

## Chapter 10



### *Science Panel for the Amazon (SPA)*

#### *Working Group 4*

#### **PEOPLES OF THE AMAZON**

*Lead Authors Athayde Simone and Larrea Danie*

### **CRITICAL INTERCONNECTIONS BETWEEN CULTURAL AND BIOLOGICAL DIVERSITY OF AMAZONIAN PEOPLES AND ECOSYSTEMS**

*Contributing Authors: Athayde, S.; Shepard, G.; Cardoso, T; van der Voort, H; Zent, S; Rosero-Peña, M; Almeyda Zambrano, A; Cuvi, N; Surui, G; and Larrea, D*

## *Chapter 10*

# **CRITICAL INTERCONNECTIONS BETWEEN CULTURAL AND BIOLOGICAL DIVERSITY OF AMAZONIAN PEOPLES AND ECOSYSTEMS**

Athayde, S.<sup>1</sup>; Shepard, G.<sup>2</sup>; Cardoso, T.<sup>3</sup>; van der Voort, H.<sup>2</sup>; Zent, S.<sup>4</sup>; Rosero-Peña, M.<sup>5</sup>;  
Almeyda Zambrano, A.<sup>5</sup>; Cuvi, N.<sup>6</sup>; Surui, G.<sup>7</sup>; and Larrea, D.<sup>8</sup>

<sup>1</sup> Kimberly Green Latin American and Caribbean Center and Department of Global and Sociocultural Studies, Florida International University (FIU), U.S. [sathayde@fiu.edu](mailto:sathayde@fiu.edu)

<sup>2</sup> Museu Paraense Emílio Goeldi (MPEG), Brazil. [gshepard@museu-goeldi.br](mailto:gshepard@museu-goeldi.br); [hvoort@museu-goeldi.br](mailto:hvoort@museu-goeldi.br)

<sup>3</sup> Departamento de Antropologia, Universidade Federal do Amazonas (UFAM), Brazil. [thiagocardoso@ufam.edu.br](mailto:thiagocardoso@ufam.edu.br)

<sup>4</sup> Instituto Venezolano de Investigaciones Científicas (IVIC), Venezuela. [szent@ivic.gob.ve](mailto:szent@ivic.gob.ve)

<sup>5</sup> Tropical Conservation and Development Program, Center for Latin American Studies, University of Florida, U.S. [mcrosero@ufl.edu](mailto:mcrosero@ufl.edu); [aalmeyda@ufl.edu](mailto:aalmeyda@ufl.edu)

<sup>6</sup> Facultad Latinoamericana de Ciencias Sociales Sede Ecuador (FLACSO), Ecuador. [ncuvi@flacso.edu.ec](mailto:ncuvi@flacso.edu.ec)

<sup>7</sup> Centro Cultural Indígena Paiter Wagôh Pakob, Aldeia Paiter, Terra Indígena Sete de Setembro, Brazil. [gasodasurui@hotmail.com](mailto:gasodasurui@hotmail.com)

<sup>8</sup> Conservación Amazónica (ACEAA), Bolivia. [dlarrea@conservacionamazonica.org.bo](mailto:dlarrea@conservacionamazonica.org.bo)

## ***Chapter 10***

### **ACRONYMS AND ABBREVIATIONS (INCOMPLETE)**

ILK: Indigenous and local knowledge

IPLCs: Indigenous peoples and local communities

PAs: Protected Areas

IL: Indigenous lands

CBD: Convention on Biological Diversity

SDGs: Sustainable Development Goals

UNDRIP: United Nations Declaration on the Rights of Indigenous People

Policy for Territorial and Environmental Management of Indigenous Lands (Brazil)

SPI: Serviço de Proteção ao Índio

FUNAI: National Indian Foundation

CIDOB: Confederation of Indigenous Peoples of Bolivia

Federation of Afro-descendant Associations of the Putumayo department (Fedecap)

Department of Indigenous Peoples in Isolation and Initial Contact (DACI)

AIDSESP

COICA

Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services

(IPBES)

Sustainable Development Reserve (RDS)

## *Chapter 10*

# INDEX

KEY MESSAGES	i
ABSTRACT	ii
GRAPHICAL ABSTRACT	iii
1. 1	
2. 2	
3. 77	
4. 111	
5. 144	
5.1 Amazonian agriculture and agroforestry	16
5.2 Fisheries and aquatic management	19
5.3 Hunting	20
5.4 Brazil nut extractivism	21
6. 222	
7. 2727	
8. 2928	
REFERENCES	30
CORE LINGUISTIC GLOSSARY	38
BOXES	43
Appendix 1	47

## KEY MESSAGES

- Indigenous peoples and local communities play a critical role in the sustainable use and conservation of Amazonian biodiversity and ecosystems. Over 3,000 Indigenous lands and territories have been recognized across Amazonia under diverse tenure systems, which, added to formally recognized protected areas, represent nearly 45% of the region, protecting almost half of remaining forests (RAISG 2020<sup>1</sup>; FAO 2021<sup>2</sup>).
- Non-indigenous Amazonian local communities, including small collective groups such as Afro-descendant communities (*Maroons, Quilombolas*) and extractivists of mixed descent (*mestizos, caboclos, ribeirinhos*) have been historically dispossessed and often overlooked in scientific research, recognition of rights, and social and environmental policies.
- Recognizing Indigenous peoples' and local communities' rights to their territories and resources is fundamental for the maintenance of biodiversity, including agrobiodiversity and genetic resources, as well as food security across the Amazon.
- Sophisticated environmental knowledge systems and worldviews held by IPLCs include key resources, practices and concepts for understanding, using and managing the Amazon. This knowledge is critical for informing and guiding scientific research, development projects, conservation policies and bioeconomy initiatives.
- Many Indigenous Amazonian languages are critically endangered by some of the same forces that threaten biodiversity. Just as these languages, cultures and worldviews are in danger of extinction, so are the associated knowledge systems that are linked to and sustaining Amazonian biodiversity.
- Women have had an important role in Amazonian conservation and development, playing a critical role in the maintenance of Amazonian agrobiodiversity, as well as food security and sovereignty among Indigenous peoples, Afro-descendant populations and other local communities.

---

<sup>1</sup> To be confirmed

<sup>2</sup> To be confirmed

- Indigenous Peoples and local communities across the Amazon are stewards of diverse worldviews, values, institutions and governance systems that are crucial not only to biodiversity conservation but also to democracy itself.

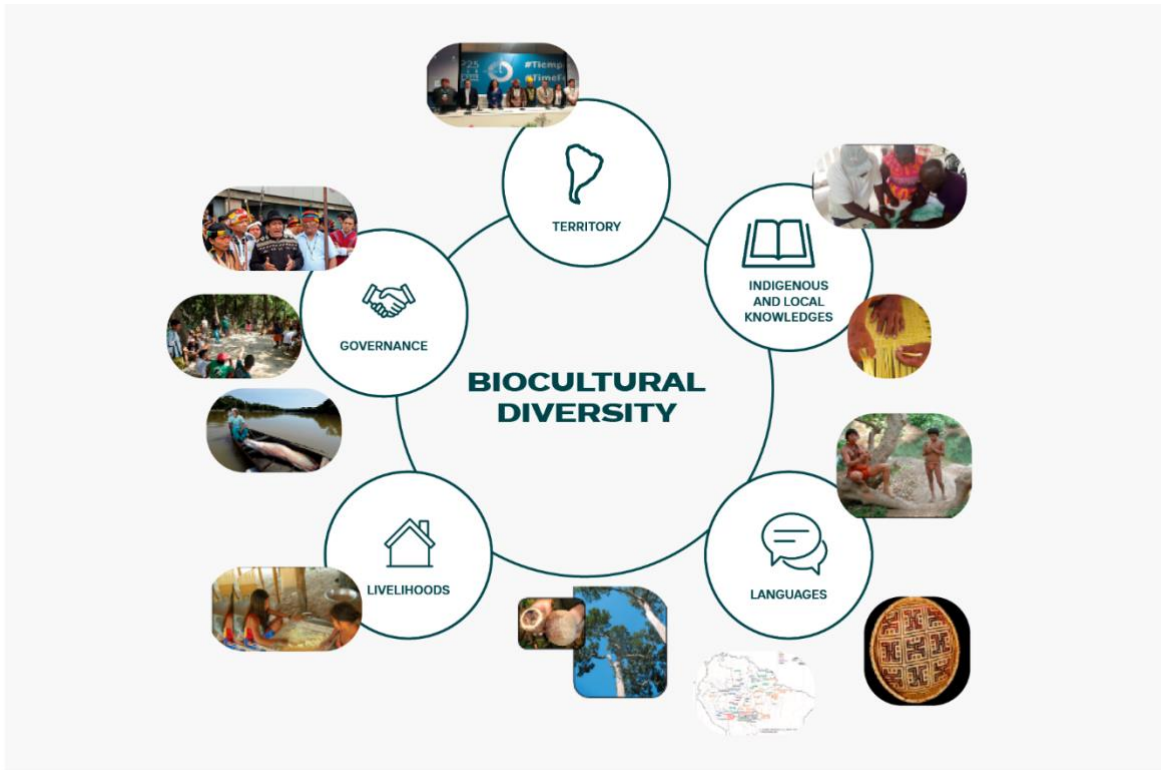
DRAFT

## **Abstract**

In this chapter, we explore important interconnections between biological and cultural diversity in the Amazon, also defined as biocultural diversity. Biocultural diversity considers the diversity of life in all its dimensions including biological, sociocultural and linguistic aspects, which are interconnected and have co-evolved as social-ecological systems. This chapter focuses on worldviews, knowledge systems, livelihood strategies and governance regimes of Amazonian peoples as documented in ethnographic, ethnobiological and human ecology studies beginning in the mid- to late twentieth century. The focus here is on Indigenous peoples and local communities (IPLCs) across Amazonian countries and the French Guiana territory. We synthesize the main social and political processes that have led to the formal recognition of IPLCs) lands and/or territories across the Amazon, notwithstanding persistent gaps, challenges and obstacles to the consolidation and protection of these areas, which will be discussed in other chapters of this report. The huge cultural diversity encountered in the Amazon is manifested through around 300 spoken Indigenous languages connected to particular worldviews and spiritual connections to nature. IPLCs have played a critical role in shaping, protecting and restoring Amazonian ecosystems and biodiversity under different changing contexts, despite historic ongoing processes including genocide, disease, violence, displacement, and conflicts between conservation and development agendas. Amazonian peoples hold diverse and interconnected livelihood strategies including agriculture and agroforestry, fisheries and aquatic management, hunting, resource gathering and extraction, as well as rural-urban market-based economic activities and wage-based employment in different sectors. These activities and practices are influenced to varying extents by seasonal and geographical variations, ecosystem features, cultural diversity, market forces and public policies. We highlight the important role played by women in protecting agrobiodiversity, promoting food security and sovereignty in the Amazon. Policies aiming to conserve and use Amazonian biodiversity need to recognize IPLCs sociocultural and territorial rights, and be integrative of Indigenous and local knowledge, languages, worldviews and spiritual practices.

**Keywords:** Biocultural diversity; Amazonian peoples; Indigenous peoples and local communities; Indigenous and local knowledge; Indigenous and local cosmologies and epistemologies; Livelihoods; Governance.

## GRAPHICAL ABSTRACT



This figure represents a roadmap for the different subsections included in this chapter, and highlights the interconnectedness between biocultural diversity elements: territory, governance, languages, knowledge, livelihoods. The concept of biocultural diversity considers the diversity of life in its human-environmental dimensions, that includes biological, sociocultural and linguistic diversity. Biodiversity, cultural diversity and linguistic diversity are interconnected and have co-evolved as social-ecological systems (Maffi 2001)<sup>3</sup>. These connections are present in our daily lives, in urban, rural spaces and their interlinkages, from what we eat to our livelihood styles, including our understanding and relationships with one another and with the environment around us. In this chapter we focus more specifically on Indigenous peoples and local communities across Amazonian countries, but these critical biocultural connections are manifested everywhere and among every Amazonian resident.

---

<sup>3</sup>To be confirmed



## 1. INTRODUCTION

This chapter outlines the critical interconnections between sociocultural and biological diversity across the Amazon, what has been called “biocultural diversity”. The concept emerged from the intersection between diverse academic disciplines and Indigenous and local knowledge systems (ILK) and recognizes that all humans are immersed in a web of interdependence between cultural, linguistic and biological systems (Maffi and Woodley 2010). Throughout the globe, human cultures have co-evolved with different ecosystems through the places we live, the food we eat, the landscapes we construct, and the spiritual and political systems we advocate. In Amazonia, biocultural diversity is especially rich, as expressed through a multitude of cultural identities, worldviews, languages, knowledge systems and livelihoods and their associated governance regimes, technological innovations, and landscape management practices (Balée 2003; Heckenberger 2010<sup>4</sup>; Salisbury and Weinstein 2014; Athayde et al. 2017a; Caballero-Serrano et al. 2019). These interlinked processes have important, but largely overlooked implications for policies related to biodiversity conservation and sustainable development, as discussed in Parts 2 and 3 of the SPA report.

For this chapter, we have adapted the definition of “Indigenous Peoples and Local Communities” (IPLCs) as proposed by the United Nations to reflect the diversity of Amazonian peoples<sup>5</sup>, including those who self-identify as Indigenous, belonging to specific nations or ethnic groups, as well as Afro-descendant communities, *caboclo* or *mestizo* riverine dwellers and forest extractivist communities such as rubber tappers, açai collectors, palm nut gatherers, and others. Some of these peoples and communities have, through years of struggle, seen their cultural and territorial rights recognized by the encompassing nation states, while others have not. Thus, in addition to the tremendous diversity of social-ecological contexts and livelihood strategies in Amazonia, there are also widely variable political and legal particulars that impinge on different peoples’ socio-cultural sovereignty, access to resources and territorial rights (IWGIA 2020)<sup>6</sup>. This chapter focuses on worldviews, knowledge systems, livelihood strategies and governance

---

<sup>4</sup> To be confirmed

<sup>5</sup> The definition of Indigenous peoples and local communities adopted by the Science Panel for the Amazon can be accessed in this link:

<https://drive.google.com/file/d/1BjArMUSgmjhiWtLNN2E8NEaesqRKLfTe/view?usp=sharing>

<sup>6</sup> To be confirmed

regimes of Amazonian peoples as documented in ethnographic, ethnobiological and human ecology studies beginning in the mid- to late twentieth century. In this regard, the chapter follows up on the historical context presented in Chapters 8 and 9, while setting the stage for discussions about contemporary Amazonia in Part 2 of the report.

The Amazon is home to around 34 million people living in the eight Amazonian nations of Bolivia, Brazil, Colombia, Ecuador, Guyana, Peru, Suriname and Venezuela plus French Guiana. Of this total, nearly 2.8 million are Indigenous people (9.2%), consisting of at least 350 distinctive ethnic groups or nations, including some 60 of whom remain in voluntary isolation (IWGIA 2020; RAISG 2020).<sup>7</sup> IPLCs in Amazonia are involved in the communal governance of between 3.2 and 3.8 million square kilometers of territory (FAO 2021). Over 3,000 Indigenous lands and territories have been recognized across Amazonia under diverse tenure systems, which, added to formally recognized protected areas, represent nearly 45% of the region, protecting almost half of remaining forests (RAISG 2020<sup>8</sup>; FAO 2021<sup>9</sup>). More than 80% of the area occupied by Indigenous peoples is forested, and 35% of all Latin America's remaining intact forests are occupied by Indigenous peoples. These statistics are a clear indication of the inextricable link between cultural and biological diversity in Amazonia, and highlight IPLCs as crucial partners for ongoing biodiversity conservation, as well as forest management.

