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INDIGENOUS BIOECONOMY

ANCESTRAL KNOWLEDGE AND SOCIAL TECHNOLOGIES

ORGANIZED BY:

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Marasmius yanomami fungus. The rhizomorphs of M. yanomami are used in the ornamentation of baskets by Yanomami women. They are known to be used by birds in their nests. The type of fungus was discovered in 2019 and its location is in Amazonas.

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Table of Content

Cover Letter

With great enthusiasm and commitment to intercultural dialogue, the third volume of the Amazônia Concertation Journals delves into bioeconomy from the perspective of indigenous researchers.

By combining a deep and sensitive dialogue between indigenous and non-indigenous scientific literature, the indigenous anthropologists Braulina Baniwa and Francisco Apurinã, also authors of the report “New Economy for the Brazilian Amazon”, elaborate in this publication on the different meanings of “economy” for Indigenous Peoples, offering a multifaceted, holistic, and grounded view on how to relate to productive arrangements and economic activities aimed at the prosperity of the Amazon rainforest.

Learning from other perspectives and ways of relating to the world, and valuing the ancestral knowledge of Indigenous Peoples, historically marginalized from the Brazilian intellectual and economic debate, is unquestionably the only path to building new paradigms that the world so desperately needs and for developing policies and actions aimed at fostering more effective, sustainable, and fair bioeconomy.

This collaboration between The Amazon Concertation, WRI Brasil, and authors Braulina Baniwa and Francisco Apurinã is not just a technical and academic exercise but a commitment to valuing Brazilian sociodiversity and to practices that consider the specificities and complexities of the Amazon as a key to responding to the challenges of the region and the rest of Brazil.

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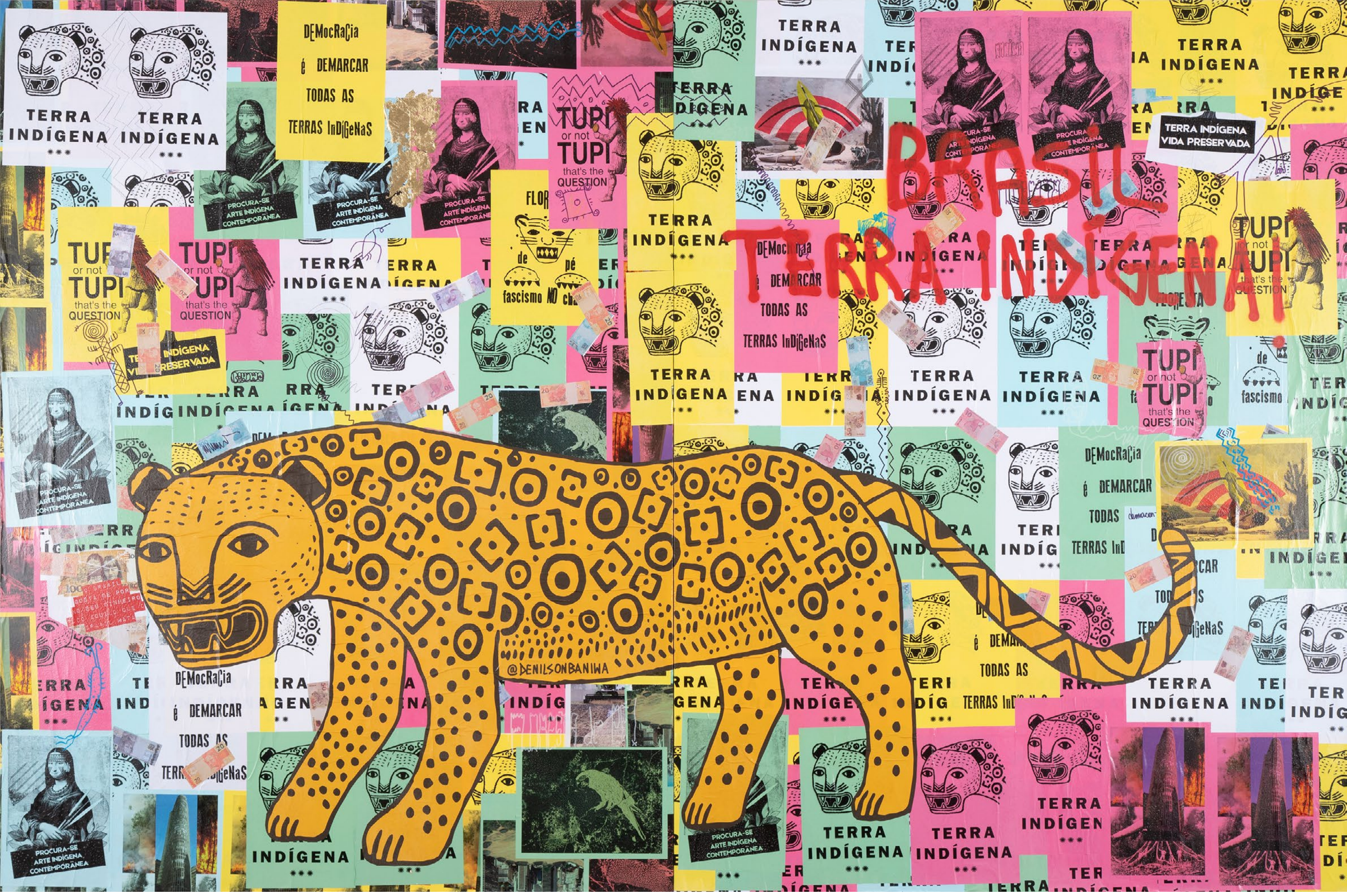

Denilson Baniwa. Brazil, Indigenous Land, 2022, street posters on canvas.

1.

INTRODUCTION

Bioeconomy is a new term in Brazil and fairly unknown to indigenous peoples, therefore it is little discussed in their territories. However, this work, in addition to describing economic processes from an indigenous perspective, presents an eclectic knowledge production arrangement, both in terms of focus and of representation, resulting from a partnership between indigenous and non-indigenous authors.

The focus is on the Amazon, but it could be on any other part of the globe where there is an expectation of large-scale exploration of products that generate economies. But what type of economy? As peoples with oral traditions whose relationship with nature is characterized by family arrangements for subsistence, there are still many challenges for indigenous people to be heard. Their economies, productions and ways of life are yet to be included in the statistics of the national economy. This work demonstrates that the indigenous economy is much more than statistics, which does not exist for these peoples either.

2.

INDIGENOUS BIOECONOMY AS AN INSTRUMENT FOR TERRITORIAL MANAGEMENT AND MITIGATION OF ENVIRONMENTAL AND CLIMATE CHANGE

Territory from an indigenous perspective

> When indigenous peoples fight to their original rights to their territories, they are fighting for the right to exist, not to survive. Because all you need to survive is a plot of land. But indigenous people see the land as a set of relationships. What, for many people would mean owning a lot of land, is a way to give meaning to our being in the world. Land for us is part of us. Indigenous people look at the land not as an object to be negotiated, but something that is part of them. It is part of their very existence (Munduruku, 2018).

