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ETHNOCARTOGRAPHY OF FISHING IN THE KAXINAWÁ INDIGENOUS LANDS IN THE MUNICIPALITY OF JORDÃO – ACRE – BRAZIL

Etnocartografía de la pesca en las Tierras Indígenas Kaxinawá del municipio de Jordão – Acre – Brasil

Etnocartografia da pesca nas Terras Indígenas Kaxinawá do município de Jordão – Acre – Brasil

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ABSTRACT

The experience reported in this article refers to the ethnocartography workshops held between 2004 and 2016 in 13 Indigenous Lands (IL) located in the Upper Juruá and Upper Purus regions, in the international border area between Acre (Brazil) and Ucayali/Madre de Dios (Peru). In this specific case, this article addresses the mapping processes of fisheries carried out in 2005 in the three Kaxinawá Indigenous Lands located in the municipality of Jordão. The ethnomapping workshops aim to support community-based processes of territorial and environmental management of the Indigenous Lands in the state of Acre. They are specifically characterized by research actions and socio-environmental diagnoses conducted by the Indigenous peoples themselves on the natural and cultural resources relevant to their communities. These actions are developed via political and educational initiatives, resulting in the development of thematic maps and in the establishment of Territorial and Environmental Management Plans.

Keywords: Ethnomapping; Huni Kuĩ; Fishing; Amazon; Territorial and Environmental Management Plans.

RESUMO

A experiência aqui relatada refere-se às oficinas de etnocartografia realizadas entre 2004 e 2016 em 13 Terras Indígenas (TIs) localizadas no Alto Juruá e Alto Purus, na faixa de fronteira internacional entre o Acre (Brasil) e Ucayali/Madre de Dios (Peru). Neste caso específico, o artigo trata do mapeamento das zonas de pesca realizado em 2005 nas três Terras Indígenas Kaxinawá localizadas no município de Jordão. As oficinas de etnomapeamento têm como objetivo subsidiar

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processos comunitários de gestão territorial e ambiental das Terras Indígenas do Estado do Acre. Caracterizam-se especificamente por ações de pesquisa e diagnósticos socioambientais realizados pelos próprios povos indígenas sobre os recursos naturais e culturais pertinentes às comunidades. Essas ações são desenvolvidas por meio de ações políticas e educativas que resultam na criação de mapas temáticos e na sistematização de Planos de Gestão Territorial e Ambiental.

Palavras-chave: Etnomapeamento; Huni Kuĩ; Pesca; Amazônia; Planos de Gestão Territorial e Ambiental.

RESUMEN

La experiencia aquí relatada se refiere a los talleres de etnocartografía realizados entre los años 2004 y 2016 en 13 Tierras Indígenas (TI) ubicadas en el Alto Juruá y Alto Purus en la franja de frontera internacional entre Acre (Brasil) y Ucayali/Madre de Dios (Perú). En este caso específico, el artículo trata del mapeo de zonas de pesca realizado en 2005 en las tres Tierras Indígenas Kaxinawá ubicadas en el municipio de Jordão. Los talleres de etnocartografía tienen como finalidad apoyar los procesos comunitarios de gestión territorial y ambiental de las Tierras Indígenas del Estado de Acre. Se caracterizan específicamente por acciones de investigación y diagnósticos socioambientales realizados por los propios pueblos indígenas sobre los recursos naturales y culturales relevantes para las comunidades. Estas acciones se desarrollan a través de actividades político-educativas que resultan en la creación de mapas temáticos y la sistematización de Planes de Gestión Territorial y Ambiental.

Palabras clave: Etnocartografía; Huni Kuĩ; Pesca; Amazonia; Planes de Gestión Territorial y Ambiental.

1 INTRODUCTION

The experience presented here relates to the ethnocartography workshops held between the months of June and November 2005 in the three contiguous Kaxinawá Indigenous Lands (Rio Jordão, Baixo Rio Jordão, and Seringal Independência) of the Huni Kuĩ people, located in the Upper Juruá River region, in the municipality of Jordão, which occupies the southwest area of the state of Acre, on the border between Brazil and Peru.

The workshops on political and educational actions held in the Indigenous communities brought together a significant number of representatives from these groups to discuss the conflicts and progress related to the territorial and environmental management of their lands. The objective was to support the ongoing community-based territorial management processes in the Indigenous Lands located in the border area between Brazil and Peru.

Here, an ethnographic history of the concepts of space and of territorial configurations will be presented through the collaborative mapping process carried out by the Huni Kuĩ people. Indigenous cartography, as a “form of local knowledge” (Harley, 2005,

p. 211), has shown different ways of mapping the experience of space and time, with these being “dialogues irreducible to Western cartographic knowledge” (Bolaños, 2023, p. 12).

Indigenous maps express forms of use, movements, displacements, temporalities, culturalities and interculturalities. Created by the indigenous peoples themselves, they provide precise clues on community and inter-community agreements, as well as the space and time related to fisheries and hunting zones, wells and lakes, rivers and streams, current and former dwelling places, plantations and forests, cemeteries, clay for ceramics, the presence of spirits and enchanted beings, palm trees, fruits, and other elements essential for the use, handling, and conservation of the natural and agroforestry resources of these territories (Freschi, 2004, p. 20).

In educational projects developed over the past four decades by the Comissão Pró-Indígenas do Acre (CPI-Acre), a non-governmental organization (NGO), along with associations and various Indigenous peoples of Acre (Brazil), Indigenous Cartography has been used as a fundamental means for the management of their territories.