## **2. COLONIZATION AND TERRITORIAL DELIMITATION OF THE AMAZON**

In order to contextualize biocultural relationships within the complexity of post-colonial Amazonian social formations, we briefly describe the historical processes of colonization, resistance and recognition of Indigenous and local communities' sociocultural and territorial rights that took place during the 20th century across Amazonian countries. A historical timeline summarizing main moments and events that led to current assertion of rights and territorial configurations across Amazonian countries is presented in Figure 10.1. Additional information about these historical developments can be found in Appendix I.

---

<sup>7</sup> To be confirmed

<sup>8</sup> To be confirmed

<sup>9</sup> To be confirmed

The very earliest explorers of the Amazon described large villages that numbered in the thousands (Denevan 1976; Hemming 2008)<sup>10</sup>, and recent archeological work has confirmed the existence of large, pre-colonial polities in some parts of Amazonia that built extensive earth works and developed rich artistic and religious traditions (Fausto 2000; Erickson 2006; Heckenberger et al. 2008; Rostain 2008, see CH8)<sup>11</sup>. Some Amazonian peoples engaged in long-distance trade with Andean and coastal peoples (Camino 1977; Santos-Granero 2002)<sup>12</sup>. European colonization resulted in the enslavement, displacement, decimation from diseases, and violence and cultural extinction of many Indigenous peoples since the XVI century (see Chapter 9). Complex pre-colonial political formations and artistic traditions found in the archeological record were all but exterminated in the first hundred years of European colonization (Walker et al. 2015). Thus, the observations made by missionaries, explorers and researchers among Indigenous peoples do not reflect the primordial, “pre-contact” status of Amazonian political and social life (Shepard et al. 2020). Instead, the social formations and ecological adaptations of historical as well as contemporary indigenous peoples of the Amazon must be understood through the lens of post-Conquest genocide (Beckerman 1979).

**Figure 10.1.** Timeline summarizing the main historical events affecting socio-cultural and territorial rights of Indigenous peoples and local communities (IPLCs) across Amazonian countries. Dates and events are approximations and do not necessarily apply to all countries or peoples, while some events and their effects are ongoing.<sup>13</sup>

Ensuing cycles of migration and resource exploitation in Amazonia (see [Chapter 11](#)) resulted in the formation of diverse Amazonian identities and socio-cultural groups including peasants, riverine communities, forest-based communities, and Afro-descendant groups including the *Maroons* in Suriname and French Guiana, and the *Quilombolas* in Brazil (Kambel 2006; Superti and Silva 2015; Chambouleyron and Ibáñez-Bonillo 2019)<sup>14</sup>. In particular, the Rubber Boom of the late 19th century resulted in a massive migration of impoverished peasants to the Amazon

---

<sup>10</sup> To be confirmed

<sup>11</sup> To be confirmed

<sup>12</sup> To be confirmed

<sup>13</sup> To be confirmed

<sup>14</sup> To be confirmed

interior, resulting in the enslavement, displacement or extermination of thousands of Indigenous communities (Schmink and Wood 1992<sup>15</sup>; Hecht 2010).

Throughout these historical processes, surviving Indigenous peoples, Afro-descendant communities and/or peasants or “caboclos” constituted local communities throughout the Amazon interior and were engaged in various extractive and economic activities such as rubber tapping, hunting, fishing, mining and plantation agriculture (Chapter 11). Extractive economies were built on a system of debt peonage that, in addition to providing cheap labor and raw materials to colonists, religious missionaries and emerging nation states, also sought to assimilate, repress, and exterminate Indigenous cultural, linguistic and religious diversity in the name of “civilization” and progress (Ribeiro 1962). In this sense, extractive industries and economic cycles were closely tied to the birth of nation states in Latin America and the consolidation of colonial understandings of racial and cultural superiority over Indigenous as well as enslaved African populations (CH African presence in the Amazon).

Indigenous peoples as well as Afro-descendant populations in the Amazon have been historically judged according to racist, colonial stereotypes that viewed them as backward, inferior, primitive and an obstacle to cultural and economic development (Castro-Gómez 2009; 2010). Such ideologies permeated early constitutions and other laws impacting these populations in different Amazonian countries. For example, the Colombian Constitution of 1886 aimed to build a modern country "without inferior races", referring to what they called the “savages” inhabiting Amazonian forests (Castro-Gómez 2009; Marquardt 2011). Such ideologies led to the promulgation of laws promoting European immigration to several Latin American countries after World War I, in an effort to “whiten” their populations (Castro-Gómez 2009; Kabalin Campos 2018; Silva and Saldivar 2018).

The ongoing existence of isolated or “uncontacted” Indigenous peoples and historical processes of “first contact” with them have generated misconceptions in the popular imagination, reviving colonial stereotypes of people who have lived untouched in “Stone Age” conditions since time immemorial (Milanez and Shepard 2016)<sup>16</sup>. However, in most cases, isolated peoples in fact

---

<sup>15</sup> To be confirmed

<sup>16</sup> To be confirmed

belonged to larger polities who maintained networks of trade and social relations with their neighbors until recent times. Often, it was the experience of enslavement and violence during the so-called “Rubber Boom” at the turn of the 20th century that forced some Indigenous peoples to choose radical social isolation from all outsiders as a survival strategy (Shepard 2016). Several Amazonian countries have developed specific policies and agencies aimed at protecting these vulnerable populations and their territories (Opas et al. 2018).

Beginning in the 1950s, and continuing through the present, most Amazonian countries embarked on a “developmentalist” project, promoting internal colonization to hinterland areas considered demographically “empty,” but in fact populated by remnant IPLCs communities. These policies led to the creation of internal frontiers, where land grabbing, deforestation and resource extraction contributed to social conflicts and ideological struggles over the use and function of land (Schmink 1982; Schmink and Wood 1991)<sup>17</sup>. In this period, lasting until the 1980s, most Amazonian countries still viewed Indigenous peoples with a paternalistic attitude as inferior peoples who should be assimilated into the national labor force, as exemplified in the Brazilian “Indian Statute” of 1973 (Ramos 1998)<sup>18</sup>.

In response to the oppressive labor conditions, violence and territorial displacement produced by these processes, diverse Indigenous, Afro-descendant, and other forest peoples began to mobilize beginning around the 1970s, claiming collective rights to lands, livelihood, cultural autonomy and democratic participation (Silva and Postero 2020)<sup>19</sup>, while gaining attention and support from national and international social and environmental movements (Ramos 1998)<sup>20</sup>. The Coordination of Indigenous Organizations of the Amazon Basin (COICA) was founded in Peru in 1984, and includes member organizations in all Amazonian countries, as well as French Guiana. Amazonian Indigenous peoples and local communities have benefited from international initiatives such as the International Labor Organization Convention 169 of 1989, ratified by Bolivia, Brazil, Colombia, Ecuador, Peru and Venezuela. The right to self-determination has also been recognized in other international instruments, such as the 2007 UN Declaration on the Rights of Indigenous Peoples. As a result of such national and international movements, many

---

<sup>17</sup> To be confirmed

<sup>18</sup> To be confirmed

<sup>19</sup> To be confirmed

<sup>20</sup> To be confirmed

Amazonian countries implemented constitutional or legal reforms guaranteeing different territorial, cultural, social and political rights to IPLCs (Box 1; Figure 10.2; see Appendix 1; Cottrol and Hernandez 2001, Seider 2002, Postero 2007; Almeida 2008)<sup>21</sup>.

In the 1990s, the *Buen Vivir* (or “Living Well”) philosophy emerged in Latin America as an alternative to the dominant model of capitalist development that had brought widespread poverty, inequality, and environmental destruction to the region (Gudynas and Acosta 2011<sup>22</sup>; Vanhulst and Beling 2015). This philosophy is rooted on ethical principles of Andean-Amazonian Indigenous peoples, focusing on the idea of collective wellbeing among humans, and between humans and nature. *Buen Vivir* principles were incorporated in the recent constitutions of Ecuador (2008) and Bolivia (2009).

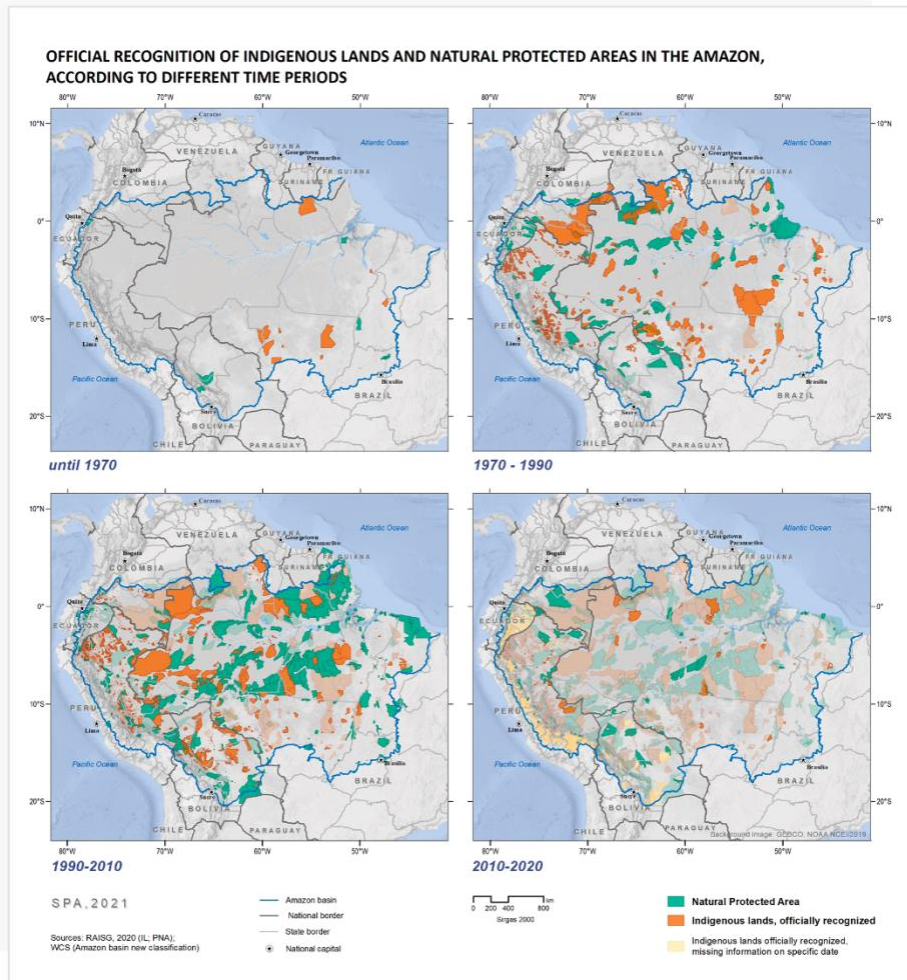
Despite such political advances and their potential contribution for the conservation of biocultural diversity, many challenges remain to the operationalization of these concepts in the Amazon (Vanhulst and Beling 2015). In Venezuela and Bolivia, for example, legal land rights are granted to only a small proportion of territorial claims (Appendix I). In Brazil, even though 21% of the Amazon region has been demarcated as Indigenous lands, agribusiness, logging and mining interests have lobbied to undermine these established protections, leading to a new wave of conflicts, rights violations, invasions, illegal deforestation and violence against Indigenous peoples, Afro-descendant populations, and other local communities (RAISG 2020<sup>23</sup>; see **Chapters XX and XX** in Parts 2 and 3). In response, Indigenous, Afro-descendant and other Amazonian communities have recently joined together to fight for their common cause, with a striking emergence of women-led coalitions and collectives (Parts 2 and 3).

---

<sup>21</sup> To be confirmed

<sup>22</sup> To be confirmed

<sup>23</sup> To be confirmed



**Figure 10.2** Map showing current Indigenous lands and protected areas in the Amazon, forming biocultural landscapes (RAISG 2021/MAPBIOMAS).<sup>24</sup>

### 3. COSMOLOGIES, WORLDVIEWS AND KNOWLEDGE SYSTEMS: IMPLICATIONS FOR NATURAL RESOURCE MANAGEMENT

Among Amazonian Indigenous peoples and local communities, socio-cultural, political and economic organization is mediated by specific ways through which people view and interact with the world and, more broadly, with the cosmos. These cosmologies and worldviews are differentiated within and across cultural groups, and have a strong influence in people's

<sup>24</sup> To be confirmed

perception and interaction with ecosystems and biodiversity (Hill 1988; Reichel 1999; Seeger 2004).

In contrast to European colonial societies, Amazonian Indigenous peoples do not view the forests that surround them as separate “natural” realms full of objectified resources to be dominated and exploited by humans. Instead, they look on the diverse animals, plants and other entities as sentient beings with their own social lives and subjective points of view (Costa and Fausto 2010; Rival 2012; Brightman et al 2012<sup>25</sup>). In this sense, Amazonian shamans are more than healers: they are responsible for communicating and negotiating with and protecting human societies from the multitude of other beings that populate the cosmos (Descola 1996<sup>26</sup>; Viveiros de Castro 1998<sup>27</sup>; Carneiro da Cunha 1998<sup>28</sup>; Shepard 2004; Athayde et al. 2016). In his autobiography, *The Falling Sky*, Yanomami shaman Davi Kopenawa (Kopenawa and Albert 2014: 116-118) enumerates predatory illnesses and shamanic helper spirits, the *xapiri*, as an encyclopedic list of biological species:

*When they encounter us in the forest, the nē wāri evil beings consider us game. They see us as spider monkeys and our children as parrots. It is true! This is the name they give us! We could never survive without the protection of the xapiri... Many xapiri are good at following evil beings' trails, including the hunting dogs and the peccary spirits, who sniff their tracks...*

*The wasp spirits arrow them, the spirits of the witiwitima namo kite lacerate them with their sharp blades, and the coati spirits knock them out with their clubs... Those of the wari mahi tree thrash them. With their skulls split open and their bodies covered in wounds, the stunned evil beings eventually stumble. Then the xapiri can force them to let go of their prey and give up the fight.*

Amazonian peoples view the cosmos as a kind of ecosystem (Reichel-Dolmatoff 1976; Århem 1996)<sup>29</sup>, and predation is a fundamental metaphor that structures the multi-faceted relationships between humans, animals and the spirit world (Fausto 2007). Just as humans hunt and kill animals for food, so do certain dangerous animals, demons, and other predatory spirits look upon humans as animals of prey. This relational understanding of indigenous Amazonian cosmology

---

<sup>25</sup> To be confirmed

<sup>26</sup> To be confirmed

<sup>27</sup> To be confirmed

<sup>28</sup> To be confirmed

<sup>29</sup> To be confirmed



has been referred to as “animism” (Descola 1994)<sup>30</sup> or “perspectivism” (Viveiros de Castro 1996; Lima 1999)<sup>31</sup>, rife with transformations and exchanges that cross-cut species boundaries and defy Western dichotomies such as nature/culture, body/mind and matter/spirit (Daly and Shepard 2019). An important aspect of Indigenous and local worldviews and cosmologies, is that ILK, perceptions and relationships differ between age groups, gender and roles played in the community (Reichel 1999; Howard 2003<sup>32</sup>; Athayde et al. 2017 b; Athayde and Silva-Lugo 2018<sup>33</sup>).

