Hydropower at the Frontier of Urbanisation

Mediating Cosmovisions and the Climate Crisis in the Brazilian Amazon

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HYDROPOWER AT THE FRONTIER OF URBANISATION: MEDIATING COSMOVISIONS AND THE CLIMATE CRISIS IN THE BRAZILIAN AMAZON.

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ABSTRACT:

The Belo Monte Hydroelectric Dam on the Lower Xingu River has severely affected the river's water pulse and threatens a multitude of endemic species and indigenous nations. A great number of dams are expected to be constructed in the years to come in the Amazon river basin which will bring further devastation. Historically, Indigenous and local populations have always opposed such endeavours and the preservation of biodiversity and forests within their territories is crucial to decelerate and revert climate change effects. Indigenous nations steward and protect over 80% of the world's biodiversity even though they are only 5% of the world's population. Despite this, defence of indigenous rights and land demarcation has been slow. Moreover, recommendations to expand hydropower generation have gained traction to enable the energy transition, as seen in last year's Glasgow COP26.

This proposal exposes the impact of Belo Monte dam on human and non-human existences and proposes an analytical framework which envisions the territory through a multitude of perspectives as well as various management arrangements. This framework intends to propose methods which can facilitate shared occupation and enable the coexistence of diverse groups in the region through policy and design.

The limits of urban practice when acting over such territories must be questioned and re-defined. If our field intends to position itself within such regions, we must begin to propose an alternative paradigm which can adequately territorialize cosmopolitics. Is *Cosmourbanism* achievable?

KEYWORDS:
Amazon, Xingu River, Belo Monte, Hydropower Infrastructure, Mediation, Cosmopolitics

1. INTRODUCTION

Hydropower Infrastructure is a fundamental artefact to comprehend the materialisation and territorialization of Brazil within its territory. Utilising infrastructure such as hydropower dams, the state consolidated its grasp over the vast Amazonian region and articulated its systems to transform a territory once considered as a green untouched frontier into a region with multiple operationalized landscapes (Brenner & Katsikis, 2020).

This paper is a product of the themes developed from Lucas de Gioia's Master in Urbanism Thesis research at TU Delft, defended in July 2021, within the Transitional Territories Studio which is part of the interdisciplinary research group Delta Urbanism of the Department of Urbanism, Faculty of Architecture, and the Built Environment. Under the mentorship of Dr.Taneha Kuzniecow Bacchin and Dr. Diego Sepulveda-Carmona, the research looked at the spatial, social and ecological impact of the Belo Monte Hydropower Dam Complex in the Xingu River Basin, specifically in the region around the Volta Grande do Xingu which happens between the Pimental Dam and the Belo Monte Dam and its reservoir in the Municipality of Altamira in the state of Pará, Brazil.

This article will be structured in 6 parts: Contextualization of the Amazon region, its people and ecology and the role of hydropower infrastructure; Defining Mediation in its varied forms and worldviews; The development of a framework to read territories through various worldviews; The Designed Results applied to the Case of Belo Monte and the Xingu; A critical review of the designed outcomes; and finally, concluding reflections for further research.

This paper proposes a discussion regarding the approach of Urbanism as a practice towards landscapes rather than presenting applicable solutions. The value of the work presented lies in the questions posed to our practice. Recent urbanism theories (Landscape and Ecological Urbanism) have brought forward alternative paradigms sensitive to natural and social conditions to counter the effects of the modern project in the production of urbanization.
However, in territories such as the Amazon region, existences have developed other forms of territorialization, and if we are to appropriately redefine our field's practice within such landscapes, we must also define its limits in terms of design methods.

2. Contextualising Hydropower Infrastructure and the Brazilian Amazon.

Brazil has an extensive layout of rivers which are considered viable for hydroelectric infrastructure implementation. During the military dictatorship (1964-1984) Hydropower infrastructure was seen as a crucial tool for development and territorial control. The legacy of this project still lives on today, since 62% of Brazil's energy needs are supplied by hydropower, consolidating its place in the nation building imagination of Brazil.

Since colonisation, South America has always been a territory of resource extraction given its fertility and resource material richness. From then onwards, urbanisation was developed in conjunction with resource extraction throughout the continent (Riséiro, 2012). The provision of large and reliable amounts of energy was necessary to sustain this economic model, normally at close range to extraction sites which in many cases, were in complex topographical and sometimes inaccessible areas (Moretto et al., 2012).

The Amazon rainforest plays a vital role in sustaining life on the planet. It represents 60% of the world's remaining rainforests (Butler, 2019; World Bank Group, 2019; WWF, n.d.) and is responsible for global ecosystemic dynamics, providing water for 70% of South America (Butler, 2019), via its roughly 390 billion trees which act as a crucial carbon sink, a third of all worldwide carbon stored by tropical forests (Butler, 2019). Because of deforestation, the amazon's hydrological cycle as a whole is close to a tipping point. The transformation of vast amounts of the forest into savannah and semi-arid shrublands are leading to cataclysmic and irreversible degradation (Lovejoy & Nobre, 2019; IPCC, 2022).

The Brazilian Amazon is home to around 180 diverse indigenous nations which have resisted and learnt to re-exist within this changing forest ever since European settlers colonised the land. Indigenous people have inhabited and constructed the forest for millennia (Durán Calisto, 2019; Tavares, 2016). Regions and territories under their stewardship have seen little deforestation (Moloney, 2020) and have even enhanced the biodiversity given that their forms of forest management allow for its regeneration (Durán Calisto, 2019).

Within the Amazon sits the Xingu River Basin, home to one of the most significant and extensive nature reserve corridors in the world, with around 28 million hectares, 56% of the basin's total area. This corridor is home to 19 nationally recognized indigenous territories which house 24 indigenous nations (Guerrero, N., Junqueira, P. et al., 2012).

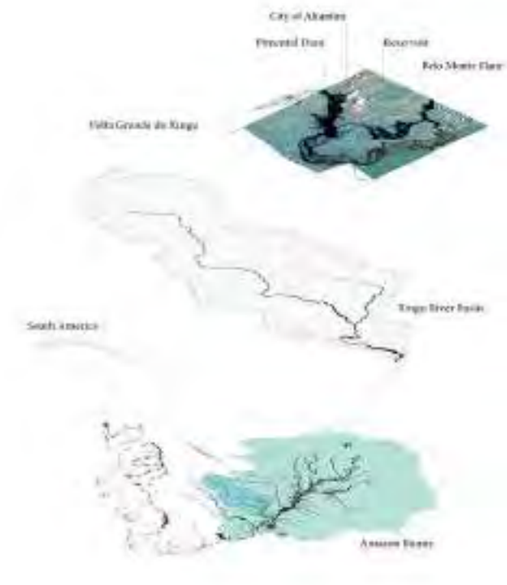

Figure 1. : The Xingu River Basin. Source: The Author, 2021.