Mapping natural and agroforestry resources, socio-environmental conflicts, the rich and diverse toponymy of regions, its physiographic characteristics, its historical and cultural elements, and several other aspects of its life and landscape, with the active participation of Indigenous populations, has become a powerful tool for the implementation of territorial and environmental management of Indigenous Lands (Gavazzi, 2012, p. 15; 2018, p. 111).

Creating mental and georeferenced maps within these projects incorporates the vast knowledge and deep awareness that Indigenous peoples have of their lands and surroundings. Undoubtedly, there is a practical need of visualizing the Indigenous territory, transferring onto paper a profound perception and knowledge of space. According to Warren (2004, cited in Cobertt, 2009, p. 4), “maps are more than just paper. They are narratives, conversations, lives, and songs experienced in a given place, and are inseparable from the political and cultural contexts in which they are used.” For Woodward and Lewis (1998, p. 1), maps, as representations of the geographic world, have been developed and upheld based on three perspectives: “the map as a cognitive system, the map as material culture, and the map as a cultural system."

Figure 01 – On the left – Agroforestry agent José Rodrigues during a mapping activity. Photo: taken by Gavazzi, 2005. **Figure 02** – On the right – Mapping the fishing areas of the Kaxinawá Indigenous Land of Rio Jordão. Photo: taken by Gavazzi, 2005.

Source: Comissão Pró-Indígenas do Acre – CPI-Acre

This endeavor is deeply connected to the training programs of Indigenous Agroforestry Agents (IAA) and Indigenous teachers. Its main objective is to provide responses to the issue of territorial and environmental management of Indigenous Lands in Acre, as well as to the conflict scenarios faced by some Indigenous peoples due to the invasion of their lands and the unabashed plundering of their natural resources. This study was carried out in the context of the border region between Brazil and Peru, an area characterized by its vast mosaic of Indigenous Lands and Conservation Units, covering an area of 7.7 million hectares, adding up to 46% of the total surface area of the state of Acre.

2 THE FISHERIES MAPS AND THE MANAGEMENT OF FISHING RESOURCES

Before establishing contact with the Nawa (non-Indigenous peoples), the Huni Kuĩ[1] (also known as Kaxinawá) of the Brazilian western Amazon lived on upland areas near the headwaters of small streams, and fishing was considered a secondary activity when compared to agriculture and hunting. Today, its contribution as a food source for Huni Kuĩ family groups is of paramount importance. Due to the scarcity of game animals in the Kaxinawá Indigenous Lands in the municipality of Jordão, fish has become as valued a food as game meat (Aquino and Iglesias, 1994, p. 118).

[1] The Kaxinawá call themselves Huni Kuĩ (True People).

Most fishing techniques are exclusively male activities, but some women also fish with hook and line when their husbands are engaged in other tasks or are away, traveling. Therefore, fishing is undertaken by Indigenous people of both sexes, and by both adults and children. It can be performed as a collective or individual activity, depending on the technique. They employ arrows, tridents, harpoons, spears, cast nets, fishing hooks, diving masks, nylon lines with hooks, and even firearms—though the latter are used less frequently nowadays. Hook fishing was traditionally used by the Huni Kuĩ, even before contact with non-Indigenous people. The "hook was cut from the joint between the ulna and the radius of the armadillo, and the line was made from *envira*" (Lagrou, 1991, p. 70).

To capture fish, an ancient and deeply rooted cultural practice among Indigenous peoples of South America (Heizer, 1987, p. 95), various plant-based poisons are employed, extracted from the leaves, roots, or sap of plants known as *tingui*, which poison or suffocate the fish, facilitating their capture. The most commonly used poison is *puikama*, a shrub grown in upland plantations, whose leaves and flowers are harvested by women, while the men crush them in a mortar made from a hole in the ground until a paste is formed. From this paste, balls (*tunku*) weighing between half a kilo and a kilo are made, and stored in waterproof rubber bags (*encauchado*: fabric vulcanized with latex, used by Indigenous peoples and gatherer communities in the Amazon) or in baskets covered with banana or *sororoca* (*Phenakospermum guyannense*) leaves (Lagrou, 1991, p. 70). The *puikama* balls are used in the pools of the Jordão and Tarauacá rivers, as well as in the smaller streams and tributaries. They dissolve in the water, and the poison acts quickly, causing the fish to jump up and surface.

Collective fishing is a cause of great joy, as the elderly, women, and children take part in it, enthusiastically, either grabbing the fish with their hands or hooking them when they have stings, such as the *mandim* and others. "You have to be careful, soft *mandim*, and even the larger, spotted *mandim*, the teeth on the *Sorubim*, piranha... Piranha can even bite chunks off of you, you have to be careful when catching them" (Agostinho, In: Tavares, 2005). According to Lagrou (1991, p. 70), *puikama* does not kill the fish; it only "intoxicates them, and after an hour, its effects disappear." Fishing is done all year round, although it is more popular during the summer, when the waters are low, clear, and clean, a time when the fish swim up the rivers to spawn and are fatter and tastier (Gavazzi, 2012, p. 219).

The debates surrounding fisheries cartography have focused on the various fishing techniques used, on the distribution and current situation of this resource in each Indigenous Land, as well as on favorable environments for fishing, on traditional management, and on

usage norms. The fisheries maps identify places where fish are mainly gathered and, consequently, the appropriate locations to fish, such as pools, *salões*[2]; *pausadas*[3], and trees that have fallen in the river, whose large roots become trapped in the riverbed.