Just as Indigenous peoples’ concepts about human-animal relationships challenge Western concepts about taxonomy and ontology, they also defy capitalistic notions about resource extraction and management. For example, in opposition to Adam Smith’s notion of market forces governing Western economic affairs, Kopenawa (Kopenawa and Albert 2014: 149) describes the concept *në rope*, which is translated as “value of growth,” a kind of “invisible hand” regulating Yanomami economy, ecology, and spirituality:

*The value of growth remains abundant in the forest and if our gardens take the value of hunger, our shamans drink the yākoana [psychoactive snuff] to bring it back home... When the forest’s richness runs away, the game becomes skinny and scarce, for this richness is what makes the game prosper... This is why the shamans also bring down the image of the game’s fat with that of the forest’s fertility.*

Amazonian farming and forest management systems are characterized by an extraordinary diversity of domesticated, semi-domesticated and wild plants, with cyclic alternation between phases of cultivation, abandonment and recovery (Rival 2012; Carneiro da Cunha 2017). For many Indigenous peoples, these cyclic movements are tied to special rituals and ceremonies, (including songs and special body preparations) that ensure the maintenance of customary laws that regulate interactions between the physical and the spiritual world (Seeger, 2004). Diversity is a fundamental theme in all aspects of Amazonian livelihoods, from farming to hunting, gathering, fishing, weaving and other activities as well as myth, ritual and shamanism (Shepard 1999; Heckler and Zent 2008; Emperaire and Eloy 2008; Athayde et al. 2017a).

---

<sup>30</sup> To be confirmed

<sup>31</sup> To be confirmed

<sup>32</sup> To be confirmed

<sup>33</sup> To be confirmed

The complex webs of human-nature relationships manifested in the daily lives of Amazonian IPLCs are connected to specific ILK domains, including artistic expressions such as music, weaving, body painting, pottery, and material culture in general. Among the Kawaiwete of the Brazilian Amazon, the valued designed baskets woven by men are considered living entities and carry a symbolic language that connects them to ancestors, and collective memory. A basket can be, at the same time, a living being, a ritualistic object and a recipient used by women to spin cotton (Athayde et al. 2017a; Figure 10.3).

The traditional pharmacopeia of Amazonian peoples includes plant remedies for common conditions such as diarrhea, intestinal worms, leishmaniasis and snake bite as well as medicines to improve a man's "aim" for hunting, a woman's dexterity at creating delicate handicrafts, the productivity of a garden, or a person's singing abilities (Shepard 2004; Kujawska et al. 2020<sup>34</sup>). In this sense, the connections between health, society and environment are manifold and multi-faceted, embracing physical and spiritual well-being as well as productive social, ecological and agricultural interactions.

**Figure 10.3.** Biocultural interactions expressed through basketry and textiles production among men and women from the Kawaiwete Indigenous people of the Brazilian Amazon. Photos by Simone Athayde, Xingu Indigenous Territory, Brazilian Amazon.<sup>35</sup>

Indigenous peoples' worldviews and values contrast sharply with the norms, scientific practices and governance institutions of settler-colonist nation states. For instance, Indigenous notions of "ownership" and "mastery" highlight the subjectivity, agency and reciprocity in relations with diverse non-human beings, in sharp contrast to objectifying Western notions about property and resource use (Fausto 2008<sup>36</sup>). Among riverine local communities, connections with the Amazonian pink dolphin (*Inia geoffrensis*) can take many forms. These dolphins appear in local imagination as enchanted beings, who can appear as persons and have sexual relations with women. In other circumstances, connections with this species can be of partnerships or mutual

---

<sup>34</sup> To be confirmed

<sup>35</sup> To be confirmed

<sup>36</sup> To be confirmed

hostility, invoking a reciprocal affective tie that transcends the human-animal divide (Arregui 2019)<sup>37</sup>.

In a recent review, Fernández-Llamazares and Virtanen (2020<sup>38</sup>) examine the widespread notion of “game animal masters” among diverse Amazonian Indigenous peoples. They discuss the largely overlooked potential of this Indigenous notion to contribute to biodiversity conservation. In Peru, for example, the Matsigenka people say that invisible guardian spirits of the forest, the *Saangariite* (‘invisible ones’), who raise game animals as their pets, may punish careless or excessive hunters by hiding their animals from them (Shepard 2002). The notion of *panema* among non-Indigenous hunters of the Brazilian Amazon also involves reciprocity with forest spirits and punishment for excessive or “perverse” hunting (Vieira et al. 2017).

The arrival of global capital markets to the Amazonian hinterlands throughout the twentieth century and the introduction of Western technologies such as shotguns, haul nets, metal tools, chainsaws and gasoline engines, has transformed Indigenous peoples’ impacts on Amazonian forests (Alvard 1995; Souza-Mazurek et al. 2000; Shepard et al. 2012<sup>39</sup>). Indigenous and other forest peoples have participated in market activities that reduced animal populations to local extinction in some regions in the mid-twentieth century (Antunes et al. 2016). And yet, as some animal populations have recovered from commercial hunting, Indigenous understandings of this process may rely on cosmological and shamanic, as much as material perceptions about the restoration of human-animal relationships (Pimenta et al. 2018).

#### **4. LANGUAGES AND BIOCULTURAL CONSERVATION**

In the Amazon, Indigenous peoples' worldviews, understanding and interconnections with nature and biodiversity are encoded and expressed in about 300 to 350 Amazonian languages (Aikhenvald 2012). This is what has remained of a much bigger number of languages, after five centuries of European colonization (Voort 2019). About 75% of Amazonian language diversity has been lost forever, without substantial documentation (Palosaari and Campbell 2011). The consequences of language loss are severe for the social and cultural fabric of Indigenous

---

<sup>37</sup> To be confirmed

<sup>38</sup> To be confirmed

<sup>39</sup> To be confirmed

communities, for academic research, and for humanity as a whole. Each single language represents an irreplaceable immaterial cultural heritage of specialized knowledge, art, and ways to conceptualize and understand the world, that are preserved in—and transmitted by—its linguistic categories and structures (Krauss 1992; Austin and Sallabank 2011; Dorian 1989; Evans 2010; Wurm 2001; Harrison, 2007; Moseley 2007, 2010).

As observed in **Chapter 13**, the Amazon region harbors exceptional indigenous language diversity. Its languages are classified into approximately 25 different families (Crevels 2012). It furthermore has a world record of around 20 linguistic isolates, which are not genealogically related to any other known languages (Crevels 2012; Seifart and Hammarström 2018). As Adelaar (1991:45) observes, this represents “unsurpassed genetic variety”.

Most Amazonian languages are seriously threatened with extinction. Although population numbers are rising, speaker numbers are dwindling, due to a tendency to shift to national languages, abandoning the indigenous languages (Crevels 2002; Grinevald 1998)<sup>40</sup>. Language shift is usually motivated by migration or the perspective of economic advantages in a dominant monolingual society (Harbert 2011; Thomason 2015). So far, only few inventories reliably map the actual socio-linguistic situation of Amazonian languages (Sichra 2009; Galucio 2018). Unfortunately, just like biological species, languages are becoming extinct before we even know what is lost.

Local languages may convey ILK and linguistic structures intricately linked to biodiversity. Ethnoecological studies among several Amazonian peoples have revealed a detailed vocabulary for classifying forest habitat types according to geomorphology, hydrology, soil types, and salient indicator species (Parker et al. 1983; Shepard et al. 1999<sup>41</sup>; Fleck and Harder 2000; Abraão et al. 2010). In some cases, Indigenous habitat classification is comparable to or even more sophisticated than contemporary scientific classification systems and can be applied to “ground truth” satellite imagery or streamline biodiversity inventories (Shepard et al. 2004; Abraão et al. 2008). Shepard (1997) and Zent (2009)<sup>42</sup> have both documented bio-culturally relevant systems of noun classification in the languages of the Matsigenka people of Peru and the

---

<sup>40</sup> To be confirmed

<sup>41</sup> To be confirmed

<sup>42</sup> To be confirmed

Uwojttüja (Piaroa) of Venezuela, respectively. Numeral classifiers in Matsigenka refer in their most basic sense to plants or plant parts, but can be applied in derived forms to create culturally relevant analogies between plants, animals and material culture (Shepard 1997). Likewise, among the Piaroa, of more than a hundred commonly used noun classifiers, at least 75 such are used to categorize and distinguish between different botanical life forms, plant parts, growth habits, and ecological associations. This linguistically-encoded system is comparable to the scientific botanist's taxonomic key. These and other examples provide specific instances of how the maintenance of folk botanical knowledge is directly dependent upon language preservation (Zent 2009).

Language loss is likewise connected with environmental destruction and biological species extinction, especially in the Amazon. During the past decades, the interdependence of linguistic and biological diversity has become increasingly obvious (Maffi 2001; Loh and Harmon 2005; Gorenflo et al. 2012). Those regions of the world with highest species diversity also contain highest linguistic diversity (see Figure 10.4). Similarity between evolutionary biological speciation and language genesis was noted already by Charles Darwin (1871).

**Figure 10.4.** Maps showing the intersection between biodiversity and linguistic diversity in the world, according to Gorenflo et al. (2012)<sup>43</sup>. (A) Biodiversity hotspots (regions 1–35) and high biodiversity wilderness areas (regions 36–40). (B) Geographic distribution of indigenous and non-migrant languages in 2009.<sup>44</sup>

In the 1988 Declaration of Belém, conservation biologists, ethnobiologists and anthropologists acknowledged the existence of an ‘inextricable link’ between biological and cultural diversity. Seminal articles (Harmon 1996)<sup>45</sup> helped identify biolinguistic diversity hotspots in the Amazon Basin, Central Africa and Indo-Malaysia/Melanesia (Loh and Harmon 2005; 2014; Maffi 2001)<sup>46</sup>. About 70% of the world’s languages are spoken on about 24% of the earth’s terrestrial

---

<sup>43</sup> To be confirmed

<sup>44</sup> To be confirmed

<sup>45</sup> To be confirmed

<sup>46</sup> To be confirmed

surface, which comprise the remaining regions of high biodiversity (Gorenflo 2012<sup>47</sup>). Furthermore, as Harmon and Loh's (2018)<sup>48</sup> indicate, "*analysis of the conservation status of languages indicates that they are more threatened overall than mammals, birds, or reptiles, and in as severe a state as amphibians.*"

Language extinction, due to shifts triggered globally by urbanization, migration and other factors, is relatable to environmental destruction and habitat loss in Amazonia. As recent satellite images show, those parts of the Amazon where indigenous peoples live, and where their languages survive, also tend to be those parts that are still green. Frainer (2020) highlights the fact that national and international policies have approached cultural, linguistic and biological diversity separately, whereas these "diversities" have co-evolved and shaped the world as we know it. Therefore, the integration of ILK in biodiversity assessments and management is crucial.

## 5. BIOCULTURAL DIVERSITY, LANDS AND LIVELIHOODS

As seen in previous sections, scientific studies of Indigenous and local knowledge systems and their corresponding imprint on the landscape, have revealed an "inextricable link" between cultural and biological diversity in Amazonia, expressed through biocultural landscapes and heritage (Posey 1989; Balée 2003; Heckenberger 2010)<sup>49</sup>. With the recognition and delimitation of Indigenous lands that took place beginning in the 1970s-1990s in many Amazonian countries, and the more recent (partial) recognition of collective land rights for Afro-descendant populations (*quilombolas*, *maroons*), IPLCs livelihoods have been increasingly shaped by national and international policies; by governmental, non-governmental and scientific institutions; and by market forces and rural-urban networks (Piñedo-Vasquez et al. 2008<sup>50</sup>; Figure 10.5; Chapter 14).

The concept of biocultural landscape and heritage recognizes the reciprocal relationships between IPLCs with forests, rivers and other Amazonian ecosystems since immemorial times

---

<sup>47</sup> To be confirmed

<sup>48</sup> To be confirmed

To be confirmed

<sup>49</sup> To be confirmed

<sup>50</sup> To be confirmed

until the present, as noted in section 10.2. For example, the Jodi people of Venezuela do not inhabit the forest in a passive way, but are active agents in constantly recreating a living forest through several management practices encoded in specific linguistic concepts and spiritual connections (Box 10.2).

Like Indigenous peoples, Afro-descendant and other Amazonian communities engage in livelihoods that are finely tuned to diverse ecosystems as well as seasonal fluctuation in river levels, especially in the flooded *varzea* forests along the main channel of the Amazon and its larger tributaries (Adams et al. 2006)<sup>51</sup>. Referred to variably as *caboclos*, *mestizos*, peasants or "riverine" dwellers (*ribeirinhos*), these populations have participated intensely in regional, national and global markets through extraction, processing and commercialization of forest resources (Fraser et al. 2018).

**Figure 10.5** Livelihood strategies of Indigenous peoples and local communities in the Amazon.<sup>52</sup>

**Figure 10.6.** *Uli Jlae Juae* and a younger kisman (*ijluwena*) playing a flute known as *jani jtwawibo* on the banks of the Kayamá river during a hunting expedition. Photo taken by Stanford Zent in 2005 in the Kayamá river, Estado Amazonas, República Bolivariana de Venezuela.<sup>53</sup>

Since the colonization of the Amazon associated with different economic cycles in the 19th and 20th century, IPLCs livelihoods have been connected to global consumption and technological developments, as well as to national and regional fluctuations in demand for wage labor (Fraser et al. 2018, **Chapters 11 and 14**). Geographer Bertha Becker (*in memoriam*) refers to the Amazon as an "urbanized forest," describing urbanization processes beginning in the 1980s triggered by the construction of railroads, highways, ports and the vehiculation of urban society (Becker 2005)<sup>54</sup>. This understanding has direct relevance to the design of integrated policies that consider the interconnected nature of cultural and biological diversity in the Amazon.

---

<sup>51</sup> To be confirmed

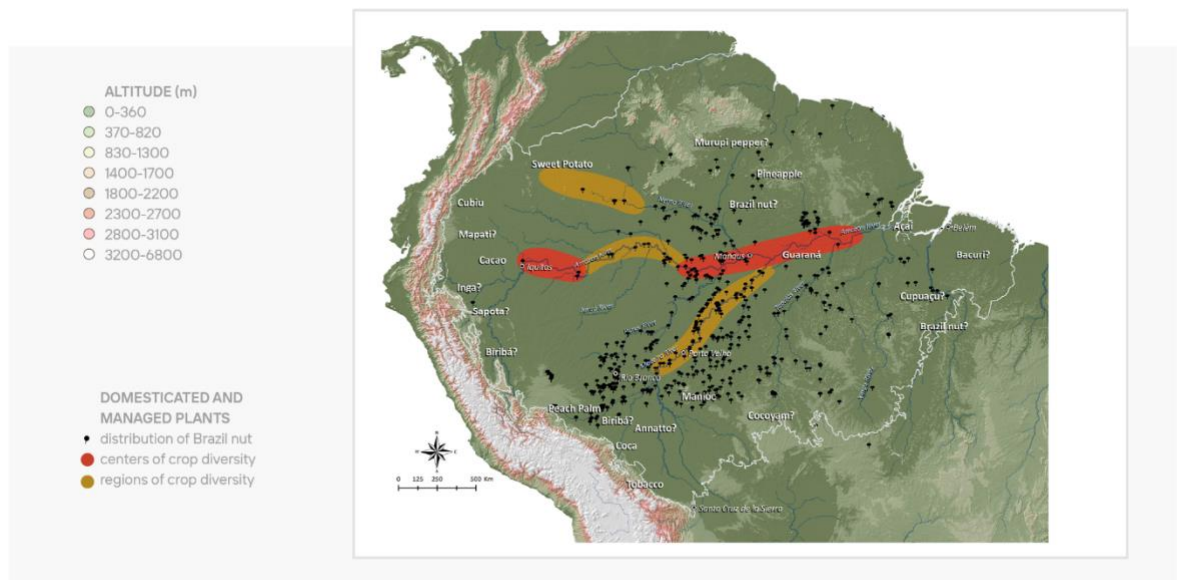
<sup>52</sup> To be confirmed

<sup>53</sup> To be confirmed

<sup>54</sup> To be confirmed

## 5.1 Amazonian agriculture and agroforestry

Traditional agricultural systems of Amazonia (Empeaire et al. 2014) include a multiplicity of cultivated and managed plants and involve complex strategies of landscape management and integration with other livelihood activities like hunting, fishing and extractivism (Denevan et al 1988; Clement 1999; Miller and Nair 2006<sup>55</sup>; Porro et al. 2012; Empeaire and Garcez 2016). The Amazon is a center of genetic diversity of diverse crops such as cassava, peanuts, maize, sweet potato, yam, chili peppers, cacao, and others (Clement et al. 2010; Zent and Zent 2012). Women often play an important role in food security and sovereignty through their cultivation, exchange, management and conservation of crop varieties (Silva 2004; Empeaire and Eloy 2014).