The basin sits within the amazon's "deforestation belt", an area at the frontier of processes of extended urbanisation (Monte-Mór, 2014), presenting the highest numbers of deforestation in the whole Amazon region. The basin's fauna and flora is mostly protected within the areas demarcated as

indigenous or ecological reserves and sustainable extraction reserves (*RESEX: Reservas Extrativistas*) although most deforested municipalities in the country lie within the basin.

Figure 2. : Characterizing the Volta Grande do Xingu. (1) The Reservoir (2) Belo Monte Hydroelectric Dam (3) Lucicleide Kurap of the Munduruku village of Dace Watpu has a moment with a pet parakeet after washing dishes in the Tapajos River in Para State, Brazil. Sources: Wikicommons and Aaron Vincent Elkaim, 2016.

The Xingu River is characterized by a rocky river bed and large river islands, but it is in the Volta Grande do Xingu, on the lower river section that an extension of around 130km of rapids and waterfalls forms an impressive natural landscape, home to 26 of the 63 endemic species of the basin. The variation of water levels throughout the year can vary from highest to lowest by a factor of 10, drastically altering the landscape, its ecologies and the survival of native species.

2.1. Political Considerations.

The land known as Brazil today, is characterized by exploitation and extraction since its colonisation. Although there have been large changes in culture, society and its spatial configuration, the approach towards the natural landscape remains one of domination. (Tavares, 2016). During the military regime of the 1960s-80s, the state feared the loss of sovereignty in the Amazon and envisioned its integration in service of the country's modernization and development through investments in large infrastructure projects and strategic territorial urbanisation (Becker, 2001; Brandao, & Siqueira, 2013; Calisto Duran, 2019; Kozlowski, 2020).

Infrastructure projects followed planned and designed vectors of occupation (Tavares, 2016), which looked to promote urbanization in strategic regions with high natural resource deposits. Consolidating national sovereignty in this region was primordial for a government which planned an Amazon to serve long term economic development aspirations to fuel industrialization of the highly urbanised southern regions of Brazil (Becker 2015, 2010, 2001; Nascimento, 2017). With the global oil crisis of 1973, national development energy plans shifted towards Hydropower which was a more reliable and endogenous source of energy (Kozlowski, 2020; Nascimento, 2017).

From a socio-technical perspective, hydropower embodied both the supply of and a tool to consolidate power. Infrastructure serves as both vector and is a catalyst of a specific form of urbanisation, known as *extended urbanisation* or *frontier urbanism:* (Becker, 1988; Monte-Mór, 2014) Strategic in terms of proximity to resources and logistic routes as well as geopolitically consolidating the state's presence in the Latin American region. Infrastructure is essential for the reproduction of urbanisation and its networked explosion over the hinterland, extending relationships of core and periphery throughout the territory, (Graham & Marvin, 2002) serving capital accumulation through the transformation of nature into commodities. This operationalization of the territory radically transformed social relationships as well as established common notions of dependency between urban and hinterland. This capital agglomeration functions at a networked and planetary scale, where many zones of primary commodity production are not articulated directly to major cities or metropolitan regions, but "to other productive landscapes of cultivation, extraction, processing and distribution, which are in turn embedded and intermeshed within an intercontinental logistics space" (Brenner & Katsikis, 2020).

2.2. Ecologic / Climatic Considerations.

Hydropower demands serious attention regarding its ecologic and climatic effects locally and globally. We must consider the viability and complexity of *sustainable* discourse which argues in favour of hydropower as "clean energy", and thus, in times of climate crisis, reframes this infrastructure as a viable replacement for carbon based energy production given its considerably smaller greenhouse emission effects comparatively. At the 2021 26th COP in Glasgow, Hydropower saw considerable institutional support and even a strong push to receive direct investment from climate bonds, enabling this technology to be promoted as a plausible solution to transition into more sustainable forms of energy generation, despite their acknowledged ecological and social "negative externalities". (International Rivers, 2021). In the most recent IPCC assessment report, Hydropower is presented as a viable and mostly positive alternative, where most of its negative impacts and externalities are subject to mediation procedures (IPCC, 2011).

Due to the historical development of hydropower implementation in the Amazon, ecologies have suffered greatly presenting loss of biodiversity and habitats, unregulated river pulses and still water, sedimentation and disrupted fish migration(Fearnside, 2006; Guerrero, N., Junqueira, P. et al., 2012). The disruption of the Xingu River pulse by the Belo Monte Dam saw a stretch of about 130km critically reduced in waterflow, disrupting ecologies and habitats to a point where many species risk serious threat of extinction. Road infrastructure built to access dam construction sites facilitated encroachment in protected areas of forest degrading the biodiversity even further to a level which threatens the basin's capacity for water provision(Guerrero, N., Junqueira, P. et al., 2012; ELETRONORTE, 2009).

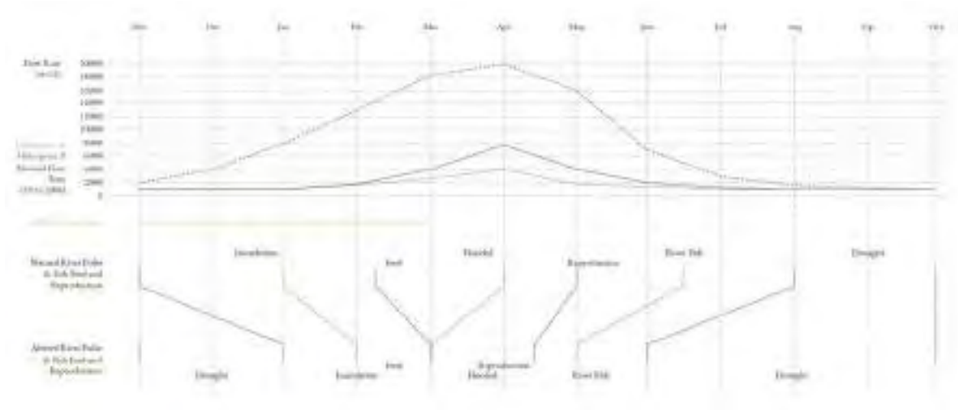

Figure 3. : Consensus Hydrogram & River Flow Diagram. Source: The Author, 2020. Data: De Olho no Xingu, 2019.

On the southern continental regional scale, the Xingu River Basin sits within a continental water system, where its springs are directly dependent on the precipitation brought by what is called the “Continental Biotic Pump” (Lovejoy & Nobre, 2019). The respiration process of the Amazon rainforest pulls a great volume of moisture from the Atlantic ocean, deep into the continent. When it hits the Andes mountain range the moisture is diverted to the Southeast of the continent, precipitating over basins, water reservoirs and crops along the way.