In a few words, indigenous PhD and writer Daniel Munduruku tells us much about the relevance and meaning of land, as well as its epistemic, cosmological and ontological representations for indigenous peoples. He adds that, when indigenous people are fighting for their lands, it is the same as fighting for the right to cultural survival – when a relationship of respect and otherness is established with others, be they human or "more-than-human" –, because land is not simply a space for a house to be built upon or to grow some plants.

According to this perspective, it becomes clear that for indigenous peoples it is impossible to think, speak, produce or make any decision in a way that is dissociated from their territories. In this sense, Munduruku's statement allows us to briefly explore this topic as a way of expressing the relevance of the land from an indigenous perspective (see also: Kolling and Silvestri, 2019).

Indigenous people nurture for these places a feeling that arises from a sense of belonging – not as owners, but as lands' sons and daughters –; therefore, they are not seen from a capitalist or consumerist perspective. On the contrary, indigenous people, their territories and the beings that inhabit them share a relationship of interdependence. It would be possible to say that the indigenous peoples are not within their territories, but rather that the territories are within them.

For indigenous peoples, everything happens in the forest, and the *kymapury*[1] (paths) emerge in this context as a crucial component for social relations between humans and non-humans. *Kymapury* are spaces where people collectively or individually think, plan, make decisions and also date and reproduce. The different paths that cross territories and forests are seen by wise indigenous men and women as spaces of protection, knowledge, transmission, alterity, exchange and reconnection, as taught by Katãury[2]:

> We, indigenous peoples, have been on this earth since the beginning of the world, as my father told me, as my grandfather told him, as my great-grandfather told my grandfather [...]. Tsura, our creator, gave life to the different beings that exist in nature: those who live on earth, those who live in water, those who live in the air and those who live in the sky, in the world of enchantments and in the underworld. Since then, we have learned to care for the things he created since the first day, taking from nature only what is necessary, as he taught us; respecting his creation, because even animals speak to us and deserve respect. Many of these animals are our own relatives. Tsura also gave the Apurinã people the knowledge that allows us to know when animals are such that we can kill for food and when we should respect them as our relatives. Therefore, everything that is harmful to nature is also harmful to Tsura's teachings. (Katãury, 2018, oral interview).

1 Kymapury is a word used by the Apurinã people, that means path as an extension of thought and of multiple relationships and socialities. Because it is through them that we access the most distinct spaces and human and more-than-human beings.

2 Katãury, also known as Matxãw and Raimundo, is the father of Francisco Apurinã. He is originally from the Apurinã do Valparaíso Indigenous Land, held the role of tuxaua for several years in different villages of his people, was a teacher of his mother tongue, an expert in handling the bow and arrow, a guitar player, a storyteller and an excellent craftsman. Katãury knew things that were yet to happen. He was baptized in the kamatxi ritual, when future shamans are introduced to their spiritual guides from this physical dimension and other dimensions. He crossed to the other side of the river (passed away) in August 2019.

Katãury God's statement teaches that indigenous people maintain relationships with the most diverse beings in nature, whether human or "more-than-human", with the latter occupying different spaces and also organizing themselves into collectives, similar to human societies (see also: Apurinã, 2022).

To better understand the indigenous way of thinking, seeing and being in the world, it is appropriate to start with the composition of different dimensions that simultaneously connect and dialogue. The worldview of the Apurinã indigenous people can be used as an example of this, as it assumes the existence of three worlds: *ikyra thyxi* (the world above/sky), *ywa thyxi* (this world/earth) and *ywa ypatape thixi*[3] (the world below/underworld), which are constantly in dialogue.

The world/earth – a dimension referred to by the Western perspective as the environment and which is also conventionally called nature – is inhabited by different species of living beings, human and "more-than-human", organized in different ecosystems: aquatic, terrestrial and aerial. Some of these inhabitants form spiritual agencies that are guardians and controllers of these spaces and are also responsible for managing, maintaining and balancing the planet, with which indigenous peoples maintain relationships of otherness, respect and reciprocity.

It is thus understood that for each ecosystem or space there is one or more controlling guardians who look after these places and the lives that inhabit them. Depending on the context, the objective and their intentionality, they could be spiritual agencies of the *kusanaty* (shamans), the shamans themselves or specific beings into which they transform. They hold the codes and techniques to communicate and interact with spirits, with humans and "more-than-humans", and are also responsible for diplomatic and social relations between different worlds, spaces and living beings. They do this in life or in spirit, being seen or invisible, while awake or dreaming. If, by chance, any of these aspects are not in synergy with the different dimensions and environments, the world will become sick, as is currently happening with the earth and biodiversity.

3 These terms used to describe the different worlds are part of the vocabulary of the Apurinã people.

Ecological and climate transformations from an indigenous perspective

For some time now, birds have stopped flying over the trees when we enter the forest to hunt. Fish no longer swim up the rivers and streams in numerous schools to reproduce or during the spawning season, as water resources are not as abundant as they used to be. Cassava, considered the mother of crops, as well as other vegetables that are part of indigenous peoples' diets, currently dies easily due to lack of rainfall. Fire, nowadays, spreads more easily through the forest, destroying crops and killing many living beings that make up biodiversity. A wide variety of plants, many of them medicinal, or responsible for providing raw materials for the construction of houses, decorations, clothing and crafts, as well as the cure and prevention of diseases, no longer have the strength to grow healthily. According to Denis dos Santos Xavante:

> Many things are happening, the crops are dying. We noticed that the day is dawning faster. Before, six o'clock in the morning was still dark, while today, at six o'clock it's daytime. The sun is very hot, we can't stay out late in the crops, when the rain falls, it falls heavily, there's a lot of drought otherwise, a lot of fish dying. So that's the kind of change that's happening. The forest is producing other fruits, food, in a different season, it is not producing in the same season as before. My mother always says that her parents' parents said that the times were going to change, and they are; and the ones who were going to suffer the consequences wouldn't be them, it would be us, our children's children. (Denis dos Santos Xavante, 2022, oral interview).

These events cause the imbalance of nature, the disappearance of biodiversity and consequently the illness of the cosmos, all factors conditioned by environmental and climatic changes that result from long-standing anthropogenic actions. Although these problems may appear to be easy to solve for those who live in the city, it is worth highlighting that for forest peoples, each of these changes has severe consequences and is extremely symbolic, as explained by the expert from Instituto Socioambiental (ISA), Paulo Junqueira, in an interview for Agência Brasil:

> The indigenous peoples see signs of nature as indicators for various events, for example: a certain formation of clouds with thunderstorms is a sign of rain, and one of them told me that today there is the thunderstorm, there are the clouds, but it doesn't rain, or the opposite happens, the rain comes before the indicators that they are familiar with. Several of these indicators are no longer working. It's as if, suddenly, all our clocks went crazy and we got lost in time (Paulo Junqueira, interviewed by Andreia Verdélio, 2017).