Cassava or manioc (*Manihot esculenta*) is the primary staple crop for many contemporary Indigenous peoples and well as peasants and other local communities of the Amazon (Boster 1984; Salick et al. 1997; Clement et al. 2010, Table 1)<sup>56</sup>. Indigenous peoples cultivate hundreds of land races and varieties of manioc (Frechione 1982; Heckler and Zent 2008; Empeaire and Eloy 2008), most of which are divided among two major types, “bitter” manioc, containing toxic

<sup>55</sup> To be confirmed

<sup>56</sup> To be confirmed



levels of cyanide and requiring detoxification before consumption, and “sweet” manioc, edible after simple boiling. These two principal types correspond to two main culture areas in historical and contemporary Amazonia, with bitter manioc cultivation found principally along the courses of major Amazonian rivers in central and eastern Amazonia as well as coastal areas, and sweet manioc cultivation, predominant along tributary and headwater rivers especially in western Amazonia (McKey and Beckerman 1993; Clement et al. 2010).

**Table 1.** Varietal diversity of Manioc (*Manihot esculenta*) in the Amazon. Source: Carneiro da Cunha and Lima (2016). [This table is preliminary: it will be re-typed and updated with more recent information].<sup>57</sup>

Bitter manioc cultivation in the northwest Amazon is associated with tremendous agrobiodiversity of manioc cultivars (Emperaire & Eloy 2008), as well as cultural innovations involved in the processing and removal of lethally toxic cyanogenic glucosides, notably the woven *tipiti* manioc press and a wide range of specialized basketry (Figure 10.7; Ribeiro 1971; Dufour 2007)<sup>58</sup>. Processes associated with bitter manioc cultivation are deeply integrated into social, symbolic, and cosmological systems (Hugh-Jones 1980; Chernela 1993)<sup>59</sup>.

Like other documented cases of agricultural systems by Indigenous peoples in Western Amazonia (Johnson 2003; Boster 1984)<sup>60</sup> the polyculture swidden agricultural system of Kichwa indigenous people of Ecuador contain a great diversity of cultivated and managed food, medicinal and ritual species (Acosta 2013; Coq-Huelva et al. 2017<sup>61</sup>). Known locally as *chakras*, these systems reflect Kichwa worldviews and values as expressed in the philosophy of Sumak Kawsay or “Living Well,” which reinforces collective management and reciprocal relationships between humans and non-human beings (Acosta 2016<sup>62</sup>, [Chapter 14](#)). Chakras are especially associated with women’s activities like planting and tending cassava, potatoes and other root crops, as well as preparing fermented manioc beer (Whitten 1978). The Kichwa chakra system

---

<sup>57</sup> To be confirmed

<sup>58</sup> To be confirmed

<sup>59</sup> To be confirmed

<sup>60</sup> To be confirmed

<sup>61</sup> To be confirmed

<sup>62</sup> To be confirmed

has provided strategic and diverse food resources to confront the rapidly changing contemporary context (Coq-Huelva et al. 2017)<sup>63</sup>.

Amazonian Afro-descendant groups and peasants or “caboclos” have also developed sophisticated agricultural and agroforestry systems, contributing to the rich agrobiodiversity represented in the region. A study done among the Aluku maroons (Afro-descendant group) of French Guiana documented 38 cultivated crops, with 156 varieties (Fleury 2016). Further research oriented to documentation and “in-situ” conservation of these varieties should be a priority, respecting IPLCs intellectual property rights over these important genetic resources (Santilli 2012).

**Figure 10.7.** Bitter manioc processing among the Baniwa Indigenous people in the Upper Rio Negro, Brazil. Photo by Glenn Shepard, 2018<sup>64</sup>.

Agroforestry systems are an integral part of swidden cultivation or slash-and-burn agriculture as practiced by contemporary Amazonian peoples (Hauser and Norgrove 2013<sup>65</sup>). Hundreds of species and varieties are cultivated in swidden-fallow agroforestry systems, with staple cultigens like manioc and maize (*Zea mays*) raised alongside, or in succession with managed agroforestry species like peach palm (*Bactris gasipaes*), cacao (*Theobroma cacao*), açai palm (*Euterpe oleraceae*), babaçu palm (*Attalea speciosa*) and Brazil nut (*Bertholletia excelsa*), among many others (Pinton and Emperaire 1992<sup>66</sup>; Porro et al. 2012; **Chapter 11**). Owing to long fallow periods, Indigenous agroforestry systems imitate the forest in terms of its structure and diversity (Denevan et al., 1984<sup>67</sup>; Posey, 1984<sup>68</sup>; Balée and Gely, 1989), and swidden fallows enriched with dozens of protected, managed, or semi-domesticated plant species can be understood as intermediate between agricultural zones and forest ecosystems (Alcorn, 1989; Cardoso 2010; Cardoso et al. 2010)<sup>69</sup>.

---

<sup>63</sup> To be confirmed

<sup>64</sup> To be confirmed

<sup>65</sup> To be confirmed

<sup>66</sup> To be confirmed

<sup>67</sup> To be confirmed

<sup>68</sup> To be confirmed

<sup>69</sup> To be confirmed

Rooted in the agricultural practices of Indigenous peoples, the field of agroecology emerged in the 1970s-1980s as a response to the socio-environmental damages inflicted by the Green Revolution (Altieri 2012)<sup>70</sup>. Agroecology combines principles of ecology with traditional knowledge of Indigenous groups and small farmers, in a sustainable production system that protects agrobiodiversity and ecosystem services and values food security and sovereignty (Altieri 2012)<sup>71</sup>. Agroforestry systems are considered a critical and viable economic option for conserving and restoring forest ecosystems around the world (IPBES 2018)<sup>72</sup>. Given the tremendous erosion of global crop genetic diversity, attributed, in part, to the green revolution and agribusiness, Amazonia is an important region for *in-situ* or agrobiodiversity conservation (Shand 1997; Steward 2013; Cunha and Lima 2016).

### ***5.2 Fisheries and aquatic management***

Freshwater fisheries play a critical role in sustaining Amazonian economies, cultures and livelihoods. The Amazon basin accounts for around 20% of the world's freshwater biodiversity (Lévêque et al. 2008)<sup>73</sup>, which is now critically threatened by commercial fisheries, land-use and livelihood changes, climate change, exotic species, hydroelectric dams and other large infrastructure projects, and mining operations (Doria et al. 2017<sup>74</sup>; Goulding et al. 2018<sup>75</sup>, see Part 2). With vanishing fish diversity and increasing river impoundment and degradation, associated ILK and specific fishing techniques are also being lost at a fast pace (Doria et al. 2017).

Traditional fishing strategies in Amazonia vary according to river types (whitewater, blackwater, clearwater), seasonal flooding regimes, and other livelihoods including agriculture, hunting, animal husbandry and extractivism (McGrath et al. 1993). Amazon *varzea* floodplain ecosystems supported large pre-colonial Indigenous populations and remain important to regional economies

---

<sup>70</sup> To be confirmed

<sup>71</sup> To be confirmed

<sup>72</sup> To be confirmed

<sup>73</sup> To be confirmed

<sup>74</sup> To be confirmed

<sup>75</sup> To be confirmed

due to their fertile soils and abundance of aquatic resources (Roosevelt 1989<sup>76</sup>; McGrath et al. 1993; Goulding et al. 2018<sup>77</sup>).

Fish species know no geopolitical frontiers, making it a difficult resource to manage. Seasonal fish migrations cross over numerous administrative and even national boundaries and between protected and non-protected areas, requiring social-ecological approaches and integrated coordination among Amazonian countries that is to date seriously lacking (Goulding et al. 2018<sup>78</sup>; Doria et al. 2017, 2020<sup>79</sup>). Available research suggests an important role for IPLCs in contributing to scientific understandings of the diversity, ecology and management of fish and other aquatic resources (Chernela 1994; Begossi et al. 1999; Ortega et al. 2001; Doria et al. 2017).

### **5.3 Hunting**

Hunting is an important livelihood strategy among Amazonian Indigenous peoples and local communities, but since productivity is generally lower for tropical forests than open habitats, overhunting has been considered a major threat for biodiversity in the Amazon (Bennett and Robinson 2000). Excessive hunting can have significant, wide-reaching ecosystem impacts by disrupting seed dispersion, predation and herbivory (Wright 2003; Peres et al. 2016). Moreover, deforestation, habitat fragmentation and agricultural expansion exacerbate such impacts as forest fragments are “emptied” of key species (Redford and Feinsinger 2003<sup>80</sup>; Francesconi et al. 2018; Ponta et al. 2019).

Some IPLCs hunting practices and cosmologies emphasize checks, balances and reciprocal exchanges between humans and prey species that would appear to restrain excessive hunting (Reichel-Dolmatoff 1976; Ross 1978; Shepard 2002, 2014; Vieira et al. 2017)<sup>81</sup>. However, the introduction of firearms to all but the most isolated Indigenous peoples, and the commercial hunting of some species (Antunes et al. 2016) has drastically increased the impact of subsistence

---

<sup>76</sup> To be confirmed

<sup>77</sup> To be confirmed

<sup>78</sup> To be confirmed

<sup>79</sup> To be confirmed

<sup>80</sup> To be confirmed

<sup>81</sup> To be confirmed

hunting, contributing to growing problems of defaunation around established settlements (Jerozolinski and Peres 2003; Shepard et al. 2012<sup>82</sup>; Boubli et al. 2020).

Yet several Amazonian Indigenous groups maintain cosmologies, restrictions, food taboos and other biocultural practices that may prevent over-hunting. For instance, the Eñepa (Panare) of Venezuela avoid hunting near certain mountains considered to be the abode of spirits who protect game animals (Zent and Zent 2018; see also Read et al. 2010). The Ye'kuana rotate hunting zones, and “rest” certain zones to allow game animals to recuperate (Hames 1980). Indigenous peoples of the upper Xingu observe some of the most extensive game animal taboos in Amazonia, contributing to the local abundance of large primates, tapir and other harvest-sensitive mammals (Carneiro 1978; Shepard et al. 2012<sup>83</sup>).

#### **5.4 Brazil nut extractivism**

The Brazil nut (*Bertholletia excelsa*) is the most important non-timber forest product of the Amazon (Duchelle et al. 2011), providing seasonal economic input on local, national, and international markets for tens of thousands of smallholders (Kainer et al. 2007; Bojanic 2001; Peres et al. 2003; Quaedylied et al. 2014). While Brazil was historically the main producer, in 2018 Bolivia was the top exporter of Brazil nuts (\$228M), followed by Peru (\$65M), and Brazil (\$60M) (OEC 2021). Brazil nut groves are especially abundant and intensely managed in the trinational border area between Madre de Dios in Peru, the Brazilian state of Acre and the department of Pando in Bolivia (Mittermeier et al. 2003; Stoian 2000; Bakx 1988). Brazil nut grove management has played an important role in resolving land conflicts, limiting deforestation, and providing sustainable economic activities in this region (Allegretti 2008; Cronkleton and Pacheco 2010). Collaborative access arrangements, growing international demand and organic certification have made Brazil nut a cornerstone of the region's economy and conservation efforts.

Archeological data documents the consumption of Brazil nuts as early as 11,000 years ago (Roosevelt et al. 1996), and a preponderance of genetic, ecological and ethnobotanical evidence suggests that the current basin-wide range of the Brazil nut has been significantly affected by

---

<sup>82</sup> To be confirmed

<sup>83</sup> To be confirmed

human management practices (Shepard and Ramirez 2011; Scoles and Gribel 2011). Comparison of Indigenous language terms for Brazil nut throughout Amazonia has contributed to the reconstruction of possible routes of human-induced dispersal, providing another example of the links between language, culture and biodiversity (Figure 10.8).

**Figure 10.8.** Indigenous terms for Brazil nut (*Bertholetia excelsa*) across several Indigenous peoples across the Amazon. Source: Shepard and Ramirez (2011).<sup>84</sup>

## 6. GOVERNANCE, DECISION AND POLICY-MAKING

The livelihood strategies and relationships of Amazonian IPLCs with biodiversity and the landscape involve a multiplicity of forms of governance. Here, we define governance as the set of rules, norms and customary laws (or institutions) used by Indigenous peoples and local communities to: a) access, use, manage, circulate and market biodiversity; b) occupy the territory; c) to make decisions about land and the territory; d) to relate to Nation states and other actors; and e) to achieve self-determination (Costa 2015; Dei and Restoule 2018)<sup>85</sup>. This multiplicity is based on a diversity of socio-cosmological systems and livelihood regimes, and is expressed through various arrangements of communal institutions and collaborative relations, articulated or not with modes of state and private governance.

In fact, the main common feature of Amazonian IPLCs socio-environmental governance systems is that they are organized in different regimes of communal governance of biodiversity, historically established in the different forms of territorial use, and are based on socio-political arrangements and diverse ecological knowledge regimes in their relations with animals, plants, fungi, minerals and spirits (Pinedo- Vasquez 1992; Diegues 1998; Lu, 2006; Fudemma and Brondizio, 2003; Stronza, 2009; Almeida<sup>86</sup>, 2012; Rodriguez et al. 2017<sup>87</sup>; Castro 2020<sup>88</sup>; Capelari et al. 2020). At the same time, such forms of governance are articulated with IPLCs

---

<sup>84</sup> To be confirmed

<sup>85</sup> To be confirmed

<sup>86</sup> To be confirmed

<sup>87</sup> To be confirmed

<sup>88</sup> To be confirmed

worldviews and cosmologies that, as we saw in previous sections, define living beings by their vital principles and the inseparability between nature and culture (Kohn 2013).

These Indigenous and local governance systems are often at odds with nation states laws and regulations, requiring new forms of socio-political organization (Erazo 2013; Athayde and Schmink 2014). Erazo (2013) noted the challenges faced by the Kichwa people from Ecuador to conform to Ecuadorian Agrarian Reform and Colonization law, which created tensions between people's existing obligations to their kin group, and the obligations toward a larger group of organizational members and leaders, which continue to the present day.

Analysis of communal forms of governance emerged after the ecological debate on biodiversity conservation with the publication of the article *The Tragedy of Commons* (Harding, 1968<sup>89</sup>). Harding stated that in communal governance arrangements, understood by the author as open access, individuals led inexorably to depletion of natural resources. However, since the early 1980s, an increasing number of scholars have documented examples of biodiversity and spaces shared in common. These studies have shown that various IPLCs communal strategies are based on a set of norms, values, institutional arrangements and worldviews that often have potential to generate sustainable community management of biodiversity over the long term (Feeny et al. 1990; McKean and Ostrom 1995; Ostrom 2015; Agrawal 2014)<sup>90</sup>. The greatest contribution of “commons” studies has been to show that a multiplicity of regimes of communal governance can be defined as dynamic collective institutional arrangements that regulate the access, use, management, circulation and control of biodiversity for food, wood, medicines, rituals, fertilizers, fuel, as well as access to resources for spiritual and religious practices (Ostrom et al., 1994; Diegues and Moreira, 2001; McKean and Ostrom, 2001)<sup>91</sup>.