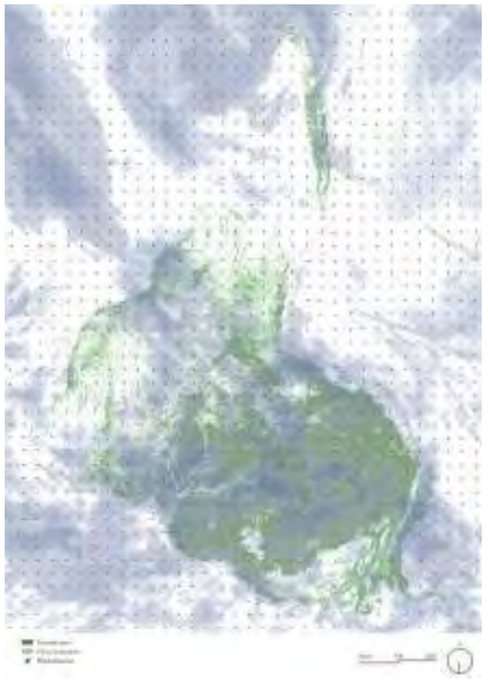

Figure 4. : The Continental Biotic Pump.
Source: The Author, 2020. Data: Lovejoy & Nobre, 2019.

2.3. Societal / Cultural Considerations.

Brazil’s Constitution of 1988 protected Indigenous rights by securing their ways of life, defining territorial demarcation and even self-governance levels within these territories. The recognition of the indigenous existence, prior to the existence of the state itself, was a radical shift from a legal perspective, recognizing Brazil’s embedded colonial condition. Nevertheless, the model of development replicated in the Amazon still does not favour the demands and rights of local existences but of the larger urban centres and economic corporations of Brazil and the world.

Prior to the 1988 Constitution, the Brazilian state looked to indigenous nations as non-citizens since they were not under state influence, (Tavares, 2016; Castro, 2002; 1996). “integrating” only granting citizen rights, even if they were left impoverished and unassisted. All Indigenous State institutions formed were conceived to regulate and control their territories and bodies (Castro, 2002; 1996). Through various overlapping processes of demarcation and claims from a multi-agency process of territorialization, the amazonian landscape assumes different characteristics and uses leading to a fragmented occupation and uneven development, overlapping intentions of preservation, stimulation and exploitation.

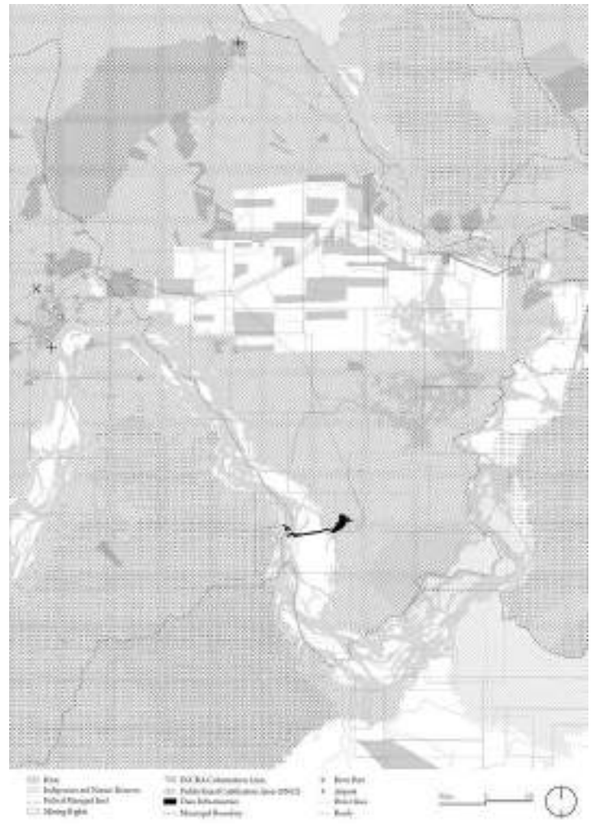

Figure 5. : Sovereignty: A Patchwork of Territorial Claims. The Author, 2021.

In the lower Xingu River, The Juruna (Yudjá) canoeing and riverine People inhabit islands and peninsulas. After continuous colonial persecution most of this nation fled upstream while a few held back in the Volta Grande do Xingu region, intermarrying with settlers and other indigenous groups. Because of the construction of Belo Monte Dam, fish ecosystems were disrupted which threatened the livelihoods and traditions of these people, forcing them to move from their lands and into new urban peripheries, further losing touch with traditional ways of life (Guerrero, N., Junqueira, P. et al., 2012). Belo Monte and plans of other dams in the basin, mobilised the Juruna and all other basin nations to resist the implementation of these projects.

Local and indigenous populations comprehend the importance of maintaining the land and ecologies stabilised so that their needs can always be cared for, allowing for sustainable processes of inhabitation and even natural biodiversity enhancement (Durán Calisto, 2019; Tavares, 2016). This is due to their cosmovision which defines all living beings as humans, even rivers and mountains, and not as commodities (Krenak, 2019; Castro, 2002; 1996).

Modernity’s requirements for consumption and nature’s capacity to sustain this model has led to the desynchronisation between natural, social and economic systems (Recubenis Sanchis, 2020). This is defined as the Anthropocene, driven by the impact of human activities on the Earth System

(Steffen et al., 2015). The impact of this geological epoch has affected our climate and ecosystems, threatening earth's biodiversity. Although all life will face the consequences of desynchronization, some are already experiencing this more than others. Indigneous people are already living through an extinct version of their world, only being able to re-signify their existence into one: resistance towards modernity. The climate urgency is one of *a* humanity, imposed upon every existence on the planet. This "humanity" is battling to save its own existence, not of every existence (Krenak; 2019).

The modern worldview is but one of a *multiplicity* of worldviews which exist on earth. For Amazonian indigenous nations, nature isn't a resource for mercantile exchange and exploitation but rather a system of life where humans and their activities are a part of the system, not above it (Krenak, 2019). Cosmopolitics (Stengers, 2010) presents a theory of the existence of more than ethnographic perspectives on a "single world" (the common "thing"), to one where we actually inhabit a pluriverse. When referring to Amerindian indingoeus peoples' cosmologies, we should not "refer to different cultural perspectives on the same "thing," but to altogether different (albeit not unrelated) things" (Latour, 2004). The urgency here lies in developing a conversation on equal terms with shared intentions.

3. Mediating Worlds.

Mediation is one of a variety of procedures to solve conflicts, and is fundamentally based in voluntary participation of the involved parties, where an intermediary facilitates communication between parties with the intent of enabling them into taking responsibility for resolving disputes (Brandao Barrios, 2020; Brogan & Spencer, 2007).

Within modernity, mediation is structured within jurisdiction constraints and processed by institutions which view mediation as an alternative practice, not commonplace (Brandao Barrios, 2020). The notion of fair justice within modernity has been conceptually constructed through punishment of the offender. On the other hand, Brandao Barrios (2020) explains that in indigenous communities "justice is to restore the peace and equilibrium within the community, and to reconcile parties". In this sense, the purpose is not to punish but to restore coexistence conditions. This is important to consider when proposing ecological and social mediation in the case of Belo Monte in the Xingu River.

