by the *cacique(s)* for the first cycle of the vegetable garden.

Next, the board should invite the education-related actors: to identify universities and schools to be involved in the project and define a calendar of plantation. Partnerships with local governments are very welcome in this process. This way, a schedule can be drafted with the confirmed institutions, identifying the best moments to have each one of the groups in

the parks and varying the activities they engage in, depending on the goals and specificities of each group to be involved.

Once the agenda is drafted, the project should be disseminated among locals – offering a series of workshops for implementing less harmful plantation methods on their lands – and hopefully transforming the landscape through culture and popular participation. The viability of financially compensating the farmers to attend the workshops should also be studied by the board, considering attending those events would take time they dedicate to their own agriculture activities and it is advantageous for the parks if the project is well received by the local farmers who will, by implementing agroecological methods, diminish the forest insular effect and improve the biodiversity well-keeping of the parks.

Once all the partnerships are formalised, the project plan and an activity calendar drafted, the implementation phase should start – the suggested duration of this phase, as mentioned, is 5 years – but this also should be consulted with the *cacique(s)*.

The first cycle should function as a pilot action, foreseeing room for evaluations and adjustments. All the events planned for the vegetable garden should agree with the plant's cycles. Types of crops and methods should follow Guarani traditions and cultural events – such as the preparation of the *Kavî* and related rituals can be an attraction for the visitors of the park.

Involving guests of the park in vegetable-garden activities is a way of promoting experience-based tourism and diversifying the type of offers available as well as the places they get to know – considering only a little portion of the park – the Falls - attracts most of the visitors. For students, it's a long-term extra-curricular activity that, as mentioned Maldaner (2016), is welcome in inclusive school curricula, enriches the cultural load of the students and promotes better inclusion of indigenous students – one idea is to have the groups visiting the park in different moments of the garden and not only planting/harvesting but including cultural and environmental education in the visits. Finally, involving scholars should also be done in different moments, to be defined jointly among universities, depending on the study subject they have in mind, bringing scientific reports, analysis and other deliverables for the well-functioning of the project.

Once the period of the first *potiro* ends, similarly to the tradition, the plantation site changes. At this point, an evaluation period should take place and afterwards, starting the

next cycle in the PNI-AR, adapting changes that might be needed and improving overall what hasn't worked well. Academics could continue their research on the plot after the plantation cycle finishes to understand the long-lasting impact of this type of culture in comparison to extensive agriculture.

e. Expected results and deliverables

As introduced, the project scope aims at different fields simultaneously. On the parks' side, the expectation is to diversify the tourism offer, attract people with sustainability and cultural interests and, in the future, diminish the insular effect of the protected area through culture and education.

For the Indigenous population, the results should be a better acceptance of their culture and a better general knowledge of their history, spaces for cultivating with scientific support if needed, valorisation of their cosmovision and rituals, and re-integration of cultural practices.

For the school students involved, it would be a culture-enriching opportunity, planned visits to the parks and their other attractions, bonding with peers from the other countries of the Triple Border and language learning (Guarani, Portuguese and Spanish). The material they produce on the cultural events could be used for promoting the project for the next year students and, at the end of 5 years, gathered as documentation of the project and maybe published.

For academics, on the one hand, the project offers science-related opportunities such as extension projects and broad research possibilities for many fields; on the other hand, they create a joint database with investigation results and raw data for future planning and adaptation of further phases of the project.

Implementing measures to officialise the different cooperations among the countries, making an effort for harmonising data, mirroring good practices from the other side of the border while merging or hosting projects and implementing Project Tekhoa are tactics to bring together the populations across the border, boosting the tourism

## **Conclusion**

Studying border regions and their dynamics is per se a multidisciplinary field which englobes historical, cultural, sociological, geographical, environmental and political subjects.

Having some concepts clarified under the optics of many authors and understanding the main lines for tracing a common ground of border territories were useful for the development of the research. Those authors dedicate their work to the borders subjects and, as introduced in the first chapter, the Triple Border Region is a perfect example of local-global dynamics unfolded by colonialism and the consequent development of globalisation.