There are many examples of commons governance by IPLCs in the Amazon, linked mainly to forest agro-extractivism, hunting practices and to rule fishing along lakes and rivers, but these governance systems are still little documented (Lu 2016<sup>92</sup>; Futemma and Brondizio 2003). In the landscape of Amazonian “commons”, biodiversity is appropriated by a well-defined community

---

<sup>89</sup> To be confirmed

<sup>90</sup> To be confirmed

<sup>91</sup> To be confirmed

<sup>92</sup> To be confirmed

of users which have the power to define resource use rights mechanisms in communal regimes, establishing rules, incentives and penalties, as well as including or excluding other users through local regulations.

In the pluri-ethnic riverine communities of the Puranga-Conquista (RDS) Sustainable Development Reserve in Rio Negro, Brazil, the household is the basic socio-political unit of the community. Heads of households are responsible for managing and negotiating access and control of spaces and natural resources that they are using directly. In general, each family has a set of cultivated spaces and forests in succession that are of their use and possession. The fishing, hunting and forest areas are managed at the community level. In this case, the community created governance mechanisms that allow access to the territory by all members of the community, and exclude access by others. At the broadest level, with the creation of the RDS, a new governance model was instituted, with co-participation between the community and the State. In this case, governance is carried out through collegiate and legal instruments of co-management, such as councils and management plans (Cardoso et al. 2009<sup>93</sup>). Such a trans-scalar model that articulates household management, with a network of relatives and allies reaching to the community level, can be seen in several modes of (re)territorialization by Amazonian IPLCs (MacDonald 1995<sup>94</sup>; Little 2003<sup>95</sup>; Lu 2006).

The artisanal fishing communities of the Middle Amazon River provide a “laboratory” in which it is possible to explore examples of communal regimes. Following Pereira (2000)<sup>96</sup>, in this region, some communities have autonomous local governance to regulate their fishing practices while others do not. Of those that do, some control only access to fishing grounds, while others control both access and individual level of resource appropriation. In some communities, there is widespread adherence to the management scheme, and in others, opposition threatens to destroy the management institution and to deplete local fish stocks. In the case of a community floodplain fishery in the Peruvian Amazon, the resource institution was active at creating rules and means to keep outsiders out of the fishery. During an initial period of external threat, when the activity was high, governance was employed to create rules regarding allowed fishing

---

<sup>93</sup> To be confirmed

<sup>94</sup> To be confirmed

<sup>95</sup> To be confirmed

<sup>96</sup> To be confirmed



techniques and seasons (Pinedo et al. 2000)<sup>97</sup>. For Lu (2016), interest and participation in the institution, however, waned with the dissipation of the external threat and due to internal conflict. Stocks (1987)<sup>98</sup> looking at Cocamilla fishing practices, argue that this model of communal regime contributes to sustainability in the floodplain's lake ecosystems in Peru.

Such common arrangements in fishery activities are based on local configurations of kinship, local notions of territoriality, ecological knowledge, the formation of alliances, and mutual respect among actors. Such arrangements have been threatened since the 1970s, mainly in Brazil and Peru (McGrath et al. 1993; Pinedo et al. 2000<sup>99</sup>; Pereira 2000<sup>100</sup>), when the "war of the lakes" began. This was a result of the modernization of the fishing fleet and the permission by the State to access IPLCs territories, generating conflicts, modes of resistance and requiring the subsequent creation of instruments of co-governance between communities and the State to mitigate conflicts.

Fishing agreements (*acordos de pesca*) and fisheries community governance (Isaac and Barthem 1995<sup>101</sup>; Pinedo et al. 2000; Castro and MacGraph 2001<sup>102</sup>; MacGraph et al 2008<sup>103</sup>), that regulate the management of *Arapaima gigas* by indigenous peoples in Juruá river (Figure 10.9) and riverine communities in the Mamirauá Reserve can be considered success stories of collective management of biodiversity (Viana et al. 2004<sup>104</sup>; Castello et al 2008<sup>105</sup>; Campos-Silva and Peres, 2016; Campos-Silva et al 2017). These cases illustrate the problems and potential solutions of co-management schemes in artisanal fisheries, as a means of amplifying the stock abundance and thereby lake productivity by limiting exploitation by larger, often external commercial boats, while improving the quality of life of artisanal fishers and their communities.

---

<sup>97</sup> To be confirmed

<sup>98</sup> To be confirmed

<sup>99</sup> To be confirmed

<sup>100</sup> To be confirmed

<sup>101</sup> To be confirmed

<sup>102</sup> To be confirmed

<sup>103</sup> To be confirmed

<sup>104</sup> To be confirmed

<sup>105</sup> To be confirmed

Local communal arrangements can also be seen among IPLCs peoples who practice forest and agroforestry. For Lu (2016<sup>106</sup>; 2001<sup>107</sup>), studying the commons in Ecuador, the consistency of responses within communities suggests the existence of institutional arrangements that influence the way that agriculture is practiced. In communities practicing individual property arrangements, large tracts of land ranging from 20 to 200 hectares have been divided among households and the rights to the remaining land area are maintained by the household. In contrast, in communities with communal property arrangements, households only gain withdrawal rights to the lands they have cleared and cultivated, which are significantly smaller than those of individual arrangement households.

**Figure 10.9.** Co-management of *Arapaima gigas* (Pirarucu) by the Paumari indigenous people in the State of Amazonas, Brazil. Photo by Adriano Gambarini, archive Operação Amazônia Nativa – OPAN.<sup>108</sup>

These Amazonian systems of biodiversity governance have gone under tremendous pressure, as 'commoners' are losing access to the territory and biodiversity, often through violent expropriation (MacDonald 1995<sup>109</sup>; Lu 2016<sup>110</sup>; Begotti and Peres, 2020), shaping what many authors call “tragedy of commoners” or “tragedy of enclosures” (Ortega Santos 2002<sup>111</sup>; González de Molina and Martínez-Alier 2001<sup>112</sup>). Such pressures are due to the advance on the forest, with processes of land privatization, infrastructure construction, and agro-pastoral and mineral exploitation of Amazon resources, with consequent impacts on IPLCs communal modes of governance. But, because of these pressures, in some cases, political mobilization and institution of social movements by IPLCs has led to social resistance and reaffirmation of

---

<sup>106</sup> To be confirmed

<sup>107</sup> To be confirmed

<sup>108</sup> To be confirmed

<sup>109</sup> To be confirmed

<sup>110</sup> To be confirmed

<sup>111</sup> To be confirmed

<sup>112</sup> To be confirmed

traditional communal appropriation regimes in Amazonian countries (MacDonald 1995; Allegretti and Schmink 2009; Silva and Postero 2019)<sup>113</sup>.

Some of these communal territorial governance regimes have been recognized and incorporated into the National Constitutions of Amazonian countries in form of territorial and cultural rights, or as models of “*buen vivir, bem viver or living well*”, as of Indigenous peoples in Ecuador and Bolivia (Sumak Kawsay) (Acosta 2008; Gudynas 2011)<sup>114</sup> and Brazil (Schlemer et al 2017; Baniwa 2019). These rights have generally taken the form of three main tenure types: a) Indigenous reserves under which an Indigenous group is given legal communal land title to large areas containing multiple communities; b) community tenure in which communities are given legal title through customary land tenure laws established for colonists; and c) protected areas, under which the state maintains public ownership of land in protected areas but grants legal use rights to Indigenous or community residents (Richards 1997)<sup>115</sup>.

The complexity and scale of environmental problems promote various types of collective and collaborative governance strategies between actors, given the impossibility of addressing them on their own. Effectiveness in collaboration, therefore, is an important research and policy-making agenda, which can contribute to designing more equitable and sustainable long-term collaborative initiatives between government, civil society and IPLCs on achieving common goals, as well as implementing forest-based economies and nature-based solutions for the region.

## 7. CONCLUSION

Recognizing the multiple interconnections between socio-cultural and biological diversity in Amazonia is essential to sustainability and environmental justice for the basin as a whole. Biocultural diversity in the region is manifested in IPLCs languages, worldviews, livelihoods, and deep historical entanglements with Amazonian plants, animals and ecosystems. The valorization and maintenance of these lifeways in Indigenous territories, local communities as well as urban centers is of critical importance for the conservation of Amazonian socio-biodiversity and the future of life on Earth for at least three main reasons: **1) the empirical as**

---

<sup>113</sup> To be confirmed

<sup>114</sup> To be confirmed

<sup>115</sup> To be confirmed

well as philosophical underpinnings of Indigenous and local knowledge systems provide key concepts and practices for developing a deeper, more historically and socially situated understanding of the Amazon in its interconnected biological, ecological and cultural dimensions, including first hand knowledge and information about plant and animal species, sustainable management practices and climate resilience (Heckenberger et al. 2008; Schwartzman et al. 2013)<sup>116</sup>; 2) **Amazonian peoples maintain sophisticated knowledge about sustainably managing diverse agricultural, aquatic and agroforestry systems**, which in turn have dynamically shaped the region’s ecosystems. Certain elements of Amazonian landscapes and biodiversity that were once considered “natural,” such as Brazil nut groves, açai palm stands and other economically important, “hyperdominant” plants bear the imprint of long-term manipulation, domestication and management by Indigenous peoples (Posey and Balick 2006<sup>117</sup>; Brondizio 2008<sup>118</sup>; Heckenberger et al. 2008<sup>119</sup>; Clement et al. 2010; Shepard and Ramirez 2011; Balée 2013; Clement 2019). Indigenous and local knowledge systems have been, and should remain, instrumental in identifying and managing useful plant and animal species, contributing to global agricultural diversity, sustainably managing forests for subsistence as well as market-based economies, as well as innovative approaches to social-ecological restoration, climate change mitigation and bioeconomy initiatives (Parts 2 and 3, CHs 23, 26-28 cf); 3) **Indigenous Peoples and Local Communities across the Amazon are stewards of diverse worldviews, values, institutions and governance systems, all of which must contribute to shaping culturally plural, inclusive, democratic societies**. According to the UN Declaration on the Rights of Indigenous Peoples (UNDRIP 2007<sup>120</sup>, supported by all Amazonian countries) IPLCs have the right to self-determination: they should be free to determine their political status and pursue their economic, social and cultural development. IPLC’s languages, customary laws, institutions and decision-making structures have resulted in successful governance of their lands and territories for decades, if not centuries, and should continue to contribute to implementing Sustainable Development Goals (SDGs), the Convention of Biological Diversity (CBD) and

---

<sup>116</sup> To be confirmed

<sup>117</sup> To be confirmed

<sup>118</sup> To be confirmed

<sup>119</sup> To be confirmed

<sup>120</sup> To be confirmed

other international policies of biodiversity conservation, environmental justice and sustainable development.

Diversity, in all its forms, must be understood as a value to be cherished, nourished, promoted and protected. Biocultural diversity in Amazonia and elsewhere provides the entire globe with knowledge, resources, alternatives and innovations for addressing uncertainty as we navigate turbulent times and social-ecological tipping points of the Earth's resilience. The Amazon is a living biocultural system that cannot survive without the valorization, empowerment and participation of the diverse societies that have flourished among its rivers, forests, savannas and estuaries for centuries.

## 8. RECOMMENDATIONS

- **Support the recognition of land, territorial and socio-cultural rights** to Indigenous peoples, Afro-descendant communities and other local communities, in connection to policies that value and support forest and water-based livelihoods, including economic incentives and credit for non-timber forest products;
- **Support the documentation and preservation of Amazonian Indigenous languages and associated knowledge systems** as living manifestations of endangered biocultural diversity;
- **Develop policies** for raising public awareness about Amazonian languages, including concrete **actions for linguistic revitalization and conservation integrated with biodiversity conservation** policies;
- **Promote applied research on agrobiodiversity connected to food security and sovereignty** across Amazonian IPLCs, respecting associated biocultural relationships and intellectual property rights.
- Recognize and support **women's leadership and role on agrobiodiversity conservation and resource management** in the Amazon;
- Support **forest-based and ecosystem-based livelihoods in the Amazon**, through economic incentives, policies and regulations;
- Support the **protection of the territories of Indigenous peoples in voluntary isolation**.

## REFERENCES

- Allegretti M. 2008. A construção social de políticas públicas. Chico Mendes e o movimento dos seringueiros. *Desenvolv e Meio Ambient* **18**.
- Antunes AP, Fewster RM, Venticinque EM, *et al.* 2016. Empty forest or empty rivers? A century of commercial hunting in Amazonia. *Sci Adv* **2**: e1600936.
- Athayde S, Silva-Lugo J, Schmink M, and Heckenberger M. 2017a. The Same, but Different: Indigenous Knowledge Retention, Erosion, and Innovation in the Brazilian Amazon. *Hum Ecol* **45**: 533–44.
- Athayde S, Silva-Lugo J, Schmink M, *et al.* 2017b. Reconnecting art and science for sustainability: learning from indigenous knowledge through participatory action-research in the Amazon. *Ecol Soc* **22**: art36.
- Athayde S and Silva-Lugo J. 2018. Adaptive Strategies to Displacement and Environmental Change Among the Kaiabi Indigenous People of the Brazilian Amazon. *Soc Nat Resour* **31**: 666–82.
- Arregui AG. 2020. Positional Wildness: Amazonian Ribeirinhos , Pink Dolphins and Interspecies Affections. *Ethnos* **85**: 819–42.
- Austin PK and Sallabank J. 2011. The Cambridge handbook of endangered languages. *Choice Rev Online* **49**: 49-0687-49–0687.
- Bakx K. 1988. From proletarian to peasant: Rural transformation in the state of Acre, 1870–1986. *J Dev Stud* **24**: 141–60.
- Balée W. 2003. Native Views of the Environment in Amazonia. In: *Nature Across Cultures*. Springer.
- Beckerman S. 1979. The Abundance of Protein in Amazonia: A Reply to Gross. *Am Anthropol* **81**: 533–60.
- Begossi A, Silvano RAM, Amaral BD, and Oyakawa OT. 1999. Use of local resources by fishers and hunters in an extractive reserve (Upper Juruá, Acre, Brazil). *Environ Dev Sust* **1**.
- Begossi A, Silvano RAM, Amaral BD do, and Oyakawa OT. 1999. Uses of Fish and Game by Inhabitants of an Extractive Reserve (Upper Juruá, Acre, Brazil). *Environ Dev Sustain* **1**: 73–93.
- Bojanic A. 2001. Balance is Beautiful: Assessing Sustainable Development in the Rain Forest of the Bolivian Amazon. PROMAB Scientific Series No. 1. *CIFOR, Univ Utr PROMAB Utrecht, Netherlands*: 256.
- Brightman M. 2012. Maps and clocks in Amazonia: the things of conversion and conservation. *J R Anthropol Inst* **18**: 554–71.