There are important examples of how Modern institutions and legislations have attempted to re-imagine entirely their processes of governance from a indigenous worldview approach in South America. Ecuador approved a new Constitution in 2008 repositioning the state's perspective and its apparatus towards Nature with the indigenous concept of Pacha Mama (Mother Earth). This allowed for nature and human life to be equally represented (Gudynas, 2019). The Sao Paulo - Brazil Guarani Green Belt State Legislation Proposal in 2016 (PL181/2016) seeked to strengthen Indigenous lands around the City of Sao Paulo giving them Biosphere Reserve Rights and extending and patching other existing nature reserve areas forming a green belt around the city to sustain ecosystem services (Bonduki, 2021). This patchwork allows for the strengthening of ecosystemic dynamics, facilitating their governance and accountability.

3.1. Procedures for Territorial / Spatial Mediation.

In the case of Belo Monte Hydropower Dam and the Xingu River mediation must intrinsically consider spatial and territorial implications. Given that Urbanism is a practice that necessarily influences and manipulates space, the possibilities for *mediation by design* over frontier territories of modern urbanisation must be revised. As Boehnert (2018) explains "Design mediates social relations (...) that shape how we live and the ways we experience and relate to each other and to the material space we live in. Design can also work to normalise new circumstances and relationships by making ideas, artefacts and spaces seem acceptable, even when grave injustices and ecological harms are done." In this way, Design has the intrinsic capacity of mediation since it may act as an interface to produce common space for dialogue and coexistence within and with space.

If the conflicting territorial conditions present are a consequence of territorial planning and occupation strategies of a Modern worldview, then we must look at paradigms which critique it. Ecological Urbanism (Farr, 2011) proposes the necessary paradigm shift to deal with the systemic complexities of such frontier territories in the Amazon. This is given that it defines and proposes design and urbanisation from the landscape and its ecologies, to achieve more coherent and balanced designs, especially in face of issues such as climate adaptation and spatial justice.

"We need to view the fragility of the planet and its resources as an opportunity for speculative design innovations, rather than as a form of technical legitimation for promoting conventional solutions. By extension, the problems confronting our cities and regions would then become opportunities to define a new approach. Imagining an urbanism that is other than the status quo requires a new sensibility—one that has the capacity to incorporate and accommodate the inherent conflictual conditions between ecology and urbanism. This is the territory of ecological urbanism." Mohsen Mostafavi (2010).

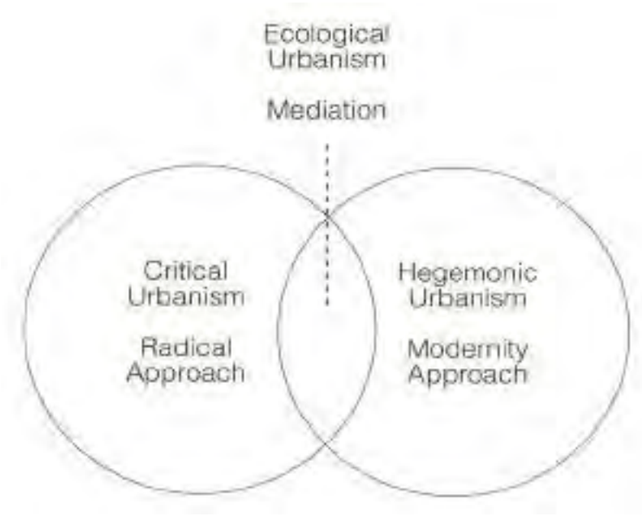

Figure 6.: Positioning Ecological Urbanism. Source: The Author, 2021.

3.2. Mediation Principles: Identifying Values for Coexistence.

Through indigenous practices for mediation (Brandao Barrios, 2020), effective synchronisation of landscape transformations and social systems changes could be achieved to reconcile worlds and cosmologies. To begin proposing mediation we must identify their values. "Worlds" have been organised into three groups to facilitate the alignment of desires and intentions with existing field

conditions. These are: Modern, Local/Indigenous and Nature. The conditions to which these relate/ perceive one another points to possible relationships of conflict and/or alliance, helping indicate fronts for meditation designs.

Figure 7. Diagram of Values. Source: The Author, 2021.

3.3. Synchronisation to achieve balance.

The concerning issue at hand with this investigation revolves around values, human presences and territories which are out of sync with each other as well as within themselves, from their own doing or by force of others. The question of synchronisation is fitting when we comprehend the physical scales and timeframe of systems at play, from the individual to community, river basin to territory and nation to region.

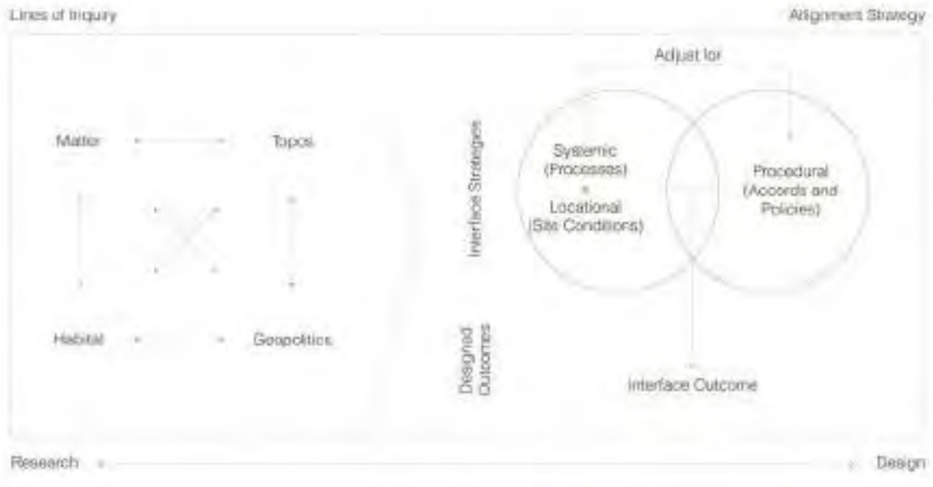

Figure 8. Lines of Inquiry Approach. Source: The Author, 2021.

Developed within the Transitional Territories Studio research framework, the project reads the territory and its constitutive systems utilising four themes of investigation as lines of inquiry: Matter, Topos, Habitat and Geopolitics. These focus the research development for a comprehensive assessment of the state of things, facilitating the identification of interrelated systems of the Modern, Local/indigenous and Natural worldviews.

The Four Mediation Principles are informed by the guidelines of Ecological and Landscape Urbanism (which require readings of landscape dynamics to propose spatial interventions and that these are specific to landscape conditions in question) for a more coherent alignment between ecology, landscape and society with Urban Design, and Mediation Principles in the modern and indigenous systems of justice which deal with conflict management for coexistence and reconciliation.