Much has been said about climate change, global warming, the Anthropocene and other analogous events. These issues are studied and debated by different schools of thought, under the umbrella of Western scientific knowledge. Such analyzes generally point out causes, consequences and possible solutions. This work, however, intends to bring to light what indigenous peoples think about these and other topics.

Causes and effects

In recent years, the destruction of nature and its inhabitants has increased uncontrollably, causing serious environmental and climate changes in different parts of the world. These changes have different origins, but are mainly related to economics, politics and globalization. Much of the damage to the environment has been caused by advances in livestock farming, land grabbing, mining, illegal mining, and illegal logging activities, as well as the installation of large infrastructure and enterprises, such as highways, hydroelectric plants, airports, energy transmission lines and others.

According to indigenous peoples' thought, when this happens, spiritual agencies personified as guardians controlling different affected spaces leave, in anger at the destruction caused to their homes. These spaces have owners, they have agencies that protect the beings that live there. Therefore, before entering these places, it is necessary to negotiate, to ask for permission - after all, it is not appropriate to enter somebody else's house without permission from the owner, as explained by Sarmento:

> In the past, these guardians inhabited these places for an indefinite period of time, but with the arrival of white men and their enterprises that have caused significant impacts on indigenous territories – and which are generally linked to the destruction of these and other spaces –, many of these guardians have migrated to other places, taking with them fish, game, fruit and other natural resources. Furthermore, the absence of these guardians causes the disappearance of these resources, with places becoming lifeless and humans hungry. (Sarmento, 2107, p.12).

Resorting to native explanations and an indigenous point of view may seem naive, but this approach covers the most important references in debates in the field of anthropology and other sciences, encompassing a myriad of aspects, from the value that these different segments attribute, to local theories to the nature of ethnographic self-representation.

Thus, we live in a time in which part of humanity and non-humanity are constantly insulted by different predatory actions that generate impacts of significant proportions, many of them irreversible. In response, we are witnessing floods in some regions and intense droughts in others, storms, landslides, dam collapses, food shortages, severe fires, rising sea levels, melting of polar ice, catastrophic storms and decline in biodiversity.

In light of the reflections expressed in this document, it can be understood that such environmental events that have been taking place, oftentimes accompanied by different phenomena, as was the case of the Covid-19 pandemic, represent spiritual agencies reacting against the destruction of their homes and of the beings that reside there. According to Ana Terra Yawalapiti:

> So we have noticed this, strong winds, intense heat, rivers drying out. So much so that these days, full rivers are very normal for us. This flooding that is killing everyone out there, that non-indigenous people are terrified about, for us this is normal, because we expect this event. It's the time when the river is full and goes as far as it wants, we don't worry about that, because it's nature. What can't happen is for us all to sink, then we'll be surprised (Ana Terra Yawalapiti, 2022, oral interview).

Ceramic mass made from clay mixed with the ashes of the bark of a tree called caraípe (from the Chysobalanaceas family). São Gabriel da Cachoeira, Brazil. Author: Thiago da Costa Oliveira. 2014. [Ref. bw_to_fot_20121029-20121124_06_02 - Acervo do Museu do Índio/FUNAI – Brasil]

Bioeconomy in the indigenous context

Once the holistic view of life, territory and conflicts with the non-indigenous economy is understood, it is possible to consider the bioeconomy. All topics thought about, talked about and discussed in national society are also thought about, talked about and discussed by indigenous peoples in their villages, but in their own way, on their terms, in their languages and contexts, based on the perspective of how they perceive their worlds. Bioeconomy is a term that has given rise to many interpretations in Brazil and around the world. If an indigenous person is asked what bioeconomy is – especially those who live in their villages and have little contact with national society – it is very likely that they will not know how to answer. On the other hand, if you ask that same person if they sell any product extracted or produced in their territory, they will certainly answer yes.

Relato da arte baniwa: https://artsandculture.google.com/story/a-arte-cerâmica-das-mulheres-baniwa-museu-do-indio/HwVBSijYoLTtKA?hl=en,

The various indigenous populations have their own sets of values, beliefs, knowledge and customs that, when compared, show aspects that are similar and others that are very different. The indigenous economy, for example, is based on different ways of hunting and fishing, collecting fruits and other natural resources used in the production of ornaments and clothing, as well as the cultivation of vegetables on river banks and in small plots. These peoples have traditional calendars and agricultural systems, by which they organize themselves and work. They produce a multitude of manufactures that serve many purposes, including exchange and sale.

According to Wagner Krahô-Kanela (2022, oral interview), his people produces a lot of handicrafts and are focused on building a tourism base, but not in a haphazard way. They think about implementing tourism that dialogues with environmental needs, without deforestation, without any trash left in the villages, without any type of aggression or pollution to the environment. Only in this way would they be able to work with tourism in a sustainable way, with a view to protecting their territory.

While in the past the indigenous economy was dedicated to subsistence, internal consumption and exchange, currently many indigenous peoples also sell the surplus of what they produce. The commercialization of products extracted from indigenous territories has increased considerably in recent years, at times becoming large businesses, as is the case of Projeto Tribos Café 3 Corações, a coffee brand produced by the Paiter-Suruí indigenous people of the state of Rondônia, the variety of chilies and peppers of the Baniwa people of the state of Amazonas and the graphics printed on the clothing made by the Yawanawa people of the state of Acre. These are just a few examples among many others found in Brazil.

In addition to these experiences, it is also possible to mention the extraction of numerous species, such as acai and Brazil nuts, which are commercialized on a large scale; the traditional festivals with music and dance that attract people from all over the world; the different types of handicrafts such as headdresses, bracelets, rings, necklaces, earrings, basketry, ceramics and carved wooden artifacts; the wide commercialization of vegetables produced in their small plots; the use and commercialization of indigenous medicine and, more recently, ecotourism activities developed by some peoples and that has been attracting visitors. According to Edimilson dos Santos:

> So, we observe that climate change is affecting many things and not just acai, but all the other fruits that depend on a period of sunshine until they ripen. We have noticed that, in recent years, we have been going through this process more intensely, today there is little acai, it is no longer a large amount. Climate change also affects our banana crops and other vegetables. Now, what is also happening is that we plant banana, and when it reaches a certain size, almost ready to harvet, the leaves start drying out and the banana starts dying. Whereas before, we planted our crops in the traditional way, prepared the fields, planted banana and the banana crop lasted a long time. Not anymore; now we only harvest once and then it doesn't yield again (Edimilson dos Santos, 2022, oral interview).

Unlike the logic of national and capitalist society, whose production aims to generate profits and capital accumulation, the indigenous economy is based on the following pillars: (i) produce in a sustainable way, at the rhythm of the villages and in harmony with nature, aiming to obtain sufficient gains for collective well-being; (ii) strengthen the work of grassroots associations using local and non-local techniques, combining indigenous and non-indigenous knowledge; (iii) maintain the relationship of otherness, respect and reciprocity between humans and "more-than-humans" and (iv) build and consolidate partnerships, with a view to training indigenous people to carry out work in specific and intercultural environments.

