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## **Sacred Conservation: Traditional Ecological and Spiritual Knowledge of the Amazonian Kĩsêdjê, Kayapó, and Kawaiwete Peoples**

As the world's largest tropical forest and the most biodiverse region on Earth, the Amazon forest is without a doubt one of the world's most important ecosystems. However, this forest is under siege in a way it has never been before: high rates of deforestation, widespread wildfires, and extensive pollution have turned many parts of the forest into a savannah and have destroyed approximately one million square kilometers of the region. Just as environmental degradation is a risk to the Amazon's ecosystem, it is a risk to the hundreds of thousands of Indigenous peoples that live in the Brazilian Amazon, 21% of which is Indigenous land.<sup>1</sup> Since the creation of grassroots organizations and alliances between Indigenous Amazonian communities and outside scientists and environmentalists in the 1970s, the struggles of the Indigenous peoples of Amazonia have made their way to the world stage. More people than ever before from around the world are pushing against environmental destruction, but fighting climate change in the region requires centering the traditional ecological knowledge of the Indigenous people who have resided there for centuries. In this paper, I will define these forms of knowledge, examine how they apply to the Xingu Indigenous Park, outline the spiritual and environmental practices of the Kĩsêdjê, Kayapó, and Kawaiwete peoples, and look at these subjects in a modern context.

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<sup>1</sup> Athayde, S., and M. Schmink. "Adaptive Resistance," Conservation, and Development in the Brazilian Amazon: Contradictions of Political Organization and Empowerment in the Kaiabi Diaspora." *Ethnohistory* 61, no. 3 (2014): 549–74. <https://doi.org/10.1215/00141801-2681795>.

In order to comprehend this traditional ecological knowledge and the societies that developed it, we must also understand their spiritual views and relationship to the environment, which are two concepts that are inherently intertwined. As Anthony Seeger says in *Nature and Society in Central Brazil*: “a society’s vision of nature is related to its vision of itself; nature and culture are part of the same symbolic construct.”<sup>2</sup> Understanding Indigenous spiritual practices is also crucial in comprehending how they relate to their environment, since many of them interpret their surroundings with a spiritual lens. Many of them possess a form of what historians Danah Zohar and Ian Marshall call “spiritual intelligence,” which they define as “the intelligence with which we address and solve problems of meaning and value, the intelligence with which we can place our actions and our lives in a wider, richer, meaning-giving context.”<sup>3</sup> While all of the Indigenous peoples across the Amazon have different cosmologies and spiritual practices, the concepts of animism, the terrifying and life-giving power of nature, holism, and the effort to live as sustainably as possible are core beliefs that unify many different tribes.

One of the most persistent myths about the Indigenous peoples of Amazonia is that they have always been natural ecologists that live with no natural footprint on untouched land. This is a profoundly racist assumption that dates back to the colonial era, where Indigenous people were described as “savages” who are so primitive that it would be impossible for them to affect their environment in any significant way. Mounting evidence proves that this is completely untrue, and many Indigenous peoples in the Amazon have completely transformed their environment into innovative anthropogenic landscapes for centuries. Their physical impact in the region is so

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<sup>2</sup> Seeger, Anthony. *Nature and Society in Central Brazil: The Suyu Indians of Mato Grosso*. Cambridge, MA: Harvard University Press, 1981. pp 50.

<sup>3</sup> Zohar, Danah, and Ian Marshall. *SQ: Spiritual Intelligence: The Ultimate Intelligence*. London, UK: Bloomsbury, 2000. pp 20.

profound that it can be seen to this day, even hundreds of years after they initially started radically altering their surroundings.