- Caballero-Serrano V, McLaren B, Carrasco JC, *et al.* 2019. Traditional ecological knowledge and medicinal plant diversity in Ecuadorian Amazon home gardens. *Glob Ecol Conserv* **17**: e00524.
- Camino A. 1977. Trueque, correrias e intercambios entre los Quechuas Andinos y los Piro y Machiguenga de la montaña peruana.(Troc, transmissions et échanges entre les Quéchuas andins et les Piro et Machiguenga de la montagne péruvienne). *Amaz Peru Lima* **1**: 123–40.
- Capelari MGM, Gomes RC, Araújo SMVG de, and Newton P. 2020. Governance and Deforestation: Understanding the Role of Formal Rule-Acknowledgement by Residents in Brazilian Extractive Reserves. *Int J Commons* **14**: 245–61.
- Carneiro da Cunha M. 2017. Traditional People, Collectors of Diversity. In: *The Anthropology of Sustainability*. New York: Palgrave Macmillan US.
- Carney JA. 2001. Black Rice: The African Origins of Rice Cultivation in the Americas. *J Blacks High Educ*: 131.
- Carney J and Rosomoff RN. 2009. In the shadow of slavery: Africa's botanical legacy in the Atlantic world. Univ of California Press.
- Carrillo González L. 2014. Consecuencias sociales del cultivo de la coca en comunidades afrocolombianas del Caquetá: Análisis de la relación entre la economía ilícita, las prácticas campesinas tradicionales y su papel en la seguridad alimentaria. *Agora USB* **14**: 203.
- Castro-Gómez S. 2009. Tejidos oníricos: Movilidad, capitalismo y biopolíticas en Bogotá (1910-1930). Editorial Pontificia Universidad Javeriana.
- Castro-Gómez S. 2010. La hybris del punto cero: Ciencia, raza e ilustración en la Nueva Granada (1750-1816). Bogotá: Editorial Pontificia Universidad Javeriana.
- Chernela J. 1994. Tukanoan Know-how: The Importance of the Forested River Margin to Neotropical Fishing Populations. *Natl Geogr Res Explor* **10**: 440–57.
- Clement CR. 1999. 1492 and the loss of amazonian crop genetic resources. I. The relation between domestication and human population decline. *Econ Bot* **53**: 188–202.
- Clement CR, Denevan WM, Heckenberger MJ, *et al.* 2015. The domestication of Amazonia before European conquest. *Proc R Soc B Biol Sci* **282**: 20150813.
- Clement C, Cristo-Araújo M De, Coppens D'Eeckenbrugge G, *et al.* 2010. Origin and Domestication of Native Amazonian Crops. *Diversity* **2**: 72–106.
- Cocks ML and Wiersum KF. 2003. The significance of plant diversity to rural households in Eastern Cape province of South Africa. *For Trees Livelihoods* **13**: 39–58.
- Costa L and Fausto C. 2010. The Return of the Animists: Recent Studies of Amazonian Ontologies. *Relig Soc* **1**.

- Crevels M. 2012. Language endangerment in South America: The clock is ticking. In: Campbell L, Grondona V (Eds). *The Indigenous Languages of South America*. De Gruyter Mouton.
- Cronkleton P and Pacheco P. 2010. Changing policy trends in the emergence of Bolivia's Brazil nut sector. *Wild Prod Gov Find policies that Work non-timber For Prod*: 15–42.
- Darwin C. 1871. *The Descent of Man, and Selection in Relation to Sex*. John Murray.
- De Almeida AWB. 2012. Territórios e territorialidades específicas na Amazônia: entre a “proteção” e o “proteccionismo.” *Cad CRH* **25**: 63–72.
- De Viveiros Castro EV de. 1998. Cosmological Deixis and Amerindian Perspectivism. *J R Anthropol Inst* **4**: 469–88.
- Castro EV de. 1998. Cosmological Deixis and Amerindian Perspectivism. *J R Anthropol Inst* **4**: 469–88.
- Denevan WM, Padoch C, Prance GT, *et al.* 1988. Swidden-Fallow Agroforestry in the Peruvian Amazon. *Adv Econ Bot* **5**: i--107.
- Descola P. 1996. *In the society of nature: a native ecology in Amazonia*. Cambridge University Press.
- Doria CR da C, Athayde S, Marques EE, *et al.* 2017. The invisibility of fisheries in the process of hydropower development across the Amazon. *Ambio*.
- Dorian NC. 1989. Small languages and small language communities: news, notes, and comments *2. Int J Soc Lang*.
- Duarte CADT. 2015. *Desencuentros territoriales: Caracterización de los conflictos en las regiones de la Altillanura, Putumayo y Montes de María*. Instituto Colombiano de Antropología e Historia.
- Duchelle AE, Cronkleton P, Kainer KA, *et al.* 2011. Resource theft in tropical forest communities: implications for non-timber management, livelihoods, and conservation. *Ecol Soc* **16**.
- Empeaire L and Eloy L. 2014. Amerindian Agriculture in an Urbanising Amazonia (Rio Negro, Brazil). *Bull Lat Am Res* **34**.
- Empeaire L and Eloy L. 2008. A cidade, um foco de diversidade agrícola no Rio Negro (Amazonas, Brasil)? *Bol do Mus Para Emílio Goeldi Ciências Humanas* **3**: 195–211.
- Empeaire L and Garcés CLL. 2016. Dinâmicas das agriculturas amazônicas. *Bol do Mus Para Emílio Goeldi Ciências Humanas* **11**: 13–6.
- Erickson CL. 2006. The domesticated landscapes of the Bolivian Amazon. *Time Complex Hist Ecol Stud Neotrop Lowl* **235**: 78.



- Evans N. 2009. *Dying words: Endangered languages and what they have to tell us*. John Wiley & Sons.
- FAO and FILAC. 2021. *Los pueblos indígenas y tribales y la gobernanza de los bosques - Una oportunidad para la acción climática en Latina América y el Caribe*. FAO.
- Farnetti T. 2013. Animism in Rainforest and Tundra: Personhood, Animals, Plants, and Things in Contemporary Amazonia and Siberia. *Inn ASIA* **15**: 189–91.
- Fausto C. 2007. Feasting on people: eating animals and humans in Amazonia. *Curr Anthropol* **48**: 497–530.
- Frainer A, Mustonen T, Hugu S, *et al.* 2020. Opinion: Cultural and linguistic diversities are underappreciated pillars of biodiversity. *Proc Natl Acad Sci* **117**: 26539–43.
- Francesconi W, Bax V, Blundo-Canto G, *et al.* 2018. Hunters and hunting across indigenous and colonist communities at the forest-agriculture interface: an ethnozoological study from the Peruvian Amazon. *J Ethnobiol Ethnomed* **14**: 54.
- Fraser JA, Cardoso T, Steward A, and Parry L. 2018. Amazonian peasant livelihood differentiation as mutuality-market dialectics. *J Peasant Stud* **45**: 1382–409.
- Futemma C and Brondízio ES. 2003. Land Reform and Land-Use Changes in the Lower Amazon: Implications for Agricultural Intensification. *Hum Ecol* **31**: 369–402.
- Gudynas E and Acosta A. 2011. The renewal of the criticism of development and harmonious coexistence as an alternative [La renovación de la crítica al desarrollo y el buen vivir como alternativa]. *Utop y Prax Latinoam* **16**: 71–83.
- Harrison KD. 2007. *When Languages Die*. Oxford University Press.
- Heckenberger M. 2009. Biocultural Diversity in the Southern Amazon. *Diversity* **2**: 1–16.
- Hemming J. 2008. *Tree of Rivers: The Story of the Amazon*. Thames & Hudson.
- Hill JD, Meeting AAA, and of Learned Societies AC. 1988. *Rethinking History and Myth: Indigenous South American Perspectives on the Past*. University of Illinois Press.
- Hill JD. 1988. Introduction: Myth and History. In: J. D. Hill (Ed). *Rethinking history and myth. Indigenous South American Perspectives on the Past*. Urbana and Cicago: University of Illinois Press.
- Howard PL. 2003. *Women and plants: Gender relations in biodiversity management and conservation*. Zed books.
- Hurtado MXA, Hurtado NKA, Barona AMS, *et al.* 2018. *Demando mi libertad. Mujeres negras y sus estrategias de resistencia en la Nueva Granada, Venezuela y Cuba, 1700-1800* (A Vergara Figueroa and CL Cosme Puntiel, Eds). Universidad Icesi.

- IWGIA. 2020. Indigenous Peoples in Voluntary Isolation and Initial Contact - IWGIA - International Work Group for Indigenous Affairs.  
<https://www.iwgia.org/es/?view=article&id=3107:indigenous-peoples-in-voluntary-isolation-and-initial-contact&catid=305>.
- Johnny M, Karimu J, and Richards P. 1981. Upland and swamp rice farming systems in Sierra Leone: the social context of technological change. *Africa (Lond)*: 596–620.
- Kabalin Campos J. 2018. Cosas de negros de Vicente Rossi, ¿un discurso heterodoxo?
- Kaimowitz D. 2003. Forest law enforcement and rural livelihoods. *Int For Rev* **5**: 199–210.
- Kainer KA, Wadt LHO, and Staudhammer CL. 2007. Explaining variation in Brazil nut fruit production. *For Ecol Manage* **250**: 244–55.
- Krauss M. 1992. The world's languages in crisis. *Language (Baltim)* **68**: 4–10.
- Kujawska M, Zamudio F, Albán-Castillo J, and Sosnowska J. 2020. The Relationship between a Western Amazonian Society and Domesticated Sedges (*Cyperus* spp.). *Econ Bot* **74**: 292–318.
- Legrás H. 2016. Slavery in Latin America. In: *The Encyclopedia of Postcolonial Studies*. Oxford, UK: John Wiley & Sons, Ltd.
- Loh J and Harmon D. 2005. A global index of biocultural diversity. *Ecol Indic* **5**: 231–41.
- Loh J and Harmon D. 2014. Biocultural diversity: threatened species, endangered languages. *WWF Netherlands, Zeist, Netherlands* **1**.
- Lu F. 2006. “The Commons” in an Amazonian Context. *Soc Anal Int J Soc Cult Pract* **50**: 187–94.
- Maffi L. 2001. *On Biocultural Diversity: Linking Language, Knowledge, and the Environment*. Washington, DC: Smithsonian Institution Press.
- Maffi L and Woodley E. 2010. *Biocultural Diversity Conservation*
- Marquardt B. 2011. Estado y constitución en la Colombia de la Regeneración del Partido Nacional 1886-1909. *Cienc Política* **6**: 56–81.
- Milanez F and Shepard Jr GH. 2016. The Few Remaining: Genocide Survivors and the Brazilian State. *Tipití J Soc Anthropol Lowl South Am* **14**: 131–4.
- Miller RP and Nair PKR. 2006. Indigenous Agroforestry Systems in Amazonia: From Prehistory to Today. *Agrofor Syst* **66**: 151–64.
- Mittermeier RA, Mittermeier CG, Brooks TM, *et al.* 2003. Wilderness and biodiversity conservation. *Proc Natl Acad Sci* **100**: 10309–13.
- Moseley C. 2010. *Atlas of the World's Languages in Danger*. Unesco.

- Moseley C. 2007. Encyclopedia of the world's endangered languages. Routledge.
- Neves EG and Heckenberger MJ. 2019. The call of the wild: rethinking food production in Ancient Amazonia. *Annu Rev Anthropol* **48**: 371–88.
- Opas M, Torres LF, Milanez F, *et al.* 2018. South America Resistance beyond the Frontier : Concepts and Policies for the Protection of Isolated Indigenous Peoples of the Amazon Resistance beyond the Frontier : Concepts and Policies for the Protection of Isolated Indigenous Peoples of the Amazon. **16**: 1–4.
- Ortega H, Hidalgo M, Salcedo N, *et al.* 2001. Diversity and conservation of fish of the Lower Urubamba region, Peru. *Urubamba Biodivers a Peruvian Rainforest, SIMAB Ser 7*: 143–50.
- Palosaari N and Campbell L. 2011. Structural aspects of language endangerment. In: Austin PK, Sallabank J (Eds). The Cambridge handbook of endangered languages. Cambridge University Press.
- Peres CA, Baider C, Zuidema PA, *et al.* 2003. Demographic threats to the sustainability of Brazil nut exploitation. *Science* **302**: 2112–4.
- Peres CA, Emilio T, Schiatti J, *et al.* 2016. Dispersal limitation induces long-term biomass collapse in overhunted Amazonian forests. *Proc Natl Acad Sci* **113**: 892–7.
- Pinedo-Vasquez M, Zarin D, and Jipp P. 1992. Community Forest and Lake Reserves in the [Peruvian Amazon]: A Local Alternative for Sustainable Use of Tropical Forests. *Adv Econ Bot* **9**: 79–86.
- Ponta N, Cornioley T, Dray A, *et al.* 2019. Hunting in times of change: Uncovering indigenous strategies in the Colombian Amazon using a role-playing game. *Front Ecol Evol* **7**: 34.
- Porro R, Miller RP, Tito MR, *et al.* 2012. Agroforestry in the Amazon Region: A Pathway for Balancing Conservation and Development. In: Nair P, Garrity D (Eds). Agroforestry - The Future of Global Land Use. Advances in Agroforestry. Dordrecht: Springer Science.
- Posey DA. 1985. Indigenous management of tropical forest ecosystems: the case of the Kayapó indians of the Brazilian Amazon. *Agrofor Syst* **3**: 139–58.
- Quaedvlieg J, García Roca IM, and Ros-Tonen MAF. 2014. Is Amazon nut certification a solution for increased smallholder empowerment in Peruvian Amazonia? *J Rural Stud* **33**: 41–55.
- RAISG. 2020. Amazonia Under Pressure. [www.amazoniasocioambiental.org](http://www.amazoniasocioambiental.org).
- Ramos AR. 1998. Indigenism. Ethnic Politics in Brazil. Madison: The University of Wisconsin Press.
- Redford KH and Feinsinger P. 2001. The half-empty forest: sustainable use and the ecology of interactions (J Reynolds, G Mace, JG Robinson, and KH Redford, Eds).

- Reichel E. 1999. Cosmology, Worldview and Gender-based Knowledge Systems among the Tanimuka and Yukuna (Northwest Amazon). *Worldviews* **3**: 213–42.
- Ribeiro D. 1962. The Social Integration of Indigenous Populations in Brazil. International Labour Office.
- Rival L. 2012. Animism and the meanings of life: Reflections from Amazonia.
- Roosevelt AC, Costa ML Da, Machado CL, *et al.* 1996. Paleoindian cave dwellers in the Amazon: the peopling of the Americas. *Science* **272**: 373–84.
- Rostain S. 2008. The Archaeology of the Guianas: An Overview. In: The Handbook of South American Archaeology. New York, NY: Springer New York.
- Salisbury DS and Weinstein BG. 2014. Cultural Diversity in the Amazon Borderlands: Implications for Conservation and Development. *J Borderl Stud* **29**: 217–41.
- Schmink M. 1982. Land Conflicts in Amazonia. *Am Ethnol* **9**: 341–57.
- Schmink M and Wood CH. 1992. Contested frontiers in Amazonia. Columbia University Press.
- Scoles R and Gribel R. 2011. Population Structure of Brazil Nut (*Bertholletia excelsa*, Lecythidaceae) Stands in Two Areas with Different Occupation Histories in the Brazilian Amazon. *Hum Ecol* **39**: 455–64.
- Seeger A. 2004. Why Suyá Sing: A Musical Anthropology of an Amazonian People. Chicago: University of Illinois Press.
- Shepard Jr GH. 2016. Ceci N'est Pas un Contacte: the Fetishization of Isolated Indigenous People Along the Peru-Brazil Border. *Tipiti J Soc* **14**: 135–7.
- Shepard Jr GH, MNFd S, Brazão AF, and Veld P Van der. 2004. Arte Baniwa: Sustentabilidade socioambiental de arumã no Alto Rio Negro. In: Terras Indígenas e Unidades de Conservação da Natureza: O desafio das sobreposições. Instituto Socioambiental.
- Shepard GH, Clement CR, Lima HP, *et al.* 2020. Ancient and Traditional Agriculture in South America: Tropical Lowlands. In: Oxford Research Encyclopedia of Environmental Science. Oxford University Press.
- Shepard GH and Ramirez H. 2011. “Made in Brazil”: Human Dispersal of the Brazil Nut (*Bertholletia excelsa*, Lecythidaceae) in Ancient Amazonia<sup>1</sup>. *Econ Bot* **65**: 44–65.
- Silva D and Postero N. 2020. Introduction to the special issue on Indigenous and Afrodescendant movements and organizations in Latin America: Negotiating, Resisting, Performing and Re-purposing Dominant Categories. <http://www.alternautas.net/blog/2020/8/7/introduction-to-the-special-issue-on-indigenous-and-afrodescendant-movements-and-organizations-in-latin-america-negotiating-resisting-performing-and-re-purposing-dominant-categories>.
- Silva G. 2004. O sistema agrícola Kaiabi. In: Grünberg G (Ed). Os Kaiabi do Brasil Central. São Paulo: História E Etnografia. São Paulo: Instituto Socioambiental, Dka Austria.