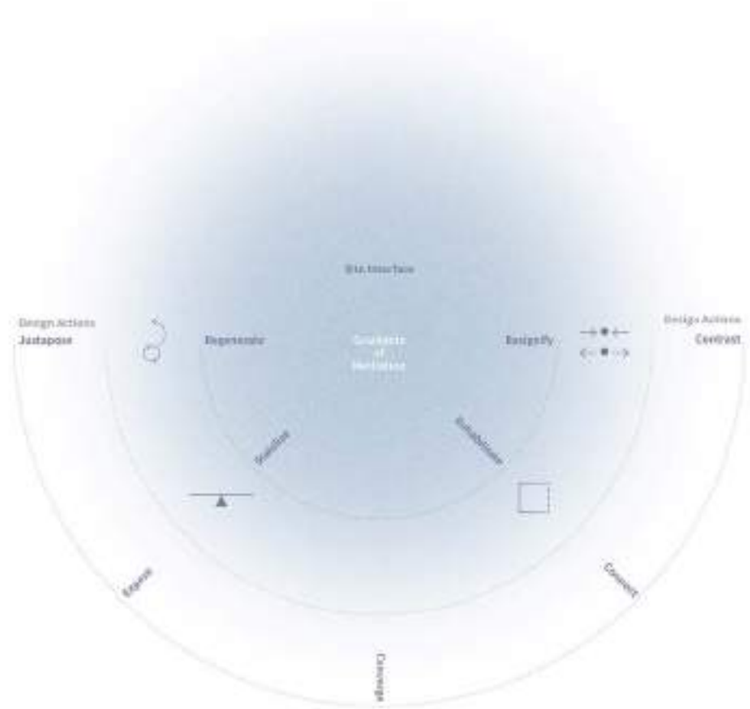

Figure 9. Mediation Principles. Source: The Author, 2021.

(i)Re-Generation process guides ecological and social systems, towards recovery from damage, renewing their systemic capacities, functionality and integrated synergies. (ii)*Stabilisation* processes act on systems that are deregulated and disturbed but not yet destroyed, focusing on achieving balance between parts. (iii)*Rehabilitation* considers that systems have been in some degree permanently damaged and only partial remediation can occur. Lastly, (iv)*Re-signify* considers that systems are damaged or disrupted beyond repair and proposed designs may only aid with repair on symbolic or metaphysical levels.

Figure 10. Analytical Framework. Source: The Author, 2020.

4. Results: A Synchronisation Framework for Reading and Designing Territorial Worldviews.

We must embrace other perspectives of the territory to comprehend the distinct elements which compose cosmopolitical values beyond our own worldview constructions. This framework is proposed in the spirit of attempting to facilitate cosmopolitical dialogue. That is if we are to in fact, act critically in territories which are already being altered disregarding their cosmologies.

The Synchronisation table below, is the beginning of this attempt, proposing a framework to cross read worlds, the landscapes and territories. The table utilises the Lines of Inquiry, to approach the territory from different layers of territorial conformation (diverse interrelated systems) together with the Abiotic-Biotic-Cultural Landscape reading framework.

Figure 11. The Table for Synchronisation. Source: The Author, 2021.

The Synchronisation Framework utilises the identified dynamics, categorised with the Synchronisation table and arranges these according to a territorial system which is identified through the Lines of Inquiry for synchronisation. These are then organised in terms of their synchronisation potential through specific aspects leading to categorized themes for Systemic Mappings. In the context of Belo Monte and the Volta do Xingu area, these are:

1. Water Flow;
2. Ecological Sustainability;
3. Basin Connectivity and
4. Territorial (re)Settlement.

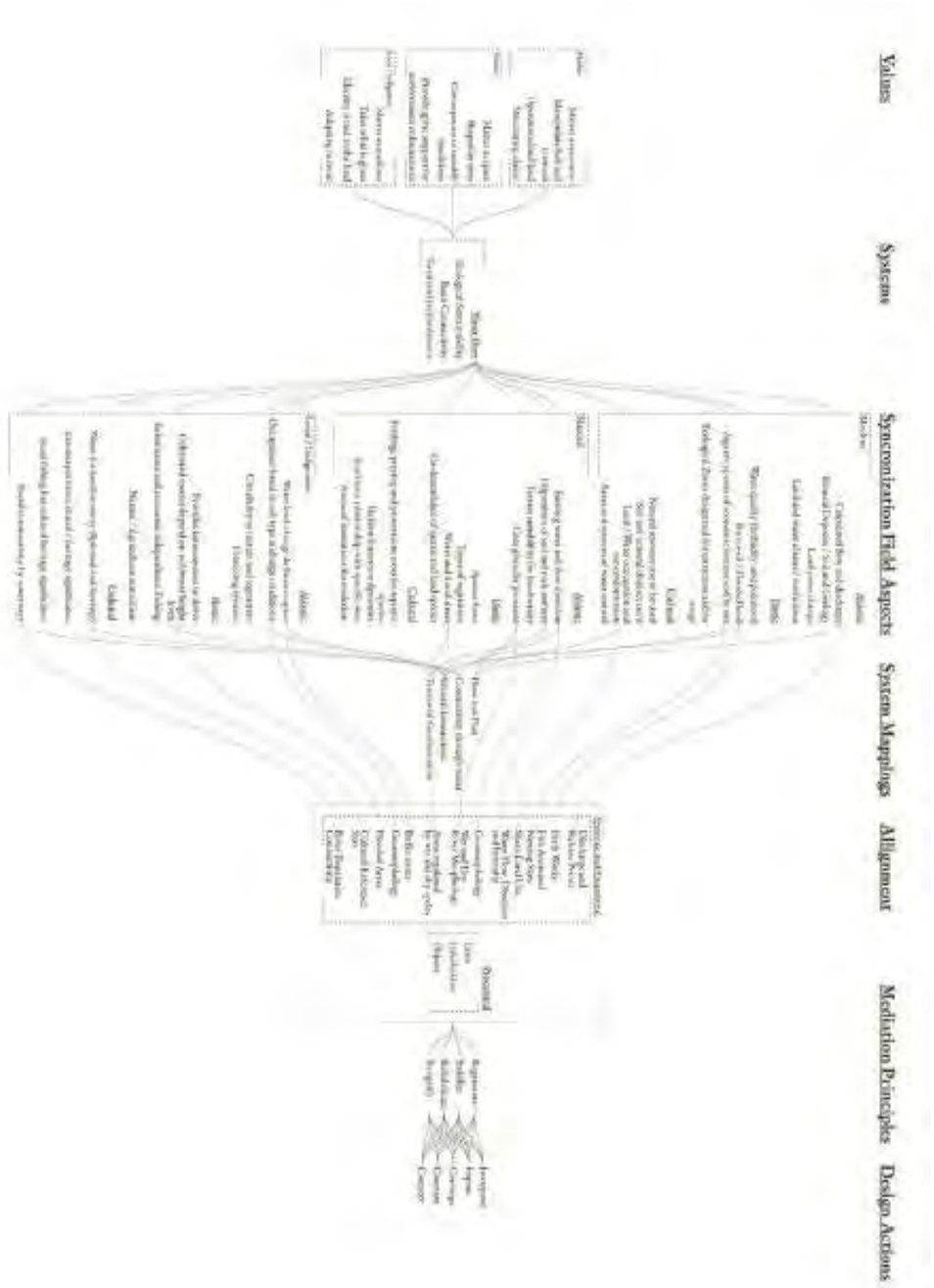

Figure 12. Synchronisation Framework. Source: The Author, 2021.