Due to gradually worsening climate change and environmental destruction across the globe, a growing number of researchers have studied how these communities have transformed the land to this extent, which has given many of them vital traditional ecological knowledge). This way of knowing can be defined as “a cumulative body of knowledge, practice and belief, evolving by adaptive processes and handed down through generations by cultural transmission.”<sup>4</sup> The very existence of Indigenous people in the region proves that they possess this kind of comprehension: in his book *Sacred Ecology*, ecologist Fikret Berkes explains that “survival is the ultimate criterion for verification of traditional ecological knowledge.”<sup>5</sup> One of the most notable examples of Indigenous peoples’ transformation of the environment can be found in the Xingu River Basin, notably the Upper Xingu Region, which shows evidence of centuries-old traditional ecological knowledge.

The Xingu River Basin is an incredibly diverse region. It is an ecological transition area, meaning that it is a combination of different biomes: while it is primarily a seasonal tropical forest, wetlands and swamps are dispersed throughout the area, and tropical savannas are present in the southern region. The Xingu River, one of the largest tributaries of the Amazon River, snakes through the area, providing valuable resources of water and food for the local ecosystem. Here, there are two seasons: the rainy season that lasts a little over seven months and brings humidity and consistent rainfall, and the dry season that lasts close to five months that turns many parts of the region into a savannah-like biome when it is at its peak. These highly variable

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<sup>4</sup> Berkes, Fikret, and Mina Kislalioglu Berkes. “Ecological Complexity, Fuzzy Logic, and Holism in Indigenous Knowledge.” *Futures* 41, no. 1 (2009): 6–12. <https://doi.org/10.1016/j.futures.2008.07.003>.

<sup>5</sup> Berkes, Fikret. *Sacred Ecology*. New York, NY: Routledge Taylor & Francis Group, 2018. pp 71.

seasons mean the lifestyles of the area's inhabitants have had to be incredibly versatile and a deep knowledge of the region is required in order to sustain these communities.

Today, evidence of Indigenous settlements and impacts on the environment can be found across all of these biomes. Prior to the arrival of Europeans in the area, the Upper Xingu region was densely populated, with vast roads, hamlets, bridges, moats, and large village plazas surrounded by houses and buildings sprawling across the region. Altogether, these settlements and roads spanned across approximately 250 square kilometers. The wetlands, rivers, and forests in the area were also closely managed: throughout centuries, the inhabitants of this land created vast croplands, decorative and ceremonial gardens, fishing weirs, and orchards. In some cases, entire forest areas that were assumed to be primary were actually a product of human activity and management.<sup>6</sup>

One of the biggest indicators of human activity is the widespread discovery of the manmade Amazonian Dark Earth (ADE) found across the region. ADE takes two forms: *terra preta* (dark earth), nutrient-rich dark soil made by humans that is composed of charcoal, organic waste, bone, and pottery, and the lighter *terra mulata* (mulatto earth) that made with somewhat different elements and is less fertile, often found in farming areas. This ADE is distinctive next to the highly weathered and infertile soils such as oxisols and ultisols that naturally surround the region. Since the Amazon forest has some of the most nutrient-poor soils in the world, ADE is one of the most significant of the Indigenous innovations.<sup>7</sup>

As of 2003, the archeological remains of major 19 settlements have been discovered in this area, demonstrating that Xinguanos had been building settlements in this region for at least

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<sup>6</sup> Heckenberger, M., Russell, J., Fausto, C., Toney, J., Schmidt, M., Pereira, E., Franchetto, B. and Kuikuro, A., 2008. Pre-Columbian Urbanism, Anthropogenic Landscapes, and the Future of the Amazon. *Science*, 321(5893), pp.1214-1217.

<sup>7</sup> Schmidt, M., 2013. Amazonian Dark Earths: pathways to sustainable development in tropical rainforests?. *Boletim do Museu Paraense Emílio Goeldi, Ciências Humanas*, 8(1), pp.15.

1,200 to 1,500 years. Before European slavers arrived, the population of the Upper Xingu was estimated to be in the thousands. After the initial arrival of the Iberians, the region remained uncontacted by settlers for centuries, mostly because there were fewer resources such as mineral deposits that were coveted by settlers. Additionally, the many waterfalls and rapids along the Xingu river make traveling to the area difficult, especially for non-Native people who are unfamiliar with the landscape.