- Silva GM and Saldivar E. 2018. Comparing ideologies of racial mixing in Latin America: Brazil and Mexico. *Sociol Antropol* **8**: 427–56.
- Stoian D. 2000. Variations and dynamics of extractive economies: the rural-urban nexus of non-timber forest use in the Bolivian Amazon.
- Stronza AL. 2009. Commons management and ecotourism: Ethnographic evidence from the Amazon. *Int J Commons* **4**: 56.
- Vanhulst J and Beling AE. 2014. Buen vivir: Emergent discourse within or beyond sustainable development? *Ecol Econ* **101**: 54–63.
- Walker RS, Sattenspiel L, and Hill KR. 2015. Mortality from contact-related epidemics among indigenous populations in Greater Amazonia. *Sci Rep* **5**: 14032.
- Wright SJ. 2003. The myriad consequences of hunting for vertebrates and plants in tropical forests. *Perspect Plant Ecol Evol Syst* **6**: 73–86.
- Wurm SA. 2001. Atlas of the World's Languages in Danger of Disappearing. Unesco.
- Zabala Gómez E. 2017. Trapiches de esclavitud, fogones de libertad: cocina y alimentación de los esclavizados en el Valle del Río Cauca (1750-1851). *Maguaré* **31**: 227–50.
- Zent S and Zent E. 2012. Jodí horticultural belief, knowledge and practice: incipient or integral cultivation? *Bol do Mus Para Emílio Goeldi Ciências Humanas* **7**: 293–338.

## CORE LINGUISTIC GLOSSARY

### **Andean-Amazon:**

**Animism:** animism can be considered both a concept and a way of relating to the world. It involves attributing sentience to other beings that may include persons, animals, plants, spirits, the environment, or even items of technology, such as cars, robots, or computers (Swancutt 2019)<sup>121</sup>.

### **Anthropogenic forests:**

### **Anthropogenic soils:**

**Biocultural diversity:** a concept that emerged from the intersection of diverse academic disciplines and knowledge systems, to convey the idea that all humans are immersed in a web of interdependence between cultural, linguistic and biological diversity, no matter how close or distant their daily connection with nature and biodiversity may be (Maffi and Woodley 2010<sup>122</sup>)

### **Black Earth:**

**Buen Vivir:** Being a category under construction, still there is no single definition for Buen Vivir. From different indigenous notions and Latin American approaches, development and modernity have been critically questioned, which has also been happening in other regions of the world. However, the term takes specific forms in different regions and places (Chaves, et. al., 2028; Gudynas & Acosta, 2011)<sup>123</sup>. So, the Latin American term Buen Vivir suggests ‘a culture of life’ (Chuji, Rengifo, & Gudynas,

---

<sup>121</sup> To be confirmed

<sup>122</sup> To be confirmed

<sup>123</sup> To be confirmed

2019)<sup>124</sup> that is a "turn towards a more biocentric, relational and collective means of understanding and being in the world"(Chaves, Macintyre, Verschoor, & Wals, 2018)<sup>125</sup>; Ubuntu, a Nguni word from South Africa, speaks to our interconnectedness and human mutuality (Nussbaum, 2003)<sup>126</sup>; In India the term *suvaraj* refers to the concept of Mahatma Gandhi that promotes self-governance and community building.

### **Chakras:**

**Colonialism:** colonialism is mainly used for the transformations brought in contexts of Western conquest and rule in the age of globally expansive commercial and industrial capitalism. Some 80 to 90 percent of the global landmass and a majority of the world's population had come under direct or indirect colonial rule by the processes initially set in train during the so-called early modern Age of Discovery, though greatly accelerated in their range and impact by the early twentieth century (Bayly 2016). In social sciences, the concept of colonial discourse has meant the use of signifying regimens that delegitimize the knowledge practices of the colonized and install as authoritative truths the conqueror's narratives of superior rationality and 'civilizing mission' (Chafer 1992).

### **Cosmology:**

**Decolonization:** the concept of decolonization involves two main aspects: 1) historical processes by which colonies become independent of the colonizing country: decolonization was gradual for some British colonies largely settled by expatriates, but very violent for others, where native rebellions were energized by nationalism. 2) Indigenous decolonization describes ongoing theoretical and political processes used to contest and reframe narratives about indigenous community histories and the effects of colonial expansion, genocide, and cultural assimilation

---

<sup>124</sup> To be confirmed

<sup>125</sup> To be confirmed

<sup>126</sup> To be confirmed

(Smith 1999).

**Epistemology:**

**Ethnocide:**

**Extractivism:**

**Genocide:** is the intentional action to destroy a people—usually defined as an ethnic, national, racial, or religious group—in whole or in part. Genocide is defined in Article 2 of the Convention on the Prevention and Punishment of the Crime of Genocide (1948) as "any of the following acts committed with intent to destroy, in whole or in part, a national, ethnical, racial or religious group, as such: killing members of the group; causing serious bodily or mental harm to members of the group; deliberately inflicting on the group conditions of life calculated to bring about its physical destruction in whole or in part; imposing measures intended to prevent births within the group; [and] forcibly transferring children of the group to another group."(UN 2014)<sup>127</sup>.

**Identity:** Identity in cultural anthropology is most commonly viewed as a sense of self or self-awareness – of personhood or subjectivity – that involves reflexive understandings of sameness and difference with “others” (Jenkins 1996).

**Indigenous and local knowledge:** Indigenous and local knowledge systems are understood to be dynamic bodies of integrated, holistic, social and ecological knowledge, practices and beliefs pertaining to the relationship of living beings, including people, with one another and with their environment. Indigenous and local knowledge is grounded in territory, is highly diverse and is continuously evolving through the interaction of experiences, innovations and different types of knowledge (written, oral, visual, tacit, practical and scientific). Such knowledge can provide information, methods, theory and

---

<sup>127</sup> To be confirmed



practice for sustainable ecosystem management. Indigenous and local knowledge systems have been, and continue to be, empirically tested, applied, contested and validated through different means in different contexts” (UN IPBES 2016:5[a])<sup>128</sup>.

**Ontology:**

**Place-making:**

**Post-colonialism:**

**Resilience:**

**Sacred ecology:**

**Sacred places/ Sacred sites:**

**Social-ecological systems:**

**Socio-biodiversity:**

**Socio-environmental governance:**

**Sumak kawsay:**

**Territoriality:** the collective effort of a social group to identify with, occupy, use and establish control over the specific parcel of their biophysical environment that serves as their homeland or territory (Little 2001)<sup>129</sup>.

---

<sup>128</sup> To be confirmed

<sup>129</sup> To be confirmed

**Territory:** In everyday usage, territory is usually taken to refer to a portion of geographic space that is claimed or occupied by a person or group of persons or by an institution. In this way it can be seen as an area of “bounded space.” Following from this, the process whereby individuals or groups lay claim to such territory can be referred to as “territoriality” (Storey 2017<sup>130</sup>).

**Worldviews:**

DRAFT

---

<sup>130</sup> To be confirmed

## BOXES

### **BOX 1. Paiterey Karah: The fight for the demarcation of the Sete de Setembro Indigenous**

**Land - Cacoal - Rondônia - Brazil.** Contributed by Gasodá Surui<sup>131</sup>

The Indigenous People Paiter, which name means “True People” or “Ourselves”, also known as the Rondônia Surui, live at the *Paiterey Karah*, which in the Tupi Mondé language means “the land of the Paiterey.” This territory is known as Sete de Setembro Indigenous Land, a name given by the National Indian Foundation (FUNAI) as a reference to the first contact of the group with non-indigenous peoples, which happened on September 7, 1969.

The Paiter speak a language of the Mondé family in the Tupi stock and are formed by four clan groups that make up our socio-cultural life: *Gãmeb* (black wasp), *Gapgir* (yellow wasp), *Kaban* (*mirindiba* fruit) and *Makor* (*taboca*). The population in 2001 is of approximately 1,500 people distributed in 28 villages, established across the territory with the objective of caring for and protecting the land against possible attacks and invasions by illegal loggers, miners, hunters and fishermen.

According to the Paiterey, the original territory before the contact with the non-indigenous society extended until Cuiabá, and the current borders were nonexistent. After the arrival of the non-indigenous, Paiter lands were invaded and the forests destroyed. Then, the government arrived, opening the BR 364 road, which resembled an enormous snake that opened the forest, swallowing our people, diminishing our land, expelling the Paiterey and leaving everything to the invaders.

Through intergenerational communication, the Paiter still remember the time when they ran away from their original territory in the 19th century, fleeing from the persecution of whites. During the escape, conflicts occurred with other indigenous and non-indigenous groups. From the end of the XIX century to the 1920s, with the exploitation of rubber, the construction of the Madeira-Mamoré railway, and the installation of telegraph lines by Rondon, the migratory flow to Rondônia increased, and its effects were felt on the Indigenous populations in the region, causing many struggles and deaths.

Surui's land physical demarcation happened in 1976 after great pressure from Paiter leaders along with FUNAI on the Brazilian government, involving several trips to Brasilia to discuss the matter. The homologation happened in the same year via decree 88.867 of October 17, 1983. Currently, the Sete de Setembro Indigenous Land occupies an area of 248,147 ha, located across the States of Rondônia and Mato Grosso. This is a space where the Paiter preserve their values, beliefs and customs, and where historical processes and social relations develop. The reduction of the territory excluded important sites for indigenous rituals, such as the *Pimenta Bueno* region, near the limit of Cacoal, where a *tucumanzal* was located, a fundamental material for the confection of handicrafts used as body adornments during the gift exchange of the *Iway* and *Metare* at the celebration of *Mapimaih*.

---

<sup>131</sup> Indigenous of the Paiter people, also known as Rondônia Surui. Graduated in Tourism at Centro Universitário São Lucas in Porto Velho, Rondônia. Master in Geography and PhD student in Geography at the Federal University of Rondônia - UNIR / PPGG. Creator and founder of the Paiter Wagôh Pakob Indigenous Cultural Center, "Force of Nature", a Paiter indigenous initiative created in November 2016, to defend and guarantee the territory, culture and traditional knowledge of the Paiter Surui people of Aldeia Paiter. Researcher at the Geographic, Nature and Human Territoriality Research Group - GENTEH - at the Federal University of Rondônia.

**BOX 10.2. The Jodí people: livelihood strategies, biocultural diversity and spirituality  
in Venezuela**

The Jodí Indigenous people possess a rich knowledge of primary forest species and their uses, including > 220 edible species, > 180 medicinal plants, > 190 species with other technological uses, and 550 species known to be eaten by wildlife (upon which people depend for food) (Zent 1999).

A close examination of Jodí subsistence practices reveals that they do not merely exploit the forests they inhabit but also create them to some extent. Certain manipulative techniques related to their foraging and trekking habits were shown to have a considerable effect on forest composition and the distribution of species. The harvest of wild fruits, for example, often involves the felling of older trees and cutting of branches, thus opening up light gaps. At the same time, people are eating fruits and depositing seeds on the spot. Another practice is the small-scale application of fire to grassy spots and fallen tree crowns. It is common to find stands of fire-resistant, economically-important palms and heliconias colonizing these areas. *Seje* (*Oenocarpus bacaba*) and *maripa* (*Attalea maripa*) palms are often felled for fruit and to create a suitable growing environment for palm larvae, a favorite food.

Besides creating light gaps, the Jodí also make use of natural tree fall clearings by transplanting useful species in them. Such managed spaces are often found close to trails at great distances from main settlements and provide future resource caches during their trekking expeditions. Taken together, all of these environment-modifying activities make for a very patchy, diversified landscape. This case study corroborates not only the anthropogenic nature of Amazonian forests, but also shows that native foragers continue to make substantial contributions to this process (Zent and Zent 2004b).

The most impressive and prolific linkage between the Jodí and biodiversity lies in their worldviews, ritual practices, and notion of personhood. The notion of what constitutes the soul or spiritual being(s) of a person (their *jnamodi*) is literally wrapped up in the diversity of living organisms around them and with whom they have contact throughout their lives. When a baby is born, the father must go out into the forest and collect an organic bundle consisting of the tiny pieces or remains of many, many different species of trees, vines, herbs, mushrooms, insects, mammals, birds, dirt, and other natural substances. In some reported cases, the bundle contained more than 100 different species. He then comes back and bathes the infant with the macerated bundle to form its spiritual self, called *jnamodi*. The *jnamodi* of a person acts as his or her intangible intermediary in their dealings with the forest and its various living entities. The fact that one shares spiritual kinship with those entities facilitates prosperous and sustainable interactions, like hunting success, bountiful harvests and immunity from pathogenic contagion (Figure 10.6). Thus, according to Jodí cosmology, every person really consists spiritually of a diversity of different species. People are not only dependent on the biodiverse forest, they are part of them (Zent et al. 2019).

**Cross-Chapter BOX: Legacy from the Ancestors: Domestication of Amazonian landscapes by Indigenous peoples, and the importance of Indigenous and local knowledge to sustainable development. (303 words) [PRELIMINARY]**

Indigenous peoples have interacted with Amazonian landscapes, ecosystems, and species for thousands of years, in some cases shaping the composition and diversity of forests and other vegetation types (Chapter 8; Posey 1985; Balée 2010<sup>132</sup>; Levis et al. 2018). These interactions are based on deep “sciences in the forest” (Lloyd and Vilaça 2020)<sup>133</sup> that include the cultivation of fully domesticated crops like manioc (*Manihot esculenta*), peanuts, and chili peppers (*Capsicum* spp), as well as familiarization, management and incipient domestication of forest resources including inga (*Inga* spp), Brazil nut (*Bertholletia excelsa*), peach palm (*Bactris gasipaes*), guarana (*Paullinia cupana*), cupuassu (*Theobroma grandiflorum*), and dozens of others (Clements et al. 2010<sup>134</sup>; Fausto and Neves 2018; Neves and Heckenberger 2019).

Indigenous Amazonian peoples depend on the standing forest for their livelihoods, however the forests they inhabit are not “pristine” or “untouched”, but rather bear the imprint of human induced transformations. The realization that large swathes of Amazonia are not pristine, natural environments, as once thought, but rather domesticated, biocultural spaces (Balée 1989; Shepard & Ramirez 2011; ter Steege et al. 2013<sup>135</sup>, Levis et al. 2018), fundamentally changes our understandings of conservation and management in regions with long-term, historic Indigenous occupancy (subsection 10.5; Clement et al. 2015; Levis et al. 2017<sup>136</sup>; Moraes et al. 2019<sup>137</sup>; Shepard et al. 2020).

Levis et al. (2018) identified eight main categories of Indigenous management practices that have contributed to food production and landscape domestication in Amazonia since pre-colonial times. We have synthesized these into six main strategies that contribute to biocultural diversity in Amazon (Figure 10.4: 1) protection, transportation and transplanting of useful species; 2) attraction of animal dispersers; 3) phenotype selection; 4) fire management; 5) soil improvement; 6) weeding. These activities are still practiced by Indigenous peoples as well as non-Indigenous rural populations in Amazonia, transformed and adapted according to contemporary worldviews, formal and informal governance systems (see next section), displacement and resettlement processes, land rights regimes in different countries (see section 10.2), intercultural contact between Indigenous and other forest peoples and market opportunities. As resource scarcity, market engagement and climate change have come to shape Amazonian livelihoods, Indigenous and other forest peoples have become key proponents and innovators in co-management initiatives, conservation and development policies, territorial governance and resource management (Part 2 of this report).