> Although the bioeconomy is considered a new term for indigenous populations, despite the fact that it is developed in many villages, there is no one better to talk about this subject than the indigenous leaders themselves who carry out this work, and with whom our team had the privilege of talking and learning during the 2022 ATL. Some of what these leaders had to say about this subject follow below: We see these things, we have several things that are linked. If we look closely, these things are our bioeconomy. Production of corn starch, pepper, pequi oil. The seeds that the community collects for seed associations. Flour, banana, cassava, pumpkin, pineapple, sugarcane. We also collect jatobá, and other forest fruits that are consumed within the village, they are not sold. Then other fruits are collected and exchanged for other things. For example, we exchange murici pulp for sugar, flour, and some things the families need. People don't just sell for money, they also barter (Rafael Tari Kayabi, 2022, oral interview).

> As for agricultural production, we have several techniques, but the most important technique that we still preserve is our mythology, because from mythology you can understand when to plant cassava, pineapple, when to take the clay and manufacture the pots, when to harvest the arumã. In fact, we still use our astronomy a lot, I think it's something that we strongly preserve, it's one of our main techniques. We sell ceramics in the Alto Rio Negro Indigenous Land, specifically in my region, and there are many who do this: for example, ceramics from the Baniwa women, from the Tukano people, in short, other peoples also sell a lot of ceramics. We also work in that region with the Baniwa pepper, which is a successful product. Baniwa art is also being produced. (Edilson Martins Baniwa, 2022, oral interview).

Activities such as agricultural and livestock production, large infrastructure works, installation of large projects, logging, land grabbing, mining, illegal mining and the expansion of human settlements, all causing major impacts on nature, are very different from those implemented by indigenous peoples. These peoples promote the bioeconomy and economic activities without harming or destructing forests and their biocultural landscapes. They cultivate, manage and sell their products in a sustainable way, using ancestral techniques as a way of guaranteeing balance and maintenance of the planet, aiming at the continuity of the present and, above all, of future indigenous and non-indigenous generations, of humans and "more-than-humans".

3.

INDIGENOUS BIOECONOMY BY NON-INDIGENOUS PEOPLE

Economy is abundance. The indigenous definition contrasts with scarcity because needs are not unlimited. The forests that once were "*endless groves and trees*" (Caminha, 1500) as described by Caminha upon his arrival in Brazil, are immense agroforestry systems cultivated for 3 thousand generations (Levis et al., 2017). It's not about how many "peoples" there were on these lands at that time, but how these peoples allocated and still allocate their resources. "Indigenous societies are the only ones with sufficient knowledge, wisdom and tradition to thrive in the forest" (Posey, 1994).

In Xingu, Ikpeng people, calling themselves Yarang (ants), never collect all the seeds they find along the trails, because seeds are the daughters of trees, and it is necessary to let some "samauma", "pequi" and "buriti" trees to grow so that they can be found by new human generations. It took the last two centuries to Western understand that the sustainable use of a given resource occurs when the rate of exploitation is less than or equal to the rate of reproduction or replenishment of its stocks (Baumol and Oates, 1987). We could have just asked the indigenous peoples.

Economic science is dedicated to understanding the formation of value, its pricing and distribution (Dobb, 2010). Indigenous knowledge is similar: it practices the concepts of use-value and exchange-value, and naturally deals with the fact that not everything that is valuable has a price. The biggest differences lie in, first, the indigenous economic system is framed by nature and, therefore, there are no externalities. And second, that remuneration is not necessarily proportional to the allocation of production factors: it is considered just to give more to those who have less.

The emergence of global interest in the bioeconomy has offered yet another opportunity for us to repeat past mistakes and fail to understand possibilities that go beyond what we already know. Davi Kopenawa, from Yanomami people, said in 1989 that white people sleep a lot, but only dream about themselves (Kopenawa and Albert, 2015).

In fact, the opportunity to go beyond in bioeconomy may once again being missed. A recent study estimated that the bioeconomy's GDP in Brazil already represents 19% of national GDP (Lima and Pinto, 2022). Not coincidentally, the value is close to the agribusiness GDP, as calculated by the Center for Advanced Studies on Applied Economics (Cepea/Esalq), with small methodological differences (Cepea, 2023). The term agribusiness was coined in the late 1950s and is currently one of the most unambiguous and established concepts that describes the group of input and output chains in biomass-based production and consumption (Davis and Goldberg, 1957). In those senses, agribusiness is bioeconomy.

The bioeconomy as a synonym for the combination of agricultural and livestock production with bioinputs and biotechnology also fails to add much to what, 50 years ago, Norman Borlaug described as agriculture under the Green Revolution (Borlaug, 1970). Even low-carbon agriculture (ABC) has established legal and conceptual frameworks, including established financing programs that are familiar to rural producers. The ABC is undoubtedly one of the biggest pillars of the decarbonization of the economy, but it should not be confused with the bioeconomy.

Bioeconomy is a new name for known things. This is also clear among indigenous people. In a recent publication, most of the indigenous people consulted declared that they did not know what bioeconomy is, although they recognize it as their own economy (Nobre et al., 2023). 30 years ago, Darrell Posey (1994), without mentioning the term bioeconomy, provided a complete analysis of the potential and presumed problems of an economy based on forest management, organized and carried out by forest peoples, and the misdirections that such activities could suffer if community logic were forged by market individualism, by the expropriation of native knowledge and the unjust distribution of its benefits. In the 2000s, the economy of the forest and its peoples became known as the economy of sociobiodiversity (Costa, 2012).

But the word is important (Jecupé, 1998), because establishing the concept is relevant to determining the scope and reach of actions. Given the different forms for the same content, Popper's falsifiability can be useful in delimiting the bioeconomy, the sociobiodiversity economy, or simply the mode of production of indigenous and traditional populations, the production and manufacturing processes and social technologies. Bioeconomy is not monoculture, it is not homogenization of the landscape, it is not standardization of products and processes and it is not exclusively based on exchange-values priced in terms of the balance between supply and demand.

Empirical observation denotes that, instead, the bioeconomy depends quite on the standing forests, and is therefore labor intensive, cultural diversified, influenced by manageable factors as biodiversity or non-manageable as seasonality, and thus antagonistic to specialization. Manufacturing processes and the products and by-products themselves are obtained by the convergence of traditional knowledge and creative adaptation sparked by material and energetic constraints. They can meet family needs and local preferences, but this does not mean that they are disconnected from national demands.

The Xingu Seed Network is a pragmatic example of how the economy based on these conditions can at the same time be connected to the great external demand. Hundreds of collectors, especially women, from various indigenous ethnicities, quilombolas and family and smallholders farming, annually collect tens of tons of seeds from more than two hundred native species to meet the demand for forest restoration promoted by the Native Vegetation Protection Law, which imposes on rural landowners the obligation to restore 12 million hectares of Permanent Preservation Areas and Legal Reserves that are currently non-compliant.