There are some discrepancies in accounts of when exactly the Europeans arrived: for example, the Kuikuro peoples report the first arrival of Portuguese slave owners to be around 1750, but the first written account from an outsider about Xinguanos is from 1884 by the German ethnologist Karl von den Steinen. While he was mostly friendly towards the people he encountered, he and his assistants introduced European diseases to the Indigenous peoples, leading to a series of deadly outbreaks. Determining the exact dates of the arrivals of outsiders is complex because most of Indigenous history is transmitted orally, with many of the people who held onto these stories dying as a result of colonization. Written accounts are also uncommon because they were often written on biodegradable material.<sup>8</sup> As of today, the most in-depth sources of the history of the Xingu region began to arrive in the late 19th and early 20th centuries.

After its discovery by outsiders, the Xingu Basin was largely unprotected by the Brazilian government for decades. Its history as a formal protected area begins in 1948, when three brothers named Orlando, Claudio, and Leonardo Villas-Bôas joined a government expedition to explore the more unmapped regions of the Amazon. While there, they came across the Juruna tribe that lived in the Upper Xingu region. Rather than trying to violently “civilize” the local

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<sup>8</sup> Heckenberger, M., Kuikuro A., Kuikuro, U. T., Russel, C. J., Schmidt, M., Fausto, C., and Franchetto, B. “Amazonia 1492: Pristine Forest or Cultural Parkland?” *Nature*, 2003. <https://doi.org/10.1038/news030915-12>.

population, they attempted to build hospitable relationships with them, and used their friendly rapport with the Juruna peoples to make connections with other tribes in the region. Throughout the next three decades, they devoted themselves to intervening in intertribal warfare, building relationships with the Indigenous peoples of the region, and assisting in relocating various tribes that were threatened by environmental destruction to the region.

In 1951, the Villas-Bôas brothers began to work on drafting a policy that would establish the area as a protected national park. After a decade of fighting for this recognition, the area was formally established as a national park in 1961 under the presidency of Jânio Quadros. This park was the largest of its kind at the time, spanning across 26,000 square kilometers, and was used as a framework for the creation of other protected areas in Brazil. However, this park was not just created to protect Indigenous people and served a political purpose as well: it was established “not only a place of refuge for endangered ‘species,’ but a craft of Brazilian nation-building, a symbolic complement and a counterbalance to the developmentalist policies of the nationalist state in the postwar period.”<sup>9</sup> After the creation of the Fundação Nacional do Índio (FUNAI) six years later, the park was then renamed to the Parque Indígena do Xingu (Xingu Indigenous Park), or the PIX, and became the largest reservation in Brazil.

With a growing number of outsiders threatening Indigenous peoples in other parts of the Amazon forest, the Villas-Bôas brothers invited tribes from further regions to migrate to the PIX. While this likely saved thousands of lives that were put at risk, it also left these tribes’ homeland to be destroyed by the people that drove them out in the first place. For some of the tribes relocated to the PIX, this adjustment was a difficult one, especially since some of these groups had historically been enemies of the Xinguanos that had lived there for centuries. Today, these

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<sup>9</sup> Athayde, S., and M. Schmink. “Adaptive Resistance,” Conservation, and Development in the Brazilian Amazon: Contradictions of Political Organization and Empowerment in the Kaiabi Diaspora.” *Ethnohistory* 61, no. 3 (2014). pp 554.

battles are far less common. In addition to the decades the Villas-Bôas brothers spent working towards intertribal unity, the prevalence of radios, shared rituals, and the introduction of Portuguese as a common language, intertribal communication and collaboration have become increasingly prevalent. Every year, around six intergroup annual ceremonies take place across the region, and these rituals are one of the main aspects that tie these groups together. Even more come together with NGOs or through their own community organizations to plan actions against the climate change that is threatening their land and homes.