Archeological data documents the consumption of Brazil nuts as early as 11,000 years ago (Roosevelt et al. 1996), and a preponderance of genetic, ecological and ethnobotanical

---

<sup>132</sup> To be confirmed

<sup>133</sup> To be confirmed

<sup>134</sup> To be confirmed

<sup>135</sup> To be confirmed

<sup>136</sup> To be confirmed

<sup>137</sup> To be confirmed

evidence suggests that the current basin-wide range of the Brazil nut has been significantly affected by human management practices (Shepard and Ramirez 2011; Scoles and Gribel 2011). A growing recognition of the role of ancient and contemporary Indigenous management practices on forest composition, even in apparently “primary” forest, calls for new approaches to biodiversity conservation and management and greater participation of Indigenous and local peoples (Franco-Moraes et al. 2019). New challenges such as climate change, changing rainfall patterns and unstable global market must also be taken into account to guarantee the viability of forest livelihoods (Kaimowitz 2007).

Table 10.x: Clements – list of semi-domesticated and domesticated plant species in the Amazon.

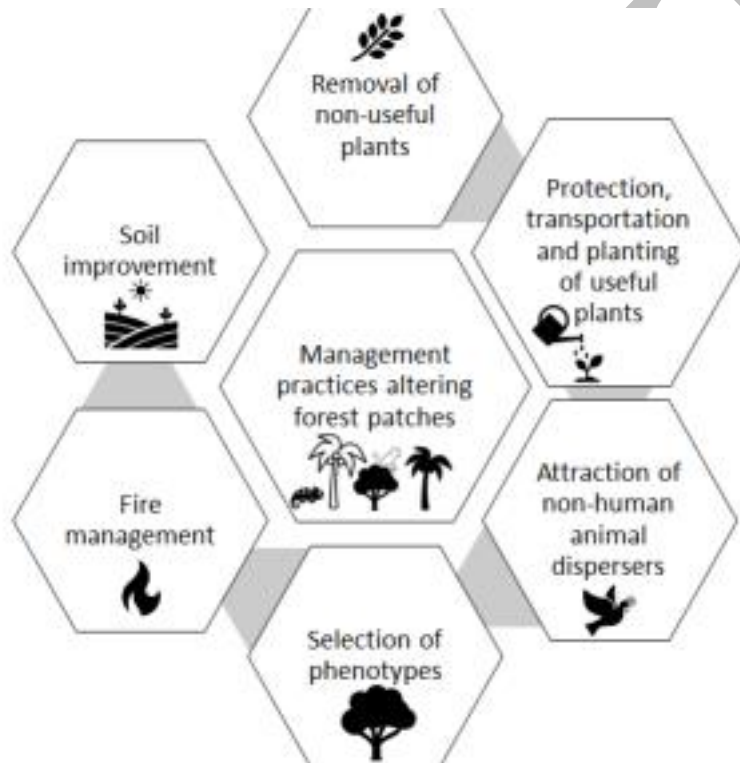


Figure 10.X (Cross-chapter Box). Indigenous management practices impacting biocultural diversity and food production in Amazonia. Adapted from (Levis et al. 2018).

**Appendix 1.** Summary of main geopolitical processes leading to the recognition of Indigenous rights and demarcation of Indigenous territories and lands in Amazonian countries.

## **Colombia**

In Colombia, Law 89 of November 25, 1890 determined the way to govern the defeated savages in the unhealthy jungles so that they embrace civilized life through Catholic Missions (REF). This law also ordered the fate of the wildlands, which were considered unhealthy and no owner territories. Other events paralleled the atrocities of the Cuacheras (rubber) companies and the Catholic Missions, and the legislation has been the migration generated from The Thousand Days War to the Amazon (REF). The consolidation of nation-states continued to be clouded by the idea of emulating the Europeans to date. In the 1920s, ideas of racial superiority were reflected again in legislation throughout the Latin American region, which promoted a large wave of migration from Europe, also motivated by the First World War (REF). Latin American countries, especially Colombia, enacted in 1922 the Law of miscegenation and whitening of society. The Government of the Others, as Castro-Gómez (2009) describes it, was a period in which science, academia, and politics came together to proclaim Indigenous and Afro descendant Peoples as undesirable for the development of the country. This law manages to legitimize a discourse against forest ecosystems and against these populations to this day.

## **Peru**

In Peru for example, the “libertador” San Martín declared in 1821 the incorporation of Indigenous peoples to the new Country of Peru but it was only in 1920 that a new constitution recognized land rights to Indigenous and Peasant communities (Chase and Salazar 2016)<sup>138</sup>. While the process of land titling for indigenous groups and peasants is still ongoing, the legal framework was clearly established then. In both Peru and Bolivia, indigenous governance has firmly based on the legal recognition of collective rights over their ancestral territories (Benavides 2010, Chumacero 2011, López and Rolla 2016)<sup>139</sup>. In the case of Peru, between

---

<sup>138</sup> To be confirmed

<sup>139</sup> To be confirmed

the fifties and the eighties, policies of occupation of the Amazon were promoted, which affected several Indigenous peoples and in some cases were violent (Tipula and Smith 2016)<sup>140</sup>. In the mid-1970s, after a fairly radical agrarian reform, the Peruvian government recognized the existence and constitutional rights of the Yanesha people (see Decree Law 20653)<sup>141</sup>, marking a milestone in recognition of Indigenous territorial and collective rights (Ref). Today, the titling of Indigenous territories occurs through the declaration of local units called "native communities" (Benavides 2010, Tipula and Smith 2016)<sup>142</sup>, which strengthened with the ratification of ILO-Convention No. 169 in the mid-1990s.

## **Bolivia**

In the case of Bolivia, the recognition of indigenous territories has its origin in the Agrarian Reform of 1953, which sought to deconcentrate rural property by transforming traditional haciendas of colonial or republican heritage into new spaces destined for economic diversification (Kay and Urioste 2006)<sup>143</sup>. In practice, powerful groups took a large part of the available lands, displacing indigenous peoples and gradually converting their traditional farms into agricultural or cattle ranches (Ref). This situation would change at the beginning of the eighties with the founding of the Central Indigenous of the Bolivian East (today the Confederation of Indigenous Peoples of Bolivia, CIDOB), which demanded the titling and expansion of rural properties in favour of Indigenous groups such as the Guaraní-Isoseños, Guarayos. Also, it promoted the inclusion of the term "Indigenous" as a distinction from that of "peasant", which gave it a category of international law that allows it to demand its territorial rights (Gómez et al. 2016)<sup>144</sup>. This movement would reap its first fruits in the early 1990s with the titling of four indigenous territories in the Bolivian Amazon (Isiboro-Secure, Sirionó, Tsimane, and Multiétnico). Added to this was the ratification of ILO-Convention No. 169, from which derived years later the concept of Communal Lands of Origin (in Spanish TCO, see Law 1715). Both in Bolivia and Peru, indigenous titling processes are pending, as well as the

---

<sup>140</sup> To be confirmed

<sup>141</sup> To be confirmed

<sup>142</sup> To be confirmed

<sup>143</sup> To be confirmed

<sup>144</sup> To be confirmed



correct application of other fundamental rights such as free, prior, and informed consent (FPIC, Tigre and Slinger 2020)<sup>145</sup>.

## **Brazil**

In Brazil, processes of occupation, resource-extraction, re-settlement and internal migrations that characterized the end of the 19th and the beginning of the 20<sup>th</sup> centuries, resulted in the assimilation, genocide and/or de-territorialization of many Indigenous groups (Little 2001<sup>146</sup>; Athayde and Schmink 2014). Large numbers of Brazilian nationals, especially from the north eastern region of Brazil were encouraged to migrate to the Amazon to exploit rubber (*Hevea brasiliensis*). Indigenous persons were attracted, and sometimes forced to work for rubber patrons, and the occasional mixing between non-indigenous nationals, Indigenous peoples and Afro-descendant persons resulted in the formation of diverse Amazonian populations, identities, territorialities and livelihoods, connected to the places, ecosystems and economies and of the territories they occupied. All of these diversity of biocultural strategies of dwelling the land, as well as the violence of colonizing fronts mobilized by the Brazilian government to occupy the then presumed “empty Amazon”, resulted in diverse territorial and land configurations and delimitations (Menezes 2000; Garfield 2001)<sup>147</sup>. The first Indian Statute from 1973 specified the government purpose of assimilation of Indigenous peoples into the national society workforce and culture (Ramos 1998)<sup>148</sup>. During the 1960s, the resettlement of Indigenous groups to dedicated small reservations was part of a bigger strategy for the development of the Amazon devised by the military. The model of development at that time relied on political repression and on the centralization of power in the federal government’s hands (Schmink and Wood 1992)<sup>149</sup>. Indigenous peoples were viewed as an obstacle to development, to be assimilated as a labor force by the Brazilian society (Ribeiro 1970)<sup>150</sup>. Small indigenous reservations were created, to accommodate the indigenous population in the process of assimilation. The Brazilian government adopted categories or stages of assimilation to determine

---

<sup>145</sup> To be confirmed

<sup>146</sup> To be confirmed

<sup>147</sup> To be confirmed

<sup>148</sup> To be confirmed

<sup>149</sup> To be confirmed

<sup>150</sup> To be confirmed

if indigenous peoples were to be considered isolated, in the process of integration, or fully integrated with the national society.

Through the late 1980s, one of the major functions of Brazil's National Indian Foundation (FUNAI) was to "contact" resistant isolated indigenous peoples who stood in the pathway of major development projects, such as the paving of the Manaus-Boa Vista road in the 1970s, through the territory of the fiercely defensive Waimiri-Atroari people. However in 1988, after decades of seeing such recently contacted peoples succumb to disease and cultural disintegration, Sydney Possuelo inverted this logic of contact and created FUNAI's Department of Isolated Indians, with the explicit intention using the accumulated knowledge of experienced field agents to identify and localize indigenous peoples without initiating contact, and instead protecting their territories from intruders (ref.). The territorial protection of isolated indigenous peoples in Brazil has been explicitly connected with the goal of preserving biodiversity through the creation of "Ethno-Environmental Protection Fronts."

## **Venezuela**

In Venezuela, the explicit recognition of indigenous land and cultural rights in the Bolivarian national constitution of 1999 represents a significant shift in the state's policy toward the country's native peoples. Within two years of that date, the government had also passed the land demarcation laws (2001), convened national and regional demarcation commissions, and set up an institutional structure to promote and process the claims. But all of these efforts have amounted to very little in the way of actual land reform and rights retributions. By 2014, fifteen years after the new constitution was passed, only 12.4% of indigenous lands, comprising approximately 2.8 million hectares, had been demarcated, and 86 land titles benefitting 372 communities distributed among 11 ethnic groups had been granted *in the entire country* (COIAM 2014). Considering there were an estimated 3,000 such communities, this means that close to 90% of the indigenous communities were still waiting for their land rights to be ratified. Besides the obvious shortfall, another criticism was that all of the land titles given were small and fragmented, thus repeating the same basic land policy of previous government administrations in which only small, community-based titles were given and the continuity of ethnic territories was broken up (Caballero 2007; Zent *et al.* 2016).

Today, the largest concentration of indigenous groups and languages (27 out of 34 languages) in the country is found in the Guyana region south of the Orinoco River (Amazonas, Bolívar, Delta Amacuro states). Not coincidentally, this area also corresponds to a major portion of the nation's biodiversity, including an estimated 75% of the plant species. Different types of forest - deciduous, semi-deciduous, and evergreen - cover approximately 83% of the surface of this region, amounting to over 375,000 km<sup>2</sup> of forested land area (Huber 1995). This makes it one of the largest continuous blocks of frontier forest existing in the world today (Miranda et al. 1998), along with several other priority areas for biodiversity conservation protected under diverse Indigenous peoples and local communities land-ownership and tenure types.

### Recent developments and Amazonian Constitutions

Starting in the 1980s, as a reaction to the oppressive conditions, violence and deterritorialization processes that characterized the 1950s to the 1970s in most Amazonian countries, Indigenous, Afrodescendant and others ethnic and social communities (such as extractivists, riverines, artisanal fisheries, and others identities) began to organize and mobilize, claiming rights to citizenship, collective access and right to land and biodiversity, cultural specificities and equal participation in their nation-states (Silva and Postero 2020)<sup>151</sup>. IPLC social movements were formed in diverse countries, mobilizing and gathering the attention and support from national and international social and environmental institutions, including the catholic church (in Brazil) (Ramos 1998; Albert 2004)<sup>152</sup>. As a result of these efforts and conflicts, many Amazonian countries implemented National Constitutions reforms and legislations that granted, in greater or lesser extent, territorial, cultural and social rights to IPLCs, including collective territorial titling, bilingual and intercultural education reform, cultural and linguistic recognition, and measures to insure political participation (Appendix 1, Table A1; Cottrol and Hernandez 2001, Seider 2002, Van Cott 2000; Postero 2007; Almeida 2008)<sup>153</sup>.

In Brazil, Indigenous peoples' and quilombolas (Afro-Descendants) resistance, agency and struggles, supported by indigenists, black movement activists, NGOs and the Catholic Church, were critical factors influencing the drafting of the 1988 Brazilian Constitution,

---

<sup>151</sup> To be confirmed

<sup>152</sup> To be confirmed

<sup>153</sup> To be confirmed

which recognized their rights over land and to their cultural identity (Ramos, 1998; Almeida 2008<sup>154</sup>, see BOX 1). This constitution opens possibilities to the Brazilian state to recognize the cultural and territorial difference of a great diversity of traditional communities in infra-legal documents (Almeida 2008; Shiraishi Neto 2007) (Appendix 1; Table A1). Brazil's pioneering policies towards isolated indigenous populations has inspired neighboring Amazonian nations. For example, responding to increasing incidents of conflict between isolated peoples and their settled indigenous neighbors in the 2010s, Peru's Culture Ministry created the Department of Indigenous Peoples in Isolation and Initial Contact (DACI) in 2013, directly influenced by FUNAI's Department of Isolated Indians (see Shepard & Torres 2019; Soria Dall'Orso 2020)<sup>155</sup>.

Despite these advances in the recognition of cultural and territorial rights, the reality on the ground is hugely different from that sealed by the laws, policies and Constitutions. The history of the process of securing rights over land among Amazonian indigenous peoples has had a direct effect on the adaptation of these societies to highly politicized, violent and contested landscapes (Hierro and Surralés, 2005; Albert, 2005)<sup>156</sup>.

According to RAISG<sup>157</sup> (Amazon Geo-Referenced Socio-Environmental Information Network), Indigenous territories currently occupy more than 45% of the Amazon Biome and represent the most preserved area in Brazil, Colombia, Venezuela, Peru, Ecuador, Bolivia, Suriname and Guyana, where around 2.8 million persons from 385 different ethnic groups live in cities, villages and demarcated lands (Source/TABLE 2). This number is probably much larger, since for many countries the latest statistics are from almost a decade ago, and this population segment displays a young demographic profile and relatively high fertility rate for all countries. The urban Indigenous population has also grown in a fast pace since the last decade, as a consequence of urbanization, economic drivers, proximity from villages, livelihood diversification, education offered in the cities, and the establishment of Indigenous

---

<sup>154</sup> To be confirmed

<sup>155</sup> To be confirmed

<sup>156</sup> To be confirmed

<sup>157</sup> To be confirmed

organization offices in many cities, to facilitate management and control over Indigenous territories (see CH 12).

DRAFT