Through the Systemic Mappings methods, the Alignment Strategy is built up utilising the identified Systemic and Situational mapped elements and their consequent alignments with procedural aspects such as Laws, involved stakeholders and identified objects from the Synchronisation Field table. With these elements we have identified the specific elements needed or part of the system in question. Mediation Principles indicate which strategy must be utilised to achieve mediation in the given system, site and involved aspects. By utilising the Design Actions, spatial propositions can be placed to achieve and set a designed mediation strategy.

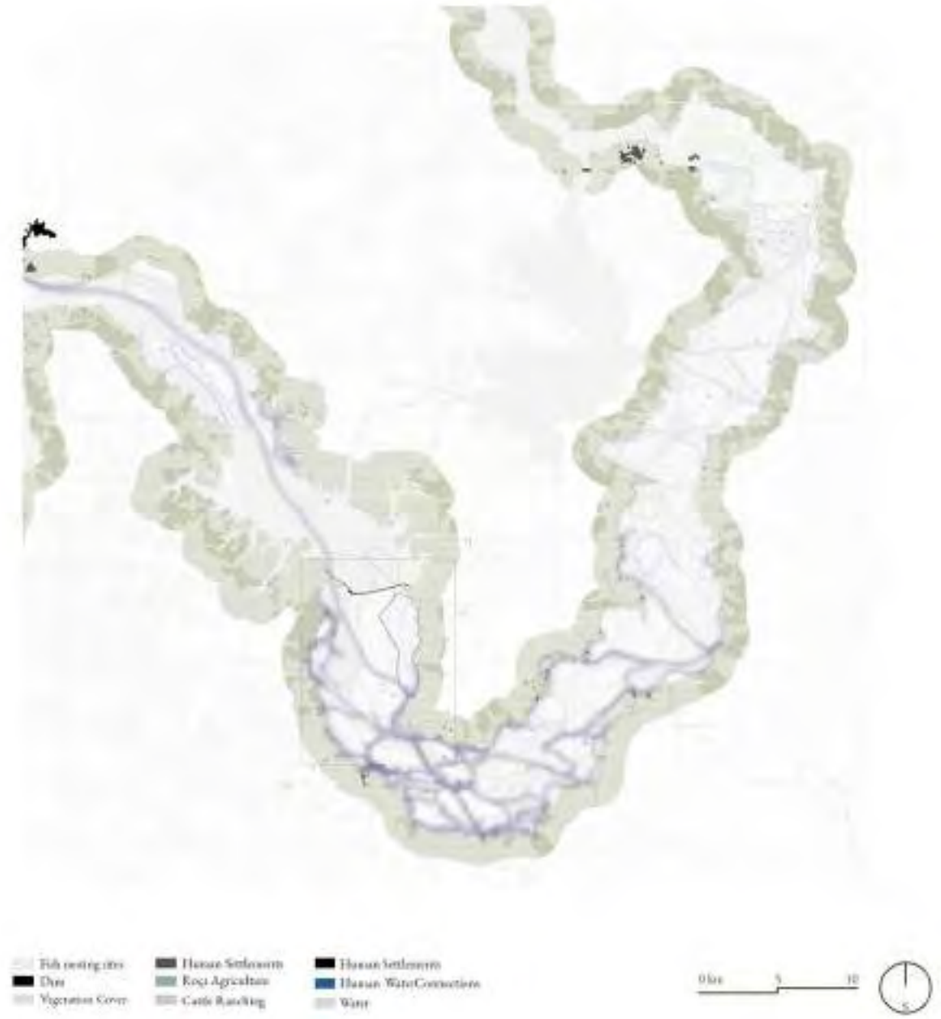

Figure 13. The Systemic Mappings for Water Flow Systems in the Volta Grande do Xingu. Source: The Author, 2021.

From the Water Flow Systemic mappings, Mediation Principles are selected which can answer to the needs of synchronisation of these systems. The location just after the Pimental Dam in the Volta Grande do Xingu river bend has the most potential to receive Design Interfaces for meditation which can bring the most impact on the water flow.

Figure 14. Designed Dam Interfaces for mediation masterplan. Source: The Author, 2021.

The re-naturalization of this branch of the river, will allow for fish to return to their natural nesting and feeding cycles in the area, reconnecting species throughout the river basin. Allowing for the natural river pulse to occur and natural river movements to flood forested land areas will facilitate the entry of fish species which are dependent on falling fruit to sustain their diets and so guarantee their cycles of nesting. This is possible with a constant open flow of water through the dam, with a design that considers the reservoir's need for water storage as well as the river pulse water level changes which guarantee the cues for fish given by the river's movement. The partial opening on Pimental Dam is designed to permit water flow levels in accordance with the permitted hydrograph projections from IBAMA(2019) and ELETRONORTE (2009), whilst maintaining the natural pulse dynamic of the river.