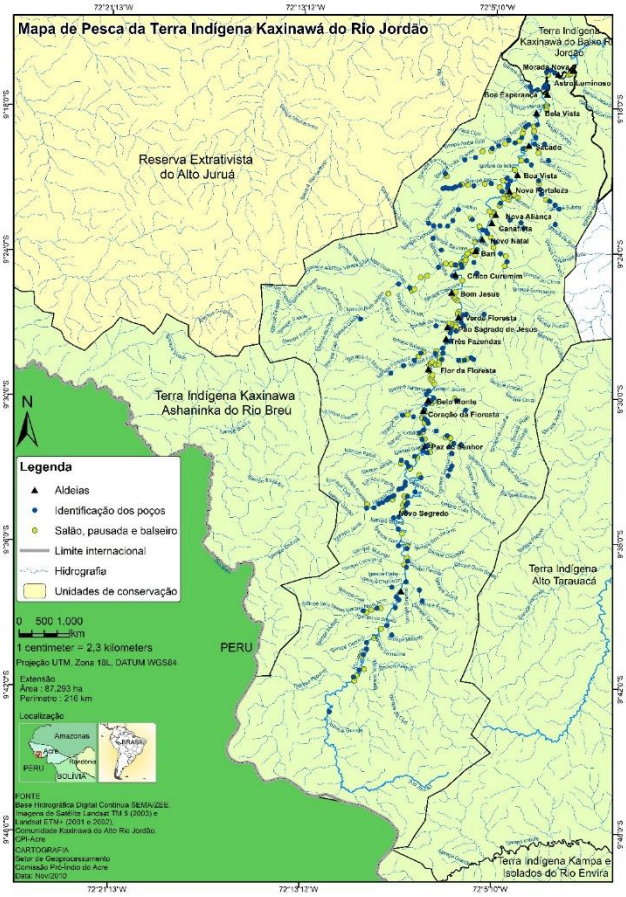
Also significant are the *balseiros*: tree trunks and driftwood dragged by the river during the rainy season, which then band together and sometimes make up veritable rafts (*balsas*, in Portuguese). These trunks are moved by the waters that erode forest-covered riverbanks, lakes, streams, and areas that are most suitable for fishing, usually located at the headwaters of rivers. According to Aquino (1996, p. 2), the Huni Kuĩ divide fish (*baka*) into "three categories: scaly fish (*baka shakaia*), leather fish (*baka bitxia*), and fish with stings (*baka mushaia*)," and they also tend to categorize them according to their habitat.

The fisheries map shows the main pools in rivers and streams. Pools are deep environments where fish like to live and are considered good fishing spots. In the fisheries map of the three Indigenous Lands, 179 pools, 14 *balseiros*, 35 *pausadas*, and 90 *salões* were identified and mapped. When mapping the pools, participants also identify their individual names. Usually, the names are determined in the Indigenous language, and when they appear in Portuguese, they are often simple translations. According to Pearce and Louis (2008, p. 108), "Indigenous cultural knowledge is process-based, established and incorporated into the landscape through the names of specific places and stories expressed in the meanings, connections, and interrelationships of these toponyms."

For the Huni Kuĩ, the pools are built and kept by animals known as "pool beasts," such as alligators, large snakes, and rays. The presence of these "beasts" in the pools is understood by this people as a fundamental aspect that prevents the pools from becoming blocked, as these are the animals that take care of them and tend to the environment. Their presence is deemed as an indicator of abundance of fish and the necessary conditions to maintain it. In this sense, fish management is directly related to the management of large snakes, alligators, and rays.

[2] Literally, "saloons": specific areas in rivers, streams, and lakes where the waters are clearer, calmer and shallow enough to allow one to see and capture fish with much more ease.
[3] The same as *balseiros*, below. Although both names carry the same meaning, they are different depending on the area. In the Hãtxa Kuĩ language, this sort of structure is called *Beshuru Ikai*.

Figure 03 – Fishing Map identifying the fishing pools of the Kaxinawá Indigenous Land of Rio Jordão – CPI-Acre



Source: Comissão Pró-Indígenas do Acre – CPI-Acre, 2005

(...) As we are managing, we want these animals to come back. My father told me that one day we will once again have what we once had. Sometimes, when the snake comes, it already knows where it used to live. He said that it will come and make the pools. He said it is the snake that makes the pools—when it comes, it makes them. He said that it opens the hole where it once lived. He told me that. He said that, if this happens, a lot of fish will come. When it comes back, everything returns as well. He said that the big snake is a sort of yuxĩ (the spirit of living and non-living beings in the forest). My father tells me this. Where you have a snake, you have everything. Everything comes. (...) Because, for the fish, the snake is considered the father of the fish. That's why the fish come, because the snake likes it. As we are managing it, we want these animals to come back. (...). Sometimes, when the snake used to come, it already knew where it was going, where it lived. (...). If we hadn't disturbed these fish that are here now, he said everything would come back — *tracajá* [turtle] and everything—would come back. That's what we were talking about: we are already having *tracajá*. In all the villages, they are saying it. They said we already have it. And from what I'm seeing, the only thing missing is the fish returning to this pool that we used to be here. That one hasn't come yet. Now, the *tracajá* is starting to come back. (...). (IAA Lucas Sales Huni Kuĩ, In: Gavazzi e Freschi, 2005).