In order to work towards protecting the area, we must first understand the various tribes that live there, notably how their spiritual practices, interactions with the environment, and social lives intersect. Firstly, we will look at the Kĩsêdjê, otherwise known as the Suyá. In their eyes, society and nature are not seen as two distinct realms: they are so intertwined that humans need to go out of their way to distinguish themselves from the “natural world.” Unlike many other tribes, the Kĩsêdjê have no creation story. Rather, they believe that up until their rituals and customs were introduced to them, men and animals were very closely related. To this day, animals and humans are so closely related that the consumption of certain animals is seen as contagious to humans: for example, elderly members of the tribe are discouraged from eating sloths, since they believe they will take on the sluggish and lethargic nature of the animal. According to the Kĩsêdjê, humans can regress into one of their animal ancestors if they do not maintain enough distance between themselves and the jungle. Some creatures such as the jaguar are seen as being humans wearing animal skin who failed to maintain enough distance between themselves and the environment. Additionally, someone who grows too close to the wilderness could also become a witch, an evil and antisocial entity who causes almost all forms of disease and death in the society. In order to avoid this, many Kĩsêdjê will shave their bodies entirely,

apply paint to their bodies, wear intricate body ornamentation (notably their striking wooden ear and lip plates), partake in body scarification, and cook all of their food before consuming it.

Beyond personal ornamentation and rituals, their willful separation from the jungle is also reflected in the way their villages are laid out. The Kĩsêdjê emphasize ordered and centralized settlements, which are seen as the center of their universe. The separation between themselves and the natural world is a continuous process: plants are cleared out in the central plaza and nearby jungle before major rituals, gardens are carefully pruned, and paths are maintained regularly. The creation and maintenance of gardens and agricultural plots is one of the most significant acts one can do to separate themselves from the perilous jungle, or the *pò*, which is a dangerous and antisocial zone. The farther out someone ventures into the *nihai pò*, the distant jungle, the more they risk encountering gruesome monsters or regressing into a fierce animal. Furthermore, since there are no gods or creators that brought humans into being, there are also no concepts of sin or virtue. Instead, the human body, mind, and spirit are the primary tools used to interpret the cosmos.

Despite their trepidation concerning the natural world, the Kĩsêdjê maintain a strong form of reverence towards their surrounding flora and fauna, to which they owe their entire human existence. For example, it is said that mice provided the Kĩsêdjê with maize, the jaguar introduced them to fire and war rituals, and various plants and animals can be called upon by singers to help cure ailments. In these musical healing ceremonies, if a child is sick and feverish, a singer will perform a quiet musical invocation of the cayman that lies still and does not overheat, or if someone wants to grow taller the singer will call upon the towering banana plants. All of the songs they know, and by extension, the heart of their existence, are based upon teachings from their surrounding environment such as running water, insects, birds, and other



animals.<sup>10</sup> The importance of song is evident in every aspect of Kĩsêdjê society: they understand their environment not through the changing of the seasons like many other cultures, but through where they socialize and sing. For them, space is defined by which songs are performed there, seasons are determined by which songs are sung during that particular time, and time is marked by the different songs they sing throughout the day. All of this is shaped by their interactions with the natural world.

Along with the Kĩsêdjê, another tribe whose society and spirituality is organized by nature is the Kawaiwete (more commonly known as the Kaiabi but have asked to be recognized as their self-denomination as of 2012). They are relative newcomers to the Xingu Indigenous Park, having only begun to arrive in the Middle Xingu from the Western side of the Xingu River during the 1950s to escape the rubber tappers and missionaries that were intruding on their land at increasingly violent rates. As their situation worsened, the Kawaiwete were left with only two options: either they submit to the intruders or leave their ancestral homeland to move to the PIX with the help of the Villas-Bôas brothers. Most chose the latter and slowly trickled up to the Park over the course of several years until a final group was brought in by airplane in 1966.<sup>11</sup> However, this transition proved to be fraught with hardships, especially since the Kawaiwete have historically been the enemies of some of the tribes in the PIX. Now, many Kawaiwete in the PIX report regretting this decision that they feel was paternalistic and coercive. Despite this relocation and increasing cultural and material exchanges with other tribes in the PIX, they still continue to maintain many of their traditional agricultural and spiritual practices.