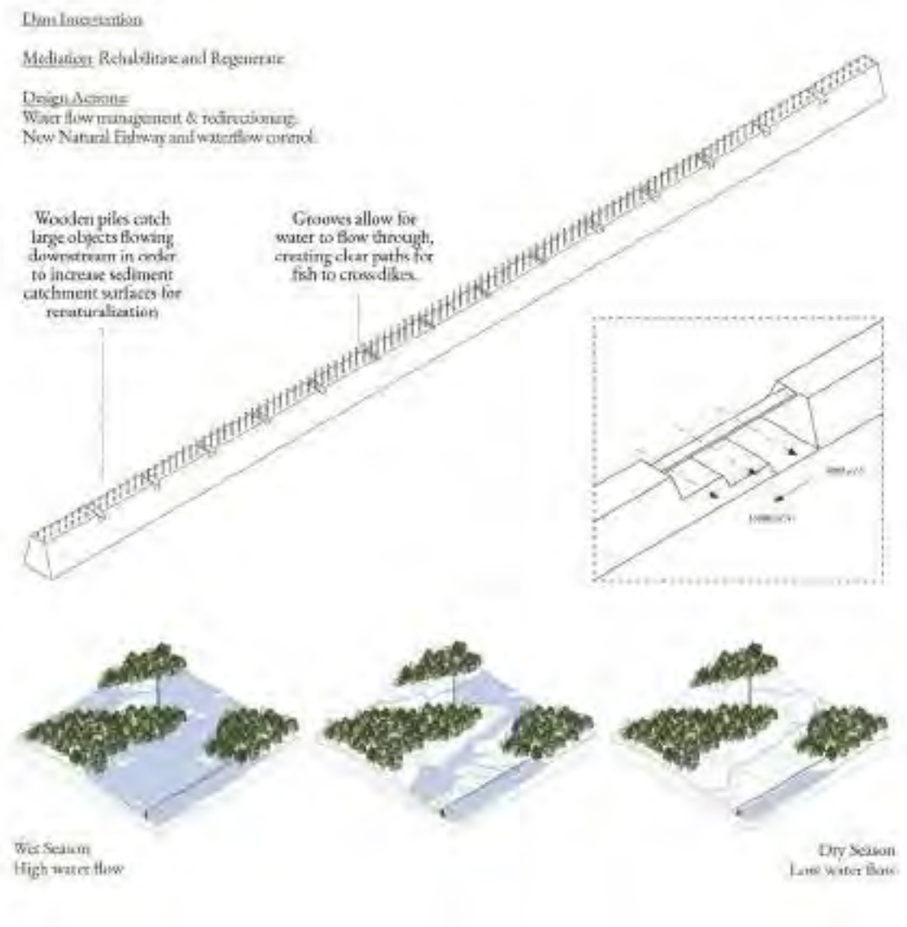

Figure 15. Dam Interfaces: Strategic openings and renaturalization dams. The Author, 2021.

Dikes are strategically placed downstream directing and concentrating constant flowing water to sustain river ecologies and social activities. The dikes are designed to capture sediment through time, and eventually be covered with vegetation, re-naturalizing the landscape.

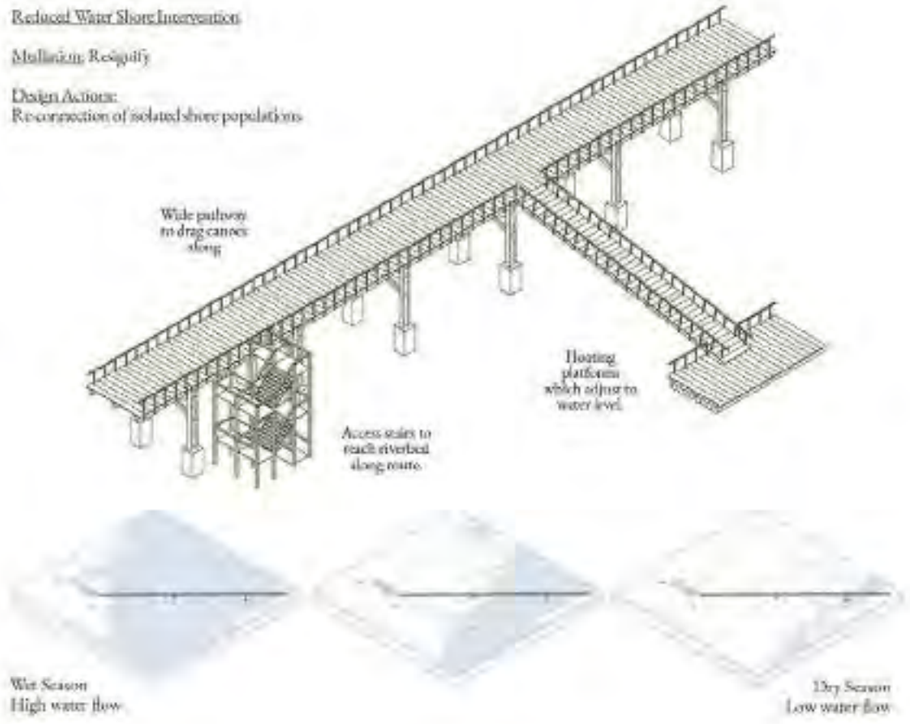

Figure 16. Pathways for reduced water flow re-connectivity. Source: The Author, 2021.

Given the re-direction of water, some parts of the river will become permanently dry and of difficult accessibility given the rocky river bed nature. Pathways would be constructed to connect communities with the water and river islands, helping to maintain their way of life connected to the river.