The mapping processes simplified the communication of spatial, cultural, and socio-environmental information regarding the Indigenous Lands, and was considered by the participants as a moment of learning. Many aspects related to the geography, history, and culture of the territory, which not everyone knew, were shared, contributing to equalizing access to information about the Indigenous Lands.

3 PIRACEMA: THE JOURNEY OF THE FISH THROUGH THE RIVER

Piracema, a word of Tupi origin, means “exit of fish.” The Huni Kuĩ assert that the fish travel during the *piracema*, a phenomenon that takes place yearly, coinciding with the summer period, when certain species of fish swim upstream against the current to spawn and reproduce. *Piracema* is considered an essential event to preserve the wealth of fish resources in rivers, streams, and lakes. For the Huni Kuĩ, not all fish take part in the *piracema*, and when they do, each species ascends separately.

A controversial topic during the construction of the fisheries map was the drastic reduction of the *piracema* phenomenon due to fishing practices conducted outside the Indigenous Lands, often illegally. Fish are captured by residents living on the outskirts of the Indigenous Lands and along the riverbanks, employing predatory fishing methods, as well as by commercial fishermen who operate along the rivers who trade fish, preventing them from reaching the headwaters to spawn.

This was a recurring issue in the workshops, where it was highlighted as a serious problem affecting fishing. One of the strategies adopted by the Huni Kuĩ to exert some control over the rivers and, consequently, over the waters and the fish, was to include, in their management plan, the creation of a watershed committee: a decision-making forum within each watershed, involving users, municipalities, organized civil society, and other “levels of government (state and federal), aimed at acting as the water parliament of the basin” (Brazil, 2011, p. 63). However, the Huni Kuĩ faced significant challenges in implementing this committee.

> During the *piracema* season, in the Lower Jordão River, many people use gillnets, which prevents a lot of fish from migrating to our area because it significantly reduces their numbers. There are many professional fishermen living downstream of the Jordão and Tarauacá rivers, and they also prevent many fish from migrating upstream. In September and October, we only get small fish like *piaba*, *piau*, a few *surubins*, and a small number of leather fish. (IAA Josias Maná, In: Gavazzi e Freschi, 2005).

As for the large fish, it was reported that some species are becoming increasingly scarce, such as *jundiaçu*, *pirapitinga*, and *caparari*, which are no longer seen in the fishing areas. The Indigenous people pointed out that *matrinxã*, *jundiá*, *jundiaçu*, *surubim*, *caparari*, and other fish are practically no longer found in the Indigenous Lands: the same is true for *tracajá* turtles (*Podocnemis unifilis*) and alligators.

> The large fish that we are still able to find now are just *surubim*, *jundiá*, and *curimatã*. But there are only a handful, there aren't many. *Matrinxã* can no longer be found. *Caparari*, only a few that the fishermen left behind, and they are slowly migrating upstream. (IAA Josias Maná, In: Gavazzi e Freschi, 2005).

4 THE LAKE, A FISHING SPOT WHOLE YEAR ROUND

Lakes are environments where fishing can be done all year round, both in winter and summer, because their waters are calm and clean. Many of the mapped fish were categorized as species that prefer to inhabit rivers, streams, and lakes. Some lake fish are rarely found in rivers: fish that inhabit streams include *piabinha, piaba chata, bode preto, cará, subaru*, "shrimp," and "crab." In the river waters, *sarapó*, *agulha*, *jundiá*, *surubim*, *curimatã*, *praiana*, *mandi*, *candiru*, *raia*, and *dourado* can be found. In the lakes, the main species are *pirarucu, piranha, pacu, traíra*, and *bode seringueiro* (Resende and Gavazzi, 1992, p. 23).

In the fisheries map, lakes that are closed off by vegetation and are not used for fishing due to difficult access were recorded. In contrast, the open lakes are the ones that present the greatest abundance of fish. All the lakes were recorded with their respective names, the vast majority of which in the Indigenous language: "Now we have these new ideas, along with this mapping, of giving names to the pools, bends, refuge areas, and to herbal areas, which are the most powerful." (Augostinho Muru, In: Tavares, 2005).

In some areas, the type of management used in each lake was recorded. In the Kaxinawá Indigenous Land of the Jordão River, 27 lakes were mapped, six of which are closed off by vegetation, making it difficult to access them, and one dries up during the summer. In the Lower Jordão River, only six lakes were identified, while in *Seringal Independência*, only three, one of which is closed off. The *igapós*[4], flooded zones of the

[4] Forest periodically flooded by river waters.

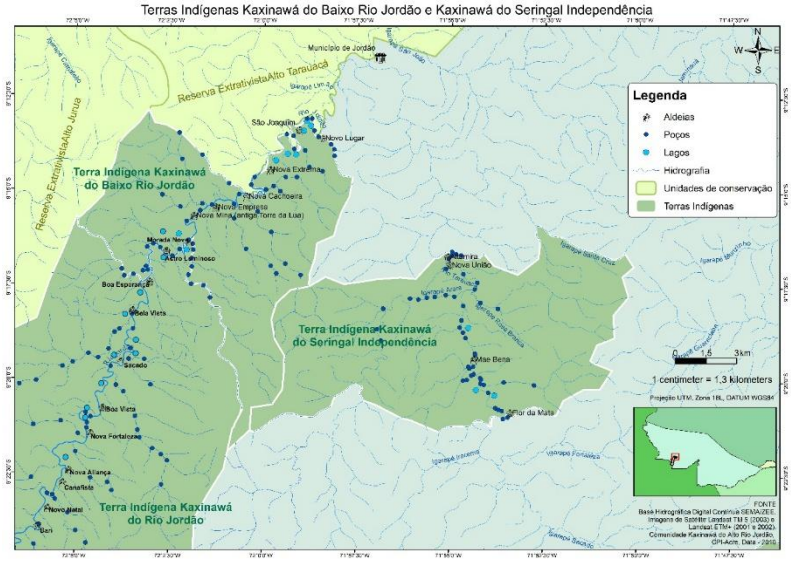
Amazon with vegetation adapted to flooding periods, which shelter a great variety of fish, were not mapped.