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<sup>10</sup> Seeger, Anthony. *Why Suyá Sing: A Musical Anthropology of an Amazonian People*. Urbana, IL: University of Illinois Press, 2004. pp 75-89.

<sup>11</sup> Schwartzman, S., B. Zimmerman, A.V. Boas, K.Y. Ono, M.G. Fonseca, J. Doblaz, P. Junqueira, et al. "The Natural and Social History of the Indigenous Lands and Protected Areas Corridor of the Xingu River Basin and Prospects for Protection." *Encyclopedia of the Anthropocene*, 2018, 369–77. <https://doi.org/10.1016/b978-0-12-809665-9.10021-7>.

When the French naturalist Francis de Castelnau made first contact with the Kawaiwete, he described them as a “warlike” and “indomitable” people who were willing to kill intruders and defend their land. Even after killing an enemy, the Kawaiwete describe a strong spiritual bond between themselves and the person they killed, whose soul they eventually take. Spirits such as these take an important role in Kawaiwete culture: spiritual guides called *mait* make contact with the community’s shamans and provide them with *ikwaapat*, or complete knowledge. *Iikwaapat* is transmitted from the spirits to the shamans via dreams and can include gifts such as physical and spiritual powers, messages from ancestors, secrets to cure ailments, and the names that are bestowed to adolescents upon their coming of age. These gifts are often provided by *mait*, benevolent spirits that are normally distant from Kawaiwete settlements and are normally found either in their own spirit world or in remote natural locations such as underwater, on the horizon, or deep in the forest. On the other hand, other more menacing spirits exist such as *Wyra Futat* and *Karuat*, roughly translated as “masters of the game,” who control all of the animals that reside in the forests and rivers and take the souls of humans.

While some of them are human-like, most spirits are animals such as sloths, eagles, and jaguars, all of which have a Master Spirit that rules over their respective species. These spirits can engage in cosmic battles called *maraka* with humans. Shamans are the only people who can fully see spirits, but common people can hear their songs and contact them if they are in the forest, which is one of the most religiously important places in their society. Animism is an integral part of Kawaiwete cosmology: plants and even objects such as mortars and pestles or baskets can have souls, or *'ang*. Any object that is created has an eternal *'ang* that remains even after death or destruction.<sup>12</sup>

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<sup>12</sup> Oakdale, Suzanne. *I Foresee My Life: The Ritual Performance of Autobiography in an Amazonian Community*. Lincoln, NE: Univ of Nebraska Pr, 2007. pp 158.

The agricultural practices of the Kawaiwete are sometimes unfairly seen as less sophisticated than the ones of other tribes in the PIX, but they have accomplished the establishment of an adaptable system of horticulture, which is impressive since they received no agricultural training specific to the foreign environment of the PIX. While there are some individual agricultural fields that belong to single households, a significant amount of the crop fields are communal. One of the Kawaiwete's main agricultural practices in the communal fields is a combination of polyvarietal manioc plots (cultivating several kinds of manioc in the same area) and polycultural plots (planting a variety of plants in the same plot). The latter is the most common form of agriculture and the Kawaiwete are able to cultivate a wide variety of resources such as cotton, maize, peanut, yams, watermelon, and bananas. By replicating the heterogeneity of the environments where these plants are normally found, the yield is more efficient and additionally protects the soil against erosion, helps prevent insects and diseases, and saves space.<sup>13</sup>

Altogether, while there are fewer rituals and ceremonies in Kawaiwete communities as there are in other tribes across the PIX, the fact that the physical and spirit worlds are so intertwined and this sense of animism means that people have to constantly be aware of their place in their environment and the cosmos as a whole. Failing to take sufficient care of their surroundings can lead to punishment by vengeful spirits, meaning many Kawaiwete make efforts to be as respectful as possible to their surroundings. For example, when a man from a village was harvesting too much annatto in a way that displeased the spirits of the forest, one of the spirits knocked him down and made him fall ill. Nonetheless, when plants or animals significantly get in the way of the Kawaiwete's survival and impede their well-being in some way, they will view