Seed collection is seasonal and does not exclude all other activities carried out by these communities in forests and cerrado areas. The development of local seed selection and processing technologies takes advantage of the adaptation of traditional techniques and instruments used in other activities of everyday life, such babassu coconut processing techniques (Urzedo et al., 2020). Local processing optimizes laboratory tests carried out by competent institutions – essential for health security and the protection of consumer rights – and maximizes efficiency in the formation of viable stocks.

The scalability of these activities occurs through the replication and multiplication of productive arrangements. For instance, the “Redário” (the national network) is an organization that currently brings together 22 seed networks and is based on the principle of fair trade, ensuring a broad genetic base and traceability of products and processes required by the market. By 2021, 425 tons of seeds from 214 native species had been produced (Redário, 2023). The restoration of 24 million hectares needed to guarantee Brazil’s contribution to containing global warming to 1.5 °C would generate a US 42 billion economy in the country based on seed networks (Nobre et al., 2023).

In addition to the transactions involving thousands of products, ranging from honey to handicrafts and representing classic consumption relationships, the bioeconomy also generates large-scale services that are diffusely distributed. Such services include pollination, climate regulation, soil protection, aquifer recharge, carbon capture and rainwater irrigation, of which scalability is intrinsic.

The field of econometrics has advanced in the ability to price these services, at least in terms of opportunity cost or implicit prices, and has been revealing significant figures. Pollinating insects provide ecosystem services equivalent to USD 12 billion per year to the Brazilian agricultural sector (Giannini et al., 2015). Other services produced in the Amazon, such as carbon sequestration and rain, generate more than USD 20 billion per year, mainly benefiting soy and livestock production and electricity generation (Strand et al., 2018). These ecosystem services add up to more than eight times the annual subsidies for agriculture in Brazil. A study shows that the government would spend around USD 4 billion per year to maintain the Amazon (Silva et al., 2022), which implies a 5 to 1 ratio in terms of benefits and costs.

Worldwide, tax, financial and credit incentives for agriculture (producers and consumers) reach USD 700 billion per year, of which 86% are paid in the United States, China, India and the European Union (OECD, 2022). With subsidies in Brazil standing below 1% of the global sum, national competitiveness is based on the development of tropical technologies, availability of land and credit and abundant ecosystem services. The deterioration of these services would imply higher production costs and compensation with new subsidies. Would the country have the fiscal capacity for such? The ecosystem services provided by forests to Brazilian agriculture – only partially measurable at present – currently reach volumes that are close to the subsidies for agriculture in Japan, a country whose GDP is more than twice that of Brazil.

There are unequivocal causal relationships between forests and ecosystem services (Gamfeldt et al. 2013), and between indigenous lands and forests (Mapbiomas, 2022). The more forest, the more ecosystem services; the more indigenous lands and conservation units, the more protected forests and less deforestation. Indigenous lands make up 23% of the Legal Amazon area, but account for less than 1% of deforestation in the region, which mainly result from illegal activities carried out by invaders, miners, land grabbers and loggers (Mapbiomas, 2022). The indigenous role in protecting forests and, therefore, providing essential services to other sectors of the economy is evident, as exemplified by the maintenance of rainfall: more than 95% of agricultural lands and 99% of pastures in Brazil do not have irrigation systems in place, and depend exclusively on rainfall and climate regulation.

The provision of these services does not require a guarantee for the territory. In classical economics, land, including the forests that cover it, are factors of production that are largely replaceable by capital and labor. This is how land has been priced by the land market in the Amazon, to the point that the difference in price between an area covered by pasture and another covered by forest is the mere cost of deforestation. One of Georgescu-Roegen's main criticisms of classical economic models and thinking regards the naivety of reducing nature to a mere "land" factor, ignoring both the impacts of its use and the perennial contribution of nature to the mechanisms that enable its use. (Georgescu-Roegen, 1971). In a parallel with Robert Ricklefs's *The Economy of Nature* (1995), the current models ignore that the forest that covers the land, or the land covered by forest, is not only a resource, but a conditioning factor, as it alters the very conditions in which the resources are made available. See the relationship between forests and ecosystem services.

But we are still far short of achieving the indigenous understanding that the economy is within the Earth, and that the land is inseparable from humanity itself (Krenak, 2019). As Ailton Krenak teaches, the word Krenak, the name of his people, means "head of the land" and refers to ancestral teachings that say that humans are part of it. The land is not a place, but the communion of life.

For indigenous people, the land reflects the need to protect life and to establish resistance. In this sense, the popularization of the use of the word "territory" as a synonym for "land" is not appropriate, as already discussed in depth in this text. The bioeconomy, with its products and services, is the economy contained in the land, as understood by Georgescu-Roegen and known by the indigenous people.

4.

SOCIAL TECHNOLOGIES OF INDIGENOUS PRODUCTION: WHAT THE ECONOMY IS MADE OF

The bioeconomy is the economy within the land. It's not a product, it's a process. If we are to think more broadly about the bioeconomy, beyond the sociobiodiversity products, we need to understand what the economy is made of. It is made of knowledge. When social technologies are brought to the center of the debate, indigenous science and knowledge gain visibility in the economic process. The production of pottery and graters are two rich experiences of the bioeconomy from a technological perspective.

Baniwa ceramic pot, made with clay and antiplastic using the "acordelado" technique. [Ref.14_11_37_1-1 - Acervo do Museu do Índio/ FUNAI – Brasil]

Tukano casserole made with clay and antiplastic using the "acordelado" technique. [Ref. 737art_1-1 - Acervo do Museu do Índio/ FUNAI – Brasil]

Contrary to what many researchers say about ancestral education, as if it were a thing of the past or something that belongs to history, Baniwa women and indigenous women from other peoples reinvented themselves to maintain this knowledge in their graphic patterns. Women's knowledge is made invisible, but the struggles of ancestral mothers to maintain this knowledge are of paramount importance for the continuity and access to this education. This is called *wanekhe*.

Long before we were born, this knowledge already existed and was passed on until it reached current generations. To receive this knowledge, one must maintain etiquette and good manners. The practice of this education has been shared with other women and non-indigenous people who wish to learn about this work. Ancestral education does not require a formal school or a notebook to write things down. Ancestral education goes beyond that. The Negro river is one of the places where it is possible to see signs of ancestral knowledge written on rocks, baskets and inside houses.

The same is found on the banks of the Içana river, because this is where the Baniwa people were born - it is the place known as where everything began, as told by the ancestors. In this site, the mythical grandmother Amaro led the women knowledge revolutions with her people. Based on this perspective, the study proposes an analysis of how ancestral or traditional education is transmitted. Does this transmission take place collectively or individually?

Regarding the symbology of continuation and appreciation of this knowledge, it is important to know, for example, the origin of the different forms of graphic syllables and their meanings, as well as the ways in which women have been transmitting this knowledge within their families. Non-indigenous people may have objects with Baniwa symbols in their homes, but they will never know what these symbols represent for a Baniwa woman.