5 USE AND MANAGEMENT OF *TINGUI*

Another widely discussed topic during the fisheries mapping activities was the use of “several types of known-regionally poisons, as the *tingui*, cultivated both in gardens and in the backyards of houses, or even collected in the forest.” (Aquino and Iglesias, 1994, p. 121).

Fishing with *tingui*, a traditional practice carried out in the summer, when the waters are low and clear, is generally a collective activity, in which a large number of people participate, including men, women, and children. In the case of the Huni Kuĩ, when a large group of people gathers, the *tinguizada* becomes a true celebration: a cultural and social event that brings everyone together on the banks of the river or stream to fish for food. Afterwards, the catch is shared among all and everyone eats together, men on one side and women on the other, in accordance with the Huni Kuĩ custom.

Figure 04 – Fishing Map identifying the fishing pools of the Kaxinawá Indigenous Lands of the Lower Rio Jordão and Seringal Independência – CPI-Acre.



Source: Comissão Pró-Indígenas do Acre – CPI-Acre, 2005

With the emergence of the rubber exploitation at the end of the 19th century and beginning of the 20th century, known as the Amazon rubber cycle, rubber companies, Peruvian rubber tappers, and people from northeastern Brazil kicked off a process of

occupying the forest, creating new productive relations, violence, fears, and uncertainties for the Huni Kuĩ (Ramalho, Sena, p. 78). This was a period the Indigenous people refer to as the "time of captivity," marked by the exploitation of labor and numerous injustices, where almost everything was prohibited by the rubber bosses. The only work allowed was cutting rubber trees and making smoked latex balls.

The rubber bosses employed cruel means and a system of slavery to increase their profits, prohibiting the indigenous people from using *tingui* in their fishing expeditions, claiming it killed the fish, poisoned the water, and caused diseases. According to Lucas Kaxinawá (In: Gavazzi and Freschi, 2005), "In the past, my father used to say that the police used to come here almost every day to pull up the *tingui*. The bosses would call them, and they would go there and pull up the *tingui*. We couldn't grow it anymore; tha't how it was, it was a rough period."

In the 1980s, with the demarcation of Indigenous Lands and the removal of the rubber bosses, the Huni Kuĩ regained their freedom and autonomy to live according to their customs and traditions, and the use of *tingui* was once again authorized.

During the ethnomapping activities, it became clear there was concern about finding ways to use the traditional practice of *tingui* without harming the fish. According to AAFI Vanderlon, his community uses a maximum of 20 and a minimum of 15 *tingui* balls. "It was agreed upon in my community to always do it this way. But from now on, we are doing this ethnomapping, and in all these pools we will create a usage plan. It has to be managed well as to avoid destroying everything."

According to the testimonies of the Indigenous people, the indiscriminate use of *tingui* caused negative environmental impacts, as it drives away and kills a large number of fish. From this issue, the participants discussed how the communities could organize the use of *tingui*, avoiding fish scarcity and, at the same time, not harming aquatic creatures. The three Indigenous Lands unanimously agreed not to use *tingui* in stagnant waters, such as lakes. Other Indigenous Lands decided not to use *tingui* in all pools and to reduce its cultivation, without, however, losing the seeds.

> (…) The fish, during the *piracema* season, if we fish and use *tingui*, we will deplete it entirely. Because the fish don't come every year. Those that come from downstream, if we catch them all, they will be gone in no time. So that's why we want to preserve our pools, and also stop using *tingui* and other things. Sometimes we have two or three pools in the village, so we'll leave at least one as a reserve, so that the fish can stay. Maybe we can use at least one. That's how we're thinking, and we're doing this work. And it's the

> same with the stream. Because there are pools where it's hard to run out of fish. In every stream, each person knows it well. Even where we go, there are small fish like *piaba* and others. And that's what we marked on the map. (IAA Lucas Sales Kaxinawá, In: Gavazzi e Freschi, 2005).

6 - RIPARIAN FOREST

The causes of deforestation of riparian forests in Indigenous Lands were widely debated among participants in the cartography activities. One of the causes identified was the relocation of family groups that used to live in the population center onto the margins of the Jordão River. With the establishment of villages along the riverbanks, the riparian forests were cleared and turned into population centers. Some Huni Kuĩ families, who had previously cultivated their gardens in upland areas (*bai kuĩ*), stopped doing so and began establishing their plantations along the riverbanks, alongside banana plantations and pastures.