Having a broad overview of key aspects of the territory, as the holistic methodology of the STeDe course, gives the researcher a panorama of the main players in the dynamics of the specific territory and transformations occurring over time. Literature expresses the richness of the biodiversity, the unicity of the landscape and the importance of water bodies in the Atlantic Forests in the Triple Border Region.

For this research, some actors were mentioned in most of the bibliography about the site consulted, namely the Guarani population originally from the territory, the Spanish settler Cabeza de Vaca, the territorial disputes and among the three countries, their similar military influence and timeline, the Itaipu Binational Hydroelectric Power Plant and finally the two Iguazu National Parks. Special attention was given to agreements and diplomatic dynamics, to give a better sense of how the National States interact and position themselves overtime. Specific data about the key cities also made evident that the realities are similar and confirmed the porous characteristic of the borders proving the regional internal fluxes, as the key concepts chapter introduces.

The same applies to the parks: a diverse bibliography was consulted, aiming for a broad overview together with specificities. The categories of environmental protection and the international recognition of their values make the importance of the twin parks evident and understanding their history, military influence and unsuccessful trials for a unique transboundary protected area introduces some deadlines to cooperation. Despite that, both parks cooperate informally, proving the power of territorial associationism and how cooperating with neighbours can bring advantages in many areas.

Studying national parks is indissociable from tourism and education aspects, as stressed many times, those are the joint goals of such spaces and because of that were the core of the proposed project. The differences in their Management Plans, especially when it comes to Indigenous communities, make evident that the Argentinian park management is more inclusive and respectful of the territory's history. Additionally, this park is more



inclusive for people with reduced mobility and vision, and this is an important aspect to highlight.

Comparing the Management Plans of the park is a strategy for understanding the differences of functioning, priorities, strengths and weaknesses of them. When contrasting the PNI-AR and PNI-BR Management Plans, the confluences among them become clear: they share the same goals, have pretty similar functioning, attractions, protection legislation, elected similar values and tackle many challenges in common. By this exercise, and reading other authors, it becomes clear that cooperation is not only possible but encouraged.

The mentioned challenges are the core of the analysis. Most of them were not only identified by the plans but by UNESCO as well. The interdependence of them also became clear when comparing the plans, connecting to Guarani cosmovision, as showcased. Additionally, it is worth mentioning that many authors and UNESCO themselves incentivise and identify the need for strengthening cooperation among the parks. Unfortunately, the research shows that CBC is not as implemented as could be due to, not exclusively but an important factor, a lack of political will from the Brazilian side.

Cross-border cooperation emerges as a tactic for jointly overcoming some of those challenges. It is an instrument for formalising the ongoing cooperation and harmonising different data – one of the most mentioned needs in the Management Plans - and for replicating successful initiatives, enlarging their reach and reaffirming the unity of the region by creating projects such as the proposed Project Tekhoa for enhancing cultural heritage and its valorisation at the same time as creating touristic offers and educational opportunities. With Guarani culture valorisation and cross-border cooperation, the parks can become a symbol not only of biodiversity protection but of a borderless Triple Border Region, a tribute to the original occupants of the area and the culture that perceives the forest not as a resource to be exploited, but as home.

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## **Declaration of Mobility**

This thesis is the result of the Joint Master's degree in Climate Change and Diversity: Sustainable Territorial Development (CCD-STeDe).

This program is offered by a consortium made up of the following universities: Università degli Studi di Padova (UNIPD, Italy), The Universidad Andina Simón Bolívar, Sede Ecuador, Universidade da Madeira (Portugal), the University of Johannesburg (South Africa) and Université Joseph Ki-Zerbo de Ouagadougou (Burkina Faso).

This program has a duration of 24 months. The course started at UNIPD in Italy, for the first semester. The second semester was spent at Universidade Da Madeira, Funchal (Portugal). The third semester was blended with the international Summer School in Madeira island (Portugal). The fourth semester was spent for internship and thesis at the Association of European Border Regions, in Germany under the supervision of Alessio Surian (UNIPD) and Domingos Rodrigues (UMa).

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