As many historians and researchers who have been to the Içana river and as the Baniwa themselves report, their people are divided into clans with their specific knowledge acquired throughout their existence. The women have inherited ancient knowledge that supports the continuity of the history of their clan's people, and that dialogues with the work of the Baniwa men. This ancient knowledge is magnificent.

The following objects produced by Baniwa women were chosen to address this ancestral knowledge in this work: *akhepa* (pottery) and *ada* (grater). The Baniwa women have learned and cultivated the ability to produce these pieces, based on experiences in their communities of origin.

Nazária props up her ceramic pot. Author: Thiago da Costa Oliveira. 2014. [Ref. bw_to_fot_20140601-20140629_07_05 - Acervo do Museu do Índio/FUNAI – Brasil]

Akhepa

Ceramics production is a very complex art, as it involves several techniques. First, the raw material, *dekai* or clay, must be collected, and it cannot be found just anywhere, only within or on specific banks of streams, where it was left by the creator. *Dekai* has different colors: yellow, white and red. The women must know the appropriate place and time to extract the material, and for that they must cultivate their own well-being, be stress-free and avoid work during their menstrual period. The clay mixture is made with native tree bark, which must be semi-new and dead, not very old, nor freshly harvested. This mixture must only be made by women, preferably those who have already had children, but the production also involves girls, always under the supervision of an older person. This production takes the time needed to search for and prepare the material. This is the time when the etiquette of ancestral education is performed and passed on transgenerationally among women.

The diversity of ceramics produced by Baniwa women is the continuation of the *weronaipemi wanekhe* (grandmothers' knowledge) and, today, must be maintained and transmitted to the new generation, in the communities and with

the participation of schools. Since their childhood, the Baniwa women have been participating in the extraction of raw material, learning where to collect the clay and where in the forest to obtain the other materials. The differential aspect in the production of *akhepa* is knowing how to make a good mixture, which subsequently facilitates the finishing process and painting of graphic syllables, resulting in a high-quality production. The graphic syllables language is essential for this type of production. *Diakhe* (infinite movement) is a classic example among the syllables, and challenges not only women but also men in *arumã* basket making.

For a Baniwa woman and her family's production to be successful, she must have received a finishing stone from her mother or grandmother. Not all women receive it, only those who deserve it. There are women who possess specific skills to produce different types of ceramics, but not all of them have this gift.

Home education has a lot of meaning in this context, as women, in addition to receiving all the information on preparation etiquette to become good wives and mothers, must follow the rules. The women receive training in their homes and learn to make different objects, ranging from household utensils to the production of *aturá* (basket) to carry cassava and rope to tie hammocks. Transmission between women, cousins, sisters, sisters-in-law and grandmothers was more frequent in the past. Each home had at least two pots to make fermented drinks from fruits or cassava, which would be offered to the men.

The way women take care of their bodies also dialogues with this knowledge production. When women fail to follow the precepts, their productions break when burning, the paint runs, or the color tone is not well defined. Obedient women maintain a reputation as followers of good customs. This fame goes a long way; even other peoples learn of girls and women who produce certain types of pottery efficiently.

This education has always been shared in collective and individual ways, in everyday life from mothers to daughters, and currently at women ceramicists' meetings. While in the past they received praise for excellent production, now the expectation of quality is greater, as they know that their products will be in other people's homes, including non-indigenous people.

In São Gabriel da Cachoeira (AM), there is raw material for this type of production, but according to experts, women in this region no longer have the physical condition to conduct the process, which requires a lot of arm strength, ability to sit and finishing skills. "We don't have that anymore", say the elderly women. Their daughters will no longer have this training, but they have received enough education to respect the production of other women.

Ada

Unlike ceramics, *ada* or the Baniwa grater has male participation in its production. The men are responsible for collecting the raw materials and shaping the graters for the women. The piece is made with a specific type of wood that is found in floodplains, within streams. After the extraction and shaping is performed by the men, they also burn the wood. The use of this material involves women, who have historically received the skills for each activity and knowledge production. This knowledge involves techniques and respect for the object and the place from which raw materials are extracted. This demonstrates the complementarity between the sexes and the participation and training of women in these activities, the access to, and transmission of transgenerational knowledge. Among the 23 peoples of the Negro river, the Baniwa and the Koripako peoples are known as the masters of this ancestral production.

After the completion of the first phase by the men - fathers, uncles and brothers -, the women continue the work, creating the drawings. The material is delicate, splints are used as rulers and each contour is measured by the masters in their heads. This is pure mathematics; the drawings involve balance and concentration. The countless teeth that make up the graters' rough surfaces are made with a stone. According to tradition, if the teeth deviate from the drawing lines traced by a woman, the teeth of her future child will follow the same crooked line. The drawings, representing the graphic syllables used, define the perfection of this work.

The demonstration of this technique can be shared between cousins and sisters from different communities. The stone used to carve the graters' teeth is of a specific type, found only in the middle part of the Içana river, in a mountainous region, where the streams emerge. These stones are collected for use by the Baniwa and Koripako families. There were no territorial borders throughout the history of these peoples, and the clans had access to a great variety of materials found in the territory of the Paraatana and Moliweni clans, on the Içana river. These clans' communities must be notified of the collection of these materials. The place deserves respect and there are principles to be followed, one of which says that people should not take their children while they sleep because this could harm their health. This is because the stone has a guardian spirit that has the power to help humans who need him.

Baniwa grater. Photo: Beto Ricardo/ISA.

After carving the teeth in the *ada*, the women paint them with natural paint made from sap from native trees, which must be mixed with burnt black paint in the chosen tone. Then, it must rest until the paint dries. Before its first use, warm water must be poured into the *ada*, always under the supervision of a wiser woman or mother. Some women only receive this training after getting married, in which case it is always the mother-in-law who helps with production.

The *ada* is used to grate cassava, peach palm, pineapple and other fruits. The utensil must be cleaned immediately after use, and the pulp that sticks to the grater removed, especially when grating cassava. According to the older women, if the grater is not cleaned, the womb and the tissues that protect the child inside the mother's womb will be altered and this may result in the child's malformation. In these cases, children will be born with marks on their skin, blindness and may not even be born at all.

The way the grater is carried in order to be washed can also cause complications during childbirth. It is necessary to talk about the consequences for those who do not learn the right way to use this object, as every production in which women participate always dialogues with their bodies and with the care of their people's health.

This fear of going through difficulties means that women are always impeccable in what they do, although some wish to challenge their grandmothers and only learn when they experience difficulties. That's when they say: "Oh, I should have listened". Old mothers say: "*Wanekhetti, Ihia pidzada, piawakatsa, piriotsa pimatsiata piriowani*", which means: "the knowledge is yours alone and must be preserved for yourself, your mother is not the one who will suffer the consequences, only you". This care for the body and respect for objects is just one of the ways in which women of the Baniwa people are trained.