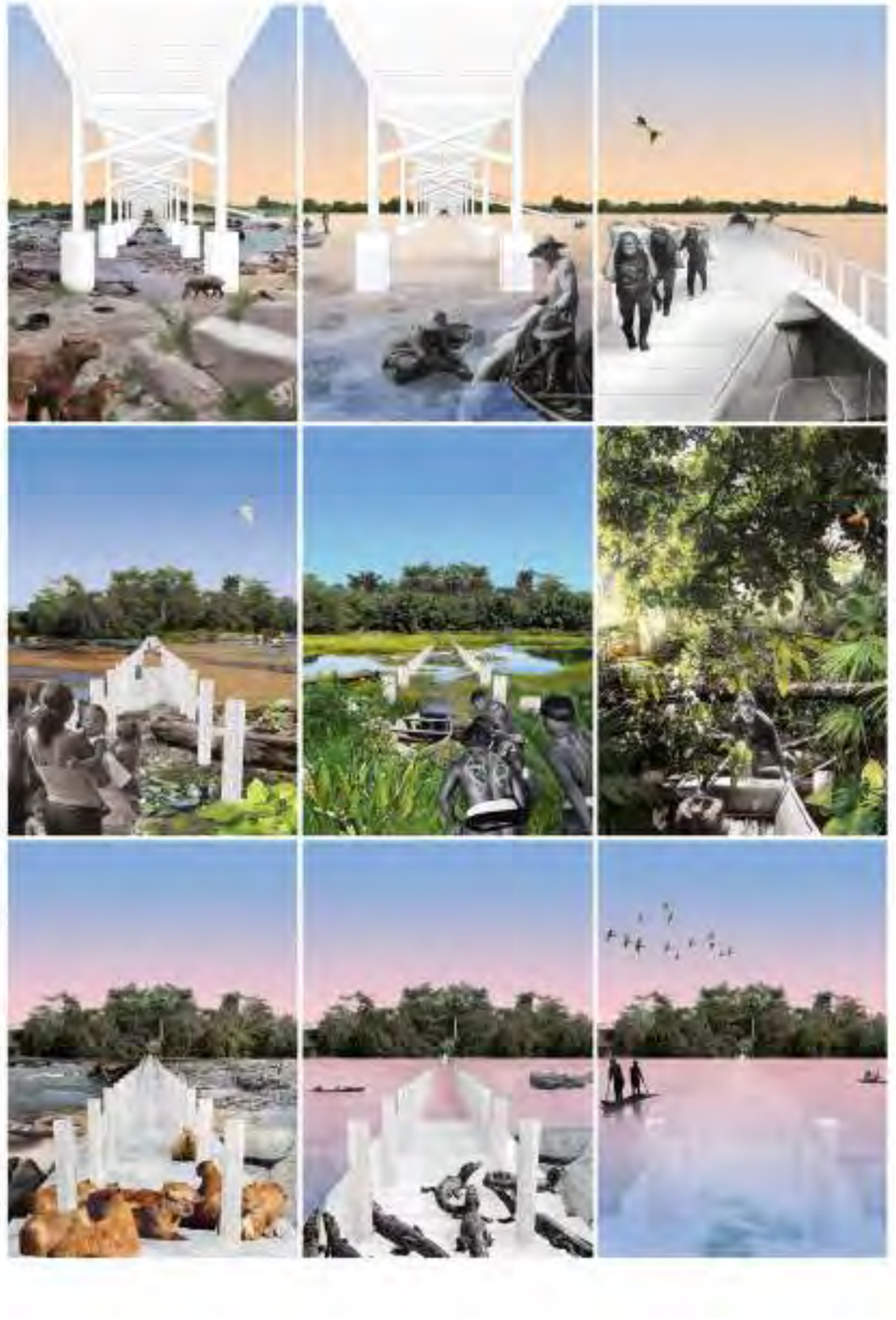

Figure 17. Visualising designed interfaces. Source: The Author, 2021.

5. Critical Review.

This research project attempts to devise an Analytical Synchronisation Framework for mediation in frontier territories of modernity utilising the Belo Monte Dam as a case study for its applicability. The utilized methodology is fundamented within theories of Landscape and Ecological Urbanism, challenging the capacities of our field to propose designs in territories with varied cosmovisions. The limitations of our practice become evident when we attempt to comprehend other forms of existence utilizing its tools. These urbanism theories are still embedded within the ethos of our civilization and Moderniy's paradigms.

The complexities of the context and knowledge applied to read it, as well as the design tools and methodological limitations are embedded into the proposed design speculations. However, we were aware not to incorporate knowledge or speak for cultures from a place of certainty but attempting to read their culture, worlds from within their own cosmovisions.
For this reason, our process of Research by Design is one which embraces explorative possibilities rather than the pursuit of certainty and deterministic design solutions.

The study considered the ethical implications of whom it attempts to speak with and for as well as minding the limits of the research regarding cultural appropriation and misinterpretation. Design proposals should be scrutinised by local and indigenous stakeholders, since these would still influence and disrupt traditional practices and cultures, in the same manner that the dam did, even if to a lesser degree or in good intention.

Ultimately, the best "solution" will always be the Dams dismantlement to achieve re-synchronization. We can state that there is no space for Large Infrastructure projects within the Amazon that can secure social and ecological balance and sustainability. All efforts to propose systemic changes through design and governance systems cannot address the enormity of the problem caused solely by the existence of the dam. We must reaffirm that this research is coming from a position of Landscape and Ecological Urbanism and does not attempt to propose radical or revolutionary solutions, but rather, through mediation reveal and propose conditions for systemic change and synchronisation.

Our field is strictly limited to its binding origins in modernity, constructed with a gaze to the world from within the city. Our current planning and design tools are unable to deal accordingly to such spaces and values, falling short to deal with these varying world models since the application of our paradigms do not translate, or simply, reduce such cosmovisions as simply religion or myth.

We need to re-evaluate how we position ourselves and our profession when approaching such spaces of action, not anymore from a standpoint of a colonial tool, historically speaking, but as enablers and conduits for the desires of sovereignty and autonomy of those people and their worlds. Urbanism needs to reconceptualize its capacities by recontextualizing its foundations seeking from the origin to acknowledge and accept plurality in design action.

Solutionist approaches acting on such conflicting territories not only risk falling short of truly addressing the main problem, but through the proposed mediation recommendations, suggest that compatibility is achievable, thus further perpetuating rhetoric in favour of infrastructure projects within these regions.

Figure 18. Situating Cosmourbanism. Source: The Author, 2021.

6. Conclusions and Reflections.

As a tool of the state, Hydropower infrastructure is designed to colonise and integrate territories and bodies into the apparatus of the nation-state of Brazil, in detriment of the existing ways of life that do not conform to this project.

More recently, Hydropower has gained traction in intergovernmental panels and conferences to tackle the consequences of climate change, even though numerous studies show just how damaging these infrastructures are to the environment and those who have done the most to defend it. Although Brazil requires energy to sustain its growth aspirations (and even this is open for discussion) much can be done to develop a better mixed grid, de-centralized and adapted to regional conditions

Figure 19. The Brazilian Green Energy Landscape in 2020: (Hydro, Solar and Wind Energy generation). Source: The Author, 2022.

Acknowledging the territory as a pluriverse is fundamental to sustain a plausible future for what is known as Brazil. We have seen that other nations, which included indigenous nations, have benefited from embracing this multiplicity in face of the social and ecological challenges ahead, especially for the South American region - deeply exploited and impoverished. Institutions that are dedicated to strengthening natural and indigenous relations must be put in centre stage to steer legislation and procedures that will guarantee and sustain values and practices for ecological preservation.

Government and society should acknowledge the importance of a forested Amazon for sustaining energy production, agriculture and water supply for national and regional security. Deforestation will lead to catastrophe, sending the nation into irreversible economic and social collapse. This paradigm shift is essential and should be encouraged also with National Security policies. All urbanisation, territorialization and operationalization through infrastructure projects were implemented to serve Brazil's modern project of territorial domination in the Amazon. To begin a renewed process of inhabitation in the region, it is essential to promote processes of planning and governance which originates from within the region, for its own sustenance rather than to only serve other regions.

Reviewing administrative municipal boundaries and indigenous and natural preservation territories would be necessary, not in terms of geographical limitations and delineations for control but rather in terms of their field conditions and in favour of local lifestyles. This would enable sustained landscape management and governance according to ecological and social systems. Other forms of governance arrangements grounded in local landscapes, dynamics and millennia self governance of its nations and peoples, proven capable of sustaining systemic equilibrium, would be essential. With the incorporation of these populations in counselling and management organisations, preservation and productive ecological processes would certainly be enhanced, giving the region a strong position in the productive matrix of the nation and strengthening its autonomy. From basin councils to Energy governance boards, local populations would consolidate their position as "stewards of the forest" and rivers.

The research project questions the critical capability of our field to propose designs in such territories. The importance of visualising worldview asymmetries and its conflicts is essential in such territories. For this reason, Urbanism must claim its role in thinking and proposing designs which can act accordingly in and for these "frontier" territories. The synchronisation framework approach begins to unveil a model that could aid in the comprehension of such conditions, and possibly allow for actions to take place in a non definitive and solutionist way. In order to move beyond the limiting urbanism paradigm embedded within the hegemonic worldview and biased by its modernist foundations, it is necessary to seek the territorialization of cosmopolitics theory. Would cosmourbanism be possible?

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