As a result, the riparian forests were cleared, causing riverbank erosion and landslides, leading to sedimentation in both the river and the fishing holes. During the workshop, the need to preserve all riparian forests was discussed—not just those along the Jordão River but also those along streams, lakes, and springs. "The riparian forest is not just for the Jordão River; we have to think about the stream, springs, and lakes. They are all riparian forests. So, we have to consider that too. It's not just about the Jordão River, we need to think about the streams and our fishing pools." (Edson Ixã, In: Gavazzi e Freschi, 2005)

> Nowadays, our river is struggling to hold its riparian forests. There are only a few small patches left. Upstream, some are still standing, but further downstream, it's hard to find riparian forests, just secondary vegetation (*capoeira*). And there's another thing: the pasture, where people are raising cattle in each village... It's not happening in all villages, just in six villages where people are raising cattle. If we don't address this, our preservation, if in each village we start buying cattle to raise and create large pastures, soon our land, this Jordão River, will turn entirely into fields along the riverbanks. There's no point in doing that. We have to think. There's no point in further destroying our land with pastures. It's important to think about our future. There's no point in thinking just about today, or tomorrow, or the day after. We have to think for 15, 100 years ahead. (Edson Ixã, In: Gavazzi e Freschi).

Agroforestry agents are the individuals responsible within the Indigenous Lands for engaging with communities about ways to preserve these forests. They organize meetings to recommend the communities to avoid growing their crops, banana plantations, and

pastures along the riverbanks and streams. “To preserve the riparian forests, when I took on the responsibility of coordinating the agroforestry agents, I used to walk—at most—three days on foot, reaching the villages and letting all the communities know that they couldn’t cut down the forest along the riverbank” (AAFI Josias Mana, In: Gavazzi and Freschi, 2005). The preservation of riparian forests is linked to improved fishing, as these ecosystems provide leaves, fruits, seeds, and insects that, when they fall into the rivers, feed the fish and other aquatic organisms.

> I’m going to talk a bit about the riparian forest. We’ve been working a lot on the riparian forest plan since the beginning. It’s very important, and now we’re able to see that. I’ve already been observing and talking to the community, with the representatives who are here. So, at least in my village, we’re seeing a lot of this. We know that the riparian forest is very important. We’re noticing that along the riverbanks, where there’s still riparian forest, there’s fruit. I know four places where fish go to feed themselves, which is where fruits fall into the water. I think that’s where you can find all kinds of fish. Where fruit falls into the water, you can see: *curimatã*, *piau*, lots of fish. This is important for us to make decisions about the riparian forest. (IAA Francisco Roseno Sabino, In: Gavazzi e Freschi, 2005).

During the mapping activities, the issue with the destruction of riparian forests led the Indigenous peoples to collectively reflect on their own strategies for protecting and conserving these forests. In designing the management plan during the ethnomapping workshops, the Huni Kuĩ established land-use regulations and decided to conserve the riparian forests to protect the water, fish, and prevent rivers, fishing holes, lakes, and stream from aggrading. They decided to leave untouched “50 meters of forest along the riverbanks, streams, lakes, and *igapós.*” (Gavazzi e Ramalho, 2012, p. 64).

Management plans are essential tools that have contributed to the protection, territorial control, and guaranteeing social and environmental sustainability for Indigenous peoples living in various territories in the state of Acre. These plans represent commitments made by the communities themselves, who consider them a priority for the actions to be developed in their territories, with the goal of improving the quality of life while respecting the culture and specificity of each people.

Many of the agreements established in these plans have already been implemented by the Indigenous peoples, especially those related to the use, management, and conservation of natural resources and agroforestry. (Gavazzi, 2008, 2011, p. 244, 2018, p. 112, 2021, p. 23, Gavazzi e Almeida, 2010, p. 225).

7. MANAGEMENT AND REGULATION OF FISHING USE

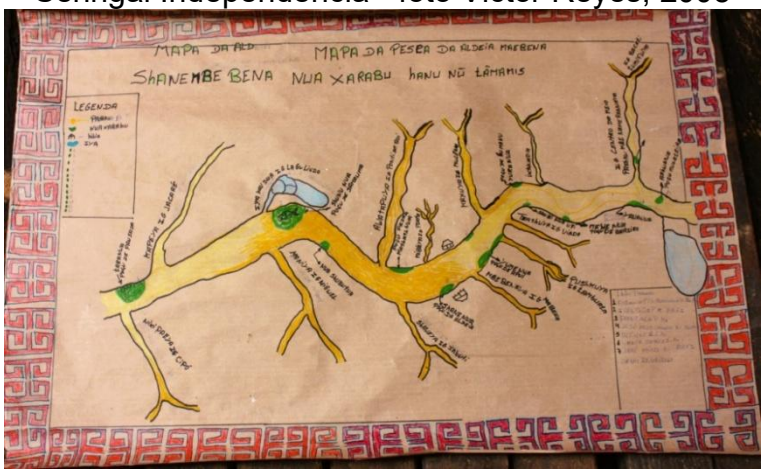
The refugee zones marked on the hunting maps are also understood as protection areas for aquatic fauna. In some territories, the refugee areas already existed before the cartographic activities, while others were created as a result of the discussions among the participants. The community consensus, expressed in the agreements for the protection and management of fishing within the Indigenous Lands, was achieved thanks to the systematization of the management plans.

The fisheries mapping procedures helped generate discussions about concerns regarding problems and positive management experiences in each Indigenous Territory. Mapping contributed to strengthening the discussions held within the communities about the current situation of fishery resources, increasing collective power to reflect on local and regional issues, as well as enhancing their ability to protect and manage their own lands and environments. The creation of the fisheries map helped Indigenous communities to assess their current circumstances in order to develop future strategies for managing fishery resources.