Grandmothers and mothers pass on this knowledge early in the morning or late in the afternoon; which can also take place among young women in the community as long as they are the same age. In youth, no demonstration on paper is necessary, teachings are learned through the power of observation and mentalization of each detail of the drawings. There is no right age for this, as observation starts from an early age.

Childhood is the time when girls have the most contact with the knowledge, when they hear stories told by the elderly, when they learn to do things without questioning why, without even knowing that it is a knowledge for life. In the past, this education was transmitted differently than today; there was no right or wrong way to apply this *wanekhetti* knowledge. However, the girls (future experts) were wary about doing the work correctly, and of the risk of damaging the objects and compromising the entire work. Grandmothers, in their turn, don't let a child do the work, and ask mothers would never allow it to happen.

Indigenous women's creative initiatives and economy

Indigenous production and creation processes are structured around three main axes: (i) individual/authorial initiatives, (ii) organization in associations, cooperatives, collectives and groups of producers and (iii) initiatives at the family level. In addition to the different initiatives, a hallmark of the indigenous bioeconomy is that it is not based on industrial production, but on the collective production process between women and men. There are some among them who work in the process of adding market value to products through the use of graphics.

Denilson Baniwa, Ayuri - The farms, place of indigenous survival, 2015, acrylic on canvas.

Over the past 15 years, the value of indigenous peoples' production has changed. Items formerly used as household utensils have become products with monetary value, generating direct income for communities. The market has appropriated indigenous knowledge in a very negative way when it gained access to their sciences, for example, the indigenous graphics that are printed on textiles, objects, companies, vehicles, etc. Would this characterize appropriation? What is known is that at no time during this process were indigenous peoples consulted.

Brazil has been consolidating itself in the process of recognizing and valuing initiatives that have gained prominence within indigenous territories. The Amazon has been in the spotlight in debates, but indigenous peoples are underappreciated. But indigenous women have become stronger and have played a decisive role in raising awareness. They have reinvented themselves during the Covid-19 pandemic, to protect their families and care for their peoples, producing masks, clothes and foods initiatives that challenge themselves to put indigenous cuisine in dispute in traditional spaces, of non-indigenous food restaurants.

An ancestral fashion show was held for the first time at the II March of Indigenous Women, as a way of materially and immaterially valuing indigenous production. The impact of this initiative was positive, and today, some of the indigenous creative fashion productions feature in traditional fashion shows, highlighting indigenous knowledge through the use of different graphic art.

II March of Indigenous Women, in Brasília. Photo: Marcelo Camargo/Agência Brasil

Regarding the transmission of intergenerational knowledge, indigenous peoples have been successful in maintaining and recreating concepts that protect this knowledge. The Xingu Seed Network is an initiative dedicated to the reforestation of areas in the Amazon Forest and the Brazilian Cerrado, generating income and autonomy for local communities. With more than 600 collectors with different backgrounds, histories, cultures and languages, the majority of the workforce is made up of women.

The collectors are grouped into three macro groups, including indigenous peoples, family farmers and urban communities, which involve women from inside and outside the territories, and thus disseminating the importance of their work. The other initiatives that have obtained origin labels are indigenous products with market access supported by indigenist institutions, showing that indigenous peoples' production is made according to their own ways, contexts, cultures and traditions.

The sociobiodiversity economy is in the process of valuing indigenous products, but this is still perceived with a certain tutelage, which unfortunately brings back memories of a colonizing historical period that continues to this day, as indigenous professionals in various areas of activity become hostages of private, governmental, and non-governmental institutions. In this sense, it is important to leave a question for reflection: Until when will our work be overlooked, imitated, or not fairly valued?

5.

FINAL CONSIDERATIONS

The indigenous economy is within nature, and nature within territories, and territories within human and more-than-human beings. Therefore, the economy - and thus the bioeconomy - are not defined by products and services, but by their production processes. Products and services are not the ends, but the means by which ancestral knowledge is perpetuated and social technologies are developed. The close connection between the way of doing things and their consequences to the social division of labor is what gives meaning to production.

This is this text's focus. However, it suggests a new narrative of indigenous productive realities based on data and the indigenous peoples' own developments on the theme of bioeconomy in the Amazon territories and indigenous peoples. This journey involved the participation of different actors, whose diverse knowledge base provided the foundations for the construction of this work. When asked about the term bioeconomy, the answers came in different forms - people who had some experience with this word, others who had only heard of it and others who had never heard the term bioeconomy, but whose activities and practices nevertheless characterize an unnamed bioeconomy.

Therefore, the text is not intended to be a panacea for the implementation of the bioeconomy in the Amazon. However, at the very least, it proposes a reflection, especially when it comes to bioeconomy in the indigenous community context. In this sense, the text draws attention to the dichotomy between two types of knowledge: indigenous and dominant Western knowledge, which leads to inefficiency and failure of many projects and programs implemented in indigenous territories, not to mention the intensification of climate, ecological and environmental changes.

In this sense, the text describes bioeconomy processes from an indigenous perspective and knowledge in synergy with partner institutions, enabling new perspectives, values and learning opportunities for the construction of a new context, and promoting promising and effective results for the bioeconomy in the Amazon. This knowledge production arrangement from the inside out, with the participation of indigenous researchers as protagonists of this process, is unprecedented, both in the bioeconomy field and in terms of other sociocultural aspects.

After all, indigenous peoples are known for their sophisticated orality which, among many relevant aspects, express their worldview through beautiful stories that illustrate how, since the dawn of humanity, they have established a relationship of otherness and reciprocal respect with nature, that which is conventionally called the environment or biodiversity.

According to Ailton Krenak (2020), if people do not cultivate deep links with their ancestral memory, with the references that support the essence of their identities, then their values, customs and traditions will go crazy in this crazy world we all inhabit. In this sense, the indigenous peoples' ways of perceiving, seeing and being in the world are different from the Western perspective; thus the implementation of the bioeconomy, as well as other initiatives, need to be seen from the same perspective, and based on the same understanding and mutual interests.

The following is an example of two different ways of looking at the same thing. From the perspective of many non-indigenous people, a Brazil-nut tree is seen simply as a tree that can be felled, and the wood extracted to build a corral for livestock farming. Whereas for many indigenous peoples, this same tree represents a mythological plant present in their cosmology, with different functions and a very relevant role, including as a source of food, medicine and material for the construction of homes, canoes, etc.

Brazil-nut trees, like other plants, have life and occupy a significant position in the sociocosmologies of indigenous societies in the Amazon; they are inseparable from human history and preponderant actors within different social contexts. Furthermore, all living beings – such as plants – have their controlling guardians, who are responsible for the protection, management, maintenance and sustainability of different ecosystems, which are their homes.

This asymmetrical relationship between two ways of thinking and different types of knowledge has caused serious damage to nature, mainly due to human actions that directly result in negative impacts, many of which are irreversible. For this reason, concerns and discussions about climate change on the planet have been growing, with climate change recently being referred to as climate emergency due to its alarming progression.

