The Indigenous Territories and Local Sustainable Development in the Amazon Region

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1 Introduction

Amazonia is the largest tropical rainforest on the planet. It hosts a quarter of the world's terrestrial species, accounting for 15% of global terrestrial photosynthesis, and produces about 20% of its oxygen supply. The Amazon basin covers over 8 million km^2 and plays a vital role in regulating South America's rainfall cycle through phenomena known as flying rivers (Marengo 2006). The Nutrient drainage by the Amazon River to the Atlantic Ocean helps foster oceanic life that sequesters carbon (Subramaniam 2008). Besides, the primary productivity of the Amazon

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biosphere is essential to the global carbon budget, being its maintenance paramount to mitigate the effects of climate change (Yang et al. 2018).

Analyzing the Amazonian territory invites us to think about its structure and formation socio-spatial, in this space where different forms of territorialization converge and feed. The appropriation of the Amazonian territory changes the structure of relationships between Amazonian societies. The social practices and its relationships with the people in this territory from which the appropriation is carried out express these territorial changes.

The particular characteristic of each culture in the Amazon has left a lot of people for those ancestral and traditional inhabitants, from sacred places and respective places with different ends. This can explain the modalities of spatial occupation, advantages in each region, considering their physical structure, extensions, and limits as well as the change of their natural surroundings (Guevara Romero et al. 2015). Therefore, they have sustainable support for resources, determined for the intensity in which the vegetation cover is modified. Consequently, they are advisers of the exchange processes that support the soils and their effects, considering these elements allowing forms of adaptation, appropriateness, and identity, evidencing the transformation of the uses of the territory.

Let us consider that these elements explain the modalities of territorial occupation. They are consequent improvements, as each population modifies and adapts the territorial physical structures, natural surroundings, its boundaries, and the densification of areas that suit its cultural heritage. The people and the indigenous communities have marked roots in their territory; their view is more palpable and visible because they have based on their cosmovision and their relationship with the land. This particular characteristic determines their behavior, and the approval of their natural resources, surroundings (Guevara Romero et al. 2015). The indigenous people keep up a connection with the territory they inhabit. Also, they have a perception that goes from their cosmovision to compatibility with external elements to their culture; and execute decision making, based on the forms of organization of the surrounding society.

In the last year, the natural environment's protection and conservation have been a priority worldwide (Liang et al. 2016). Natural resources are the most incredible wealth that cares for humankind. The idea of a mediated environment has become part of our collective consciousness, generating a great debate around this problem and giving rise to various theories. Political positions are needed for the preservation and regeneration of the natural environment. It will guarantee a better quality of life for future generations and aim for sustainable development.

Sustainable Development is the one that assures the needs of the present without compromising the possibilities of future generations to satisfy one's own needs, according to the World Commission on Environment and Development (Brundtland 1987). From this perspective, sustainability is shown as an alternative to environmental degradation, trying to find creative answers to rectify the faults and avoid new problems in the regional context. The sustainable use of Amazon's resources is not a new topic (Brack Egg 1996). However, this work provides new elements to show a constructive perspective from an integrative vision between the

indigenous peoples' own knowledge and the understanding of non-indigenous people.

2 Amazonian Territoriality

The Amazon is multi-diverse and multicultural in terms of the societies that inhabit this territory, which is inhabited mainly by indigenous people and communities. To speak of territory from the knowledge of those who inhabit it is to refer to any extension of the terrestrial surface inhabited by human groups, by a society, constituted as a field of social relations developed on the basis of natural resources in constant evolution, where they have schematized the elements that make up space according to a scale, be it local, municipal, regional, or national.

The Amazon is a territory of extremely high socio-environmental diversity in the process of accelerated change. It covers an area of 7.8 million km^2, over 12 macro-basins, and 158 sub-basins, shared by 1,497 municipalities, 68 departments/states/provinces of eight countries: Bolivia (6.2%), Brazil (64.3%), Colombia (6.2%), Ecuador (1.5%), Guiana (2.8%), Peru (10.1%), Suriname (2.1%), and Venezuela (5.8%), in addition to Guiana French (1.1%). About 33 million people live in the Amazon, including 385 indigenous groups, in addition to some people in situations of "isolation." There are 610 natural protected areas and 2,344 and indigenous territories that occupy 45% of the Amazonian surface, not counting small, medium, and large rural owners, companies of various types, research and development institutions, as well as religious and civil society organizations (RAISG 2012).

2.1 Evolution of Amazonian Areas Protection

Amazonian regionalization beyond the political borders of the nation-state forms a conceptual and political challenge. The effort was published in 2009 and improved in the following ten years by the Amazonian Network of Georeferenced Socio-Environmental Information (RAISG), a consortium of civil organizations oriented toward socio-environmental sustainability supported by international organizations, joins one of the most outstanding advances in this regard (RAISG 2009). Figure 1 shows their most recent proposal. It includes a biogeographical regionalization, covering 6,983,273 km^2, and regionalization by river basins with an area of 8,449,318 km^2. However, the RAISG calculations since 2009 continue to use the political-administrative regionalization of 7,787,056 km^2.

The challenge of regionalization converges with other difficulties. The territory of Amazon faces the complexities in spatial-temporal analysis and diagnoses. Table 1 shows these difficulties based on indicators on the extent and population of the Amazon. First, the total population is updated every ten years in the Amazonian