In this sense, the management plans aim at various ways of using, managing, and conserving fishery resources. “I think everyone will now become more self-aware, we will spend some years without fishing with *tingui* in the pool so that we can see the result” (Edson Ixã Huni Kuĩ, In: Gavazzi e Freschi, 2005).

Aware of the dangers of predatory fishing, of the relationship that other animals have with fish, and of the issue of water contamination due to the use of *tingui*, which leads to the scarcity of fish, the Huni Kuĩ are concerned with the sustainable management of natural resources in their lands and surrounding areas, including water and fishery resources. The dialogues and reflections established in the workshops to build the fisheries map helped them design collective agreements. Predatory equipment was prohibited, and control over the use of *tingui* was introduced, establishing norms for the use, management, and conservation of these aquatic resources in the Territorial and Environmental Management Plan.

Figura 05 – Fishing map of the Mae Bane village - *Shanembe bena nua xarabu hanu nü tãmamis* - In the indigenous legend, the water is yellow – Indigenous Land Kaxinawá Seringal Independência - foto Victor Reyes, 2005



Source: Comissão Pró-Indígenas do Acre – CPI-Acre

By discussing the situation of some of the rarer fish species, especially the large leather fish like *jundiá*, *surubim*, *caparari*, as well as *tracajá* turtles and alligators, it was observed that these were the first types of fish to experience population declines. The discussions regarding the use and management of fisheries highlighted the need to rethink fishing activities and take on new challenges for the conservation of rivers and lakes. For instance, cheloniculture (breeding *tracajás* and other turtles) and pisciculture of regional Amazonian fish were widely discussed among the Indigenous participants during the fish mapping workshops. “We are interested in breeding and working with fish and turtles, like *tracajá* and other kinds. We have established a time period to mark the lakes, where it works, where we can place them.” (Vitor Pereira Busã, In: Gavazzi e Freschi, 2005).

> Fish farming is a concern of ours, because the rivers have fewer fish now. But some villages have a fish pond nearby, close to their homes, so for now, we still have that. We are also thinking about building a fish pond near the houses, so we have a reserve, a defense, and we’ll breed them, know how to manage and use them. It’s not just about farming fish; you also need to manage the fish properly. Building a pond in the village is an important thing, to have both fish farming and forest preservation. Taking advantage of the space to plant seeds around the pond is also important. It’s necessary to plant *açaí*, *buriti*, and other plants by the pond to serve as food for the fish. I think this also helps the students understand how to work with management and how to care for the animals, in this case, the fish. (Teacher Itsairu, In: Gavazzi e Freschi, 2005).

8. THE ENCHANTED BEINGS, THE METAMORPHOSES, AND THE SONGS TO INVOKE THE AQUATIC CREATURES

> (...) Scaly fish, leather fish, fish with stings—each one has its own land. They are from São Paulo, from Rio de Janeiro, from Pernambuco... They come from far away to visit our land. They stayed longer because of that prayer I told you about. That prayer is so powerful it communicates with the *yuxibu*. So, the fish authorize bringing them to stay in the pond. (Agostinho Muru, In: Gavazzi e Freschi, 2005).

In Huni Kuĩ belief, the forest, trees, rivers, lakes, ponds, backwaters, and riverbanks are inhabited by spirits that control animals and punish humans, such as: *hene yuxibu* (mother of the water or spirit of the waters, lives in all rivers and streams; she is the mistress of the waters and can charm people); *nuwa yuxibu* (spirit of the backwaters or deep pools of the rivers); and *mawa yuxibu* (spirit of the high riverbanks) (Aquino, 1996, p. 4).

The seasonality of fish or their abundance is interpreted through mythical or cosmological explanations. Therefore, in the discussions about fishing on the maps, the Indigenous peoples spoke of the shaman's mediation in their relations with certain spirits that govern some aquatic beings, such as the ritual chants to invoke the "chiefs of the fish" or the "owners of the fish," such as the large serpent, the stingray, the alligator, and the *poraquê* (electric eel), who act as ecological agents in managing and protecting the fish.

Where there are "owners of the fish," there is usually a great abundance of fish; in these cases, the "owners of the fish" are considered by the Huni Kuĩ as biological indicators. The ritual of calling for fish is performed through chants (prayers) in which people walk in circles the whole night long in the *katxanawa* ritual, and if the prayer is strong, the following year will bring an abundance of fish: "So many stingrays, serpents, alligators, electric eels, everything that exists in the river comes, because in the river is the needlefish, he is the president of the king of fish, wherever he goes, he takes them with him." (Agostinho Muru, In: Gavazzi e Freschi, 2005).

> Many elders, when someone from their family passed away, would perform a chant called *taka*, inviting all the chiefs of the fish — such as alligators, stingrays, electric eels, and the needlefish — who are the kings of the waters. Wherever they go, they invite their kin. It is said that they manage these four species. There is even a song for it (...). When a relative dies, they have a song to call the game animals, a song to call the snakes. When they are very angry because a child of theirs has passed away, they sing a song calling for

> the snake. This year, if not everyone, at least most people will be bitten by snakes. If they invite the game animals, they are part of *dua*. If the *dua* or the *bãu* (shaman) has passed, they sing to call the game animals. If the *inu inani* (spirit of the fish) dies, they sing to invite the fish, so that in that year there will be an abundance of fish. (Agostinho Muru, In: Gavazzi and Freschi, 2005).