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<sup>13</sup> Lopez-Osorio, F. and Miranda-Esquivel, D. R. "A Phylogenetic Approach to Conserving Amazonian Biodiversity." *Conservation Biology* 24, 5. (2010). pp 1359–66. <http://www.jstor.org/stable/40864036>.

it as an enemy and seek to kill it in the same way they would kill a rival.<sup>14</sup> While they treat the “natural world” with deep respect rooted in spirituality, ultimately they prioritize their own survival.

Another tribe we can look to for valuable traditional ecological knowledge is the Kayapó people (self-denomination *Mebêngôkre*), one of the most well-known tribes of the Amazon. There are at least 19 different Kayapó communities living across Brazil, with some living in uncontacted areas. Since they are so widely spread out, they do not have a homogenous culture or practices. Like the Kawaiwete, the Kayapó communities in the PIX are also relative newcomers, having only arrived in the 19th century when escaping outsiders encroaching on their lands. Since they were first contacted by the Europeans, the Kayapó have been seen as a “hostile” group that would not hesitate to attack or kill outsiders that threatened them, which is one of the reasons they have such a significant population. This practice continued for centuries, with some Kayapó continuing to attack or even kill people such as loggers, ranchers, miners, and members of the military who threaten their land.

Altogether, the Kayapó use approximately 650 different kinds of medicinal plants and 250 different kinds of plants for food.<sup>15</sup> The incredible diversity of the plants they cultivate is largely attributed to the successes of swidden cultivation (also known as slash-and-burn agriculture) that they maintain. In this process, areas of forests are burned in order to clear spaces for fields called swiddens, and the remaining ash provides fertile soil for plants to grow on. Over time, the land grows less fertile, and new swiddens are opened in a different location. The land left over lies fallow, which allows the forest to recover, ensures regeneration of soil nutrients, and

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<sup>14</sup> Oakdale, Suzanne. *I Foresee My Life: The Ritual Performance of Autobiography in an Amazonian Community*. Lincoln: University of Nebraska Press, 2005. pp 234-35.

<sup>15</sup> McConnell, D. J., Dharmapala A. E., and Attanayake S. R. *The Forest Farms of Kandy: And Other Gardens of Complete Design*. Aldershot, UK: Ashgate, 2003. pp 345.

eliminates pathogens, weeds, and insects. Ideally, this period should last a minimum of eight years, during which members of the tribe return to the area to manage weeds and pests, provide mulch and compost, and ensure the healthy succession of the land. Through this process, they create “forest islands”<sup>16</sup> that are havens of biodiversity in an area that is rapidly being destroyed by climate change and deforestation. Not only is this practice an agricultural one, it is also a spiritual one: the initial burning of plots is a highly ritualized and sacred process, with strong similarities between the dances performed when opening swiddens and the ones before waging war. Shamans preside over this burning, further demonstrating how spiritual and ecological knowledge are closely related.

In these areas, crops are planted in concentric circles in polycultural swiddens. First, the central plot is fully burned and meticulously kept clean to sustain the sweet potatoes that are planted in the area. Next, the middle plot contains more nutrient-demanding crops such as maize, yams, beans, and tobacco, which are planted next to fertile tree boles. Finally, the outer layer has plants that provide shade and require less maintenance such as plantain and banana trees. Additionally, mulch and compost that improve soil productivity and fertility are applied throughout the area. In order to sustain these practices, the Kayapó used to live semi-nomadic lifestyles where they would practice cropping every 5 to 6 years and let the land lie fallow for 8 to 11 years, which also ensured that the populations of the game they hunted to recover.