Western scientists explain that these changes may be natural consequences of variations in the solar cycle, but human activities have been their main driver, mainly due to the use of fossil fuels such as coal, oil and gas, and inappropriate uses of the environment, accompanied by deforestation and forest fires.

We have become used to news stories about climate events in different parts of the planet. The stories report earthquakes, hurricanes, melting of the polar ice, rising ocean levels, changes in rainfall patterns in several regions and desertification in others, losses and extinctions of biodiversity species (Sarmento, 2017). In recent years, Brazil has seen tragedies in the South and Southeast regions involving landslides and flooding alternated with droughts, and increase in major droughts and desertification of semi-arid areas in the Northeast region. In the Amazon, a humid region with constant and periodic rain, droughts of its numerous large rivers have been experienced.

As of the drafting of this text, the state of Amazonas has suffered the greatest drought ever recorded, devastating the Negro and Solimões rivers, resulting in the death of animals and severe food insecurity for indigenous and non-indigenous people. The situation of the Madeira river is not very different, and there is no shortage of proposals for the construction of a road connecting Porto Velho to Manaus. Once again, society is choosing to ignore that the solution created in the 1970s helped to generate precisely the problems seen today, and that such a road would transport the degradation seen in the state of Rondônia to the state of Amazonas, with the silting and drying of many other rivers as a result of the lack of basic sanitation, and the large volume of sediments carried by the rain from degraded pastures into water courses. Once again, the entities that protect the forests would be ignored, as would the fact that environmental licenses are not spiritual licenses. The obvious solution to the problem of the Madeira River is its revitalization

Indigenous peoples understand that what is conventionally called climate change, global warming and, more recently, Anthropocene, is actually nature reacting, through spiritual guardian agencies who control different worlds and ecosystems, as a counter-attack to destruction caused by human actions. These reactions are expressed through severe climatic events that cause irreparable lost and damage to populations, with material, human and environmental losses.

As a reflection, a stated by indigenous thinker Ailton Krenak (2020) would be providential: “our mother, the Earth, gives us oxygen for free, puts us to sleep, wakes us up in the morning with the sun, lets the birds sing, the currents and the breezes flow, it creates this wonderful world to share, and as for us humans, what are we doing with it, how do we treat it?

This paper closes with the maxim “nothing about us, without us”. We need to understand that everything that is discussed outside indigenous territories, especially in relation to indigenous territories themselves, is discussed among indigenous people in their villages. The conceptual constructions of the bioeconomy cannot be limited to consultations, but must be established in a joint and participatory manner with and for the indigenous people.

From the concept to the implementation of bioeconomy plans and projects, indigenous knowledge is irreplaceable and must be the main driver of the indigenous bioeconomy, in all territories and all biomes. It is these concepts and ways of life of the communities that should guide the construction of specific legislation to protect their knowledge, their territories, as well as public policies to promote and support activities related to the bioeconomy.

Recognize the fundamental role of indigenous people in protecting ecosystems and the climate, but also in the intellectual construction of their own concepts and practices. It is essential that indigenous people are the protagonists of the systematization and dissemination of their knowledge, especially about the processes of the indigenous bioeconomy, with qualification of these multiple and diverse social technologies and their knowledge; of the products of the indigenous bioeconomy, with qualification and quantification of this great economy that goes unseen by statistics, of the environmental and ecosystem services promoted by indigenous peoples, with leadership of the peoples in their territories and of the positive and irreplaceable impacts of the environmental products and services promoted by indigenous people and their territories that benefit the entire economy

Methodological notes

Methodological processes, at first glance, refer to the means of communicating with others, through the most diverse forms of communication, involving the exchange of information between two or more interlocutors in a sociocultural process that allows the creation, analysis and interpretation of different messages – sent and received – through oral or written language or even through gestures, body language, signs, graphics, among others. Not to mention that communication is, in addition to dialogue between humans, a reach to transcendental levels in which people, animals, plants, rivers, spiritual agencies coexist in full synergy of aspects such as sociality, respect and otherness. After all, this is how indigenous peoples coexist in the same space with other living beings.

The process of constructing thought, written rhetoric and dialogue between the authors will take place horizontally - these are fundamental factors that will allow us to revisit the research carried out within the scope of the New Economy for the Brazilian Amazon (Nobre et al., 2023). From this perspective, the challenge in this work – among many others – is the socialization and sharing of information about the object of study, emerging from dialogues between indigenous interlocutors and suggested bibliographic texts.

Based on this understanding, it is worth highlighting that the theoretical foundation is based on authors who dialogue with indigenous thought and construction. To this end, we rely on the following knowledge: “the sky woman and the earth woman” (Watts-Powless, 2017); “cassava as the mother of crops” (Chagas Filho, 2017); “from environmental licensing to spirits licensing” (Apurinã, 2022); “well-being and living well: according to the Baniwa people in the northwestern Brazilian Amazon” (Baniwa, 2019); “rights of indigenous peoples in dispute in the STF” (Cunha and Barbosa, 2018) and “ethical spaces in the Amazon: recognizing and integrating cultural protocols with codes of ethical conduct in research with indigenous peoples” (Apurinã and Virtanen, 2022).

However, this analysis is based on the notion of “collaborative research”, anchored on the following pillars: (i) carrying out secondary bibliographic research of works produced by indigenous and non-indigenous authors, (ii) deepening the primary data obtained in interviews, testimonies and dialogues with indigenous leaders from different peoples and regions, during the **2022 Acampamento Terra Livre**, in Brasília, and subsequent dialogues and (iii) experiences resulting from the authors’ personal and professional trajectory.

With the aim of following a holistic process based on the dialogue between different points of view, it is noted that the readings and analyzes make use of literature produced by both indigenous and non-indigenous thinkers, enabling these two types of fundamental knowledge to complement each other, instead of diverging. This is not an easy task, especially when considering the asymmetric relationship that exists between the two, with indigenous knowledge historically placed on a level of inferiority when compared to the dominant Western scientific knowledge.

In terms of the collaborative research process and the materials identified to elaborate the proposed text, the need to carry out additional interviews and dialogues with other indigenous people will be assessed. If applicable, the qualified listening method will be applied on involuntary and informal occasions, without the use of technological devices and other instruments commonly used in academia, which are not helpful in certain circumstances.

The elaboration process will occur through collaborations, feedback, insertions of different perspectives and understandings of the team on the subject. In this sense, the production of the text will be supported by virtual meetings and calls, added by the exchange of audio and written messages, aiming, above all, at a joint, participatory and synergistic production process.

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Interview and testimonials that supported the reflections proposed in this study

KATÃURY (father of Francisco Apurinã). Testimonies about the history, customs, shamanism, ontology and epistemology of the Apurinã people. Interview given in Aldeia Kamikuã, Rio Branco (AC), August 2018.

ANA TERRA YAWALAPITI. Climate Change. Interview given during the 2022 Acampamento Terra Livre. Brasília, April 2022.

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