Transformation is a constant among the Huni Kuĩ. According to the testimony of the shaman Agostinho, when we were working on the fish mapping, the *canoeira* frog, in the summer, transforms into a fish known as the white-bellied *bode* (*Pterygoplichthys pardalis* or the Amazon sailfin catfish). “It transforms in the summer. Because it is the egg of the *canoeira*. The *canoeira*, when it lays its first batch of eggs, with the first cold snap, that egg won’t turn into a frog; it will turn into a white-bellied *bode*. This fish doesn’t come from another region, it’s from here” (In: Gavazzi and Freschi, 2005). “Interchangeability, transience, becoming in action—beings transform in order to occupy water, land, and sky.” (Correia, 2023, p. 82).

For Descola (1997, p. 248), this ability for metamorphosis present in many Indigenous peoples of the Amazon is “attributed to all: humans can become animals, animals can become humans, and the animal of a given species can transform into an animal of another species.” Given this fact, it is essential to consider the system of representations, symbols, and myths that Indigenous societies build, as it is through them that they interact with the environment. “It is also with these representations and with the accrued empirical knowledge, that they develop their traditional management systems.” (Diegues *et al*., 2000, p. 21).

9. FINAL THOUGHTS

The first Territorial and Environmental Management Plans (TEMP) in Brazil emerged in Acre in 2004, during ethnomapping workshops. Starting in 2009, the government of Acre incorporated the TEMP as a public policy, and in 2012, it became part of the National Policy for Territorial and Environmental Management of Indigenous Lands, with the goal of safeguarding and promoting the protection, recovery, conservation, and sustainable use of natural resources in Indigenous lands and territories.

In the specific case of fishing resources, its mapping provided the Huni Kuĩ of the municipality of Jordão with the necessary conditions to collectively discuss and reflect on the issues of fishing and seek sustainable solutions for the shared management of these

resources, incorporating usage, management, and conservation norms into their management plan, as a possible way of administrating this important resource.

The maps created by the Indigenous peoples became essential tools for planning territorial and environmental management activities, as it is through mapping Indigenous Lands, villages, and their surroundings that reflections, debates, and community mobilizations are engendered aiming at implementing sustainable and organized forms of land and natural resource use, in favor of the protection of Indigenous peoples, of biodiversity, and of their territories. In this sense, Indigenous cartography is present throughout the creation, systematization, and implementation processes of the Territorial and Environmental Management Plans. The maps created by the Indigenous peoples themselves tell their own history of occupation, identify sacred areas, and point out that these populations have their own ways of categorizing and naming, not subject to Western science nor to the Portuguese language.

Mapping activities comprise a thought exercise regarding planning and usage of space in each village and its surroundings, providing a broader perspective for the community. It is a critical analysis of the use of land, natural resources, and agroforestry resources that contributes to a better understanding of how communities are using their territories.

As the most relevant points of production, occupation, appropriation, and resource extraction, villages form the units of production for the maps, as Indigenous territoriality is largely organized around the areas of use agreed upon by the communities. These zones, in turn, are deeply interconnected with social relationships and the management of the surrounding environment, elements that cannot be understood without considering the symbolic aspects tied to myths, rituals, and ceremonial practices.

When defining strategies for the use, management, and conservation of natural resources, it is also necessary to consider the concept of “owners” of natural resources, which is widely spread throughout the Amazon. One example of this is the needlefish, considered by the Huni Kuĩ as the king of the waters, a supernatural being with influence over fishing activities, as wherever the needlefish may be, many other fish are said to be found around it. This is just one example of the diverse collection of religious beliefs and mythology that must be considered as “a kind of transposed ecological knowledge, as a metaphorical model of how the ecosystem and the balances that must be respected in order to maintain it in a state of homeostasis works.” (Descola, 1997, p. 224).

Maps are an integral part of social and cultural construction processes, and are effective means of communication with their own visual language. They are fundamental tools for the self-determination of Indigenous peoples, as they represent environmental, political, cultural, and socioeconomic landscapes. The cartographic process allows these communities to manage and control their own territories and resources, while at the same time promoting environmental protection, security against invasions, and improved relations with their neighbors and the State.

Currently, the mapping of the three *Kaxinawá* Indigenous Territories in Jordão is being used by 39 Indigenous Agroforestry Agents, social actors responsible for managing their lands and monitoring environmental activities, defending 107,480 hectares of forest inhabited by 3,164 people against environmental and human rights violations. In addition to being used by the agroforestry agents, these Indigenous maps are also employed in educational activities by 96 Indigenous teachers and their 1,235 students in the 36 Indigenous schools present on these lands.

Indigenous cartography contributes to a deeper understanding of the territory. The elders (hunters, fishermen, gatherers), who know the territory in detail, actively take part in the creation of the maps, alongside the youth and, in some cases, the children. This collective cartographic process serves as a valuable channel for the transmission of knowledge between generations.

It is important to highlight that the ethnomapping activities are not limited to the maps themselves, but to the act of mapping, as these cartographies are in constant transformation. In other words, they are part of the ongoing process of training Indigenous agroforestry agents, teachers, and monitors, and include discussions about territorial management with other Indigenous Territories. The maps created collectively in these training activities are the result of Indigenous discussions and reflections that materialize on paper at a specific moment. However, they are neither static nor final, but rather the outcome of a continuous dialogue involving Indigenous communities, their advisors, neighbors, and the Brazilian State.

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