Beyond cultivated swiddens, the Kayapó also practice a form of nomadic and informal agriculture, where they will plant tubers, seeds, and nuts along trails, graves, and campsites. While traversing a single 13 kilometer trail in Kayapó land in 1985, anthropologist Darrell Posey identified an estimated 185 planted trees of 15 different species, 1,500 medicinal plants, and

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<sup>16</sup> Berkes, Fikret. *Sacred Ecology*. New York, NY: Routledge Taylor & Francis Group, 2018. pp 169.

5,500 food-producing plants.<sup>17</sup> In more arid areas such as the savannahs in the southern region, some members of the Kayapó tribe will plant small mounds of plants that they call *apêtê*, which they casually tend to and periodically add on to. After using them to cultivate crops for as long as possible, they will plant trees in the location that are sometimes compared to forest islands in these arid regions.

Most of the significant spiritual rituals and events such as the ritual naming of children, marriage rites, or initiation into adulthood revolve around the changing from the dry season to the rainy season. However, they often make no distinction between social and spiritual life, instead seeing the two as being closely intertwined. They see all life as being fundamentally interconnected beings that all share characteristics such as energy, health, and feeling. To the Kayapó, there is no rigid line between humans and animals: it is possible for humans to take on animalistic characteristics and vice versa. They view the relationship between humans and the environment as a series of constant exchanges that can become dangerous if they are not kept in a consistent balance. The names shamans give people that they find in nature, the food they eat, songs they are taught by the natural world, are all seen as being borrowed from the earth. Any significant change they make to the environment such as opening swiddens or finishing hunts is always accompanied by a ritual: for instance, upon finishing a hunt, men will sing the names of the animals they killed to appease their spirits and keep them from entering the village.<sup>18</sup>

Today, the landscape of the PIX has drastically changed as a result of climate change and over extraction of natural resources. Almost every aspect of the area's ecology has changed, such as the soil's health and moisture, rainfall patterns, and the region's microclimate as a whole. One of the most deadly problems faced in the PIX, and in the Amazon as a whole, is the drastic loss

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<sup>17</sup> Denevan, W M. Cultivated Landscapes of Native Amazonia and the Andes.

<sup>18</sup> <https://www.journals.uchicago.edu/doi/full/10.14318/hau7.2.008>

of moisture in the surrounding atmosphere which has desiccated significantly over the last 20 years. A combination of increased greenhouse gas emissions and deforestation fires set to clear out space for ranching and agriculture have led to an unprecedented warming of the Amazon. This poses a specific challenge for the Indigenous peoples who have traditionally practiced slash and burn agriculture for centuries. With a drier climate, it is easier for fires to spread without control, and increasingly difficult agroforestry management has become one of the biggest threats to the inhabitants of the PIX.

In response to this, some people put pressure on Indigenous communities to live without any natural footprint as natural ecologists. With a population that is growing rapidly and surrounding land that is being destroyed at a similarly rapid pace, there has been a need for more resources to sustain the region's inhabitants, but not enough space to practice the nomadic agriculture that used to be widespread. Now, the fallow periods in the swiddens are shortened to keep up with increased demand, leading to deforestation and a degeneration of soil health. With this, the amount of fauna in the area has also decreased, which affects the tribes' abilities to hunt and further throws the local ecosystem off balance. The methods of hunting, small scale cattle ranching, logging, and shifting cultivation used by Indigenous peoples in the region all have an effect on the environment and can decrease biodiversity to an extent, but this is inevitable.

Many of these forms of environmental destruction in the PIX and the Amazon as a whole have been supported by public policy and political legislation for years. While the area has been vulnerable to outside threats for centuries, the 2019 election of the right-wing president Jair Bolsonaro has further put Indigenous rights and the preservation of the area at risk. Since his election, he has eliminated Brazil's ministry of Indigenous affairs and cut the budget of the

country's environmental protection agency by 24%.<sup>19</sup> Based on a policy established by former president Michel Temer that prohibited new demarcations of Indigenous peoples' traditional lands unless they were physically present in the region or fighting for legal protection by the day Brazil's constitution was created, Bolsonaro has officially halted the demarcation of 27 Indigenous territories across the country. Additionally, a new bill entitled Bill 490/2007 has been proposed to Brazil's Chamber of Deputies, prohibiting Indigenous people from claiming new land, allowing the government to abolish reserves when they are no longer "essential," promote intervention in uncontacted tribes, and begin development projects in reserves without consulting the region's inhabitants.<sup>20</sup>

One of his most destructive policies has been the creation of hydroelectric dam projects in Amazonia, notably the Belo Monte Dam that has had devastating effects on the Xingu River since construction was initiated in 2011. The Belo Monte Dam consists of a series of three dams, several levees, and various canals that supply power stations with water that they convert into electricity. The Dam's proposed size would take up thousands of square kilometers of the Amazon forest, release millions of tons of carbon dioxide equivalent into the atmosphere, directly displace many Indigenous communities, flood massive amounts of the forest, The construction of the Dam also leads to a risk of hundreds of species becoming extinct, which is particularly dangerous because many of the species in and around the Xingu River are endemic, meaning they are almost exclusively found in that region. Supporters of the dam argue that the

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<sup>19</sup> Faiola, Anthony, Marina Lopes, and Chris Mooney. "The Price of 'Progress' in the Amazon." The Washington Post. WP Company, June 28, 2019. <https://www.washingtonpost.com/world/2019/06/28/how-building-boom-brazilian-amazon-could-accelerate-its-deforestation/>.

<sup>20</sup> Human Rights Watch. "Brazil: Reject Anti-Indigenous Rights Bill." Human Rights Watch News, August 24, 2021. <https://www.hrw.org/news/2021/08/24/brazil-reject-anti-indigenous-rights-bill#>.



electricity it creates would be a sustainable source of energy and boost economic growth, but this comes at the cost of ecological destruction.<sup>21</sup>

In light of all of these acts of violence, it can be difficult to find sources of hope, especially when taking into consideration the devastating losses of Indigenous cultures and histories. However, there is another important area to focus on: culture cannot be entirely lost, it transforms, and knowledge development is an important factor to examine as well. While globalization has been detrimental in many ways, it has also introduced valuable new resources such as more medical care and useful technology. Today, one of the most effective strategies in maintaining stable ecosystems in the PIX is through a combination of knowledge from both the locals and experts from outside the area. By combining local-scale environmental and historical understandings, collaborative research projects, community application, and open feedback, a growing amount of collaborative programs are being created. For example, in some parts of the Park, agroecology high school programs are being implemented, schooling is becoming more accessible, and the Brazilian Institute of the Environment and Renewable Natural Resources has provided free fire-fighting training.<sup>22</sup> For centuries, the traditional ecological knowledge possessed by Indigenous people has been seen as a series of primitive fantasies and that valuable knowledge can only be provided by Western science. However, a growing number of people are now realizing that Indigenous knowledge and the scientific knowledge of some outsiders are not necessarily opposed: instead, they overlap in many ways and are just different frameworks used to understand the world. The more we continue to study these ways of knowing and learn from

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<sup>21</sup> Jaichand, Vinodh, and Alexandre Andrade Sampaio. "Dam and Be Damned: The Adverse Impacts of Belo Monte on Indigenous Peoples in Brazil." *Human Rights Quarterly* 35, no. 2 (2013): 408–47. <http://www.jstor.org/stable/24518022>.

<sup>22</sup> Schmidt, Marcus Vinícius, Yakuna Ullillo Ikpeng, Tariaiup Kayabi, Rosely Alvim Sanches, Katia Yukari Ono, and Cristina Adams. "Indigenous Knowledge and Forest Succession Management in the Brazilian Amazon: Contributions to Reforestation of Degraded Areas." *Frontiers in Forests and Global Change* 4 (April 26, 2021). <https://doi.org/10.3389/ffgc.2021.605925>.

Indigenous wisdom, the more we will be able to protect biodiversity both in the Amazon and across the world as a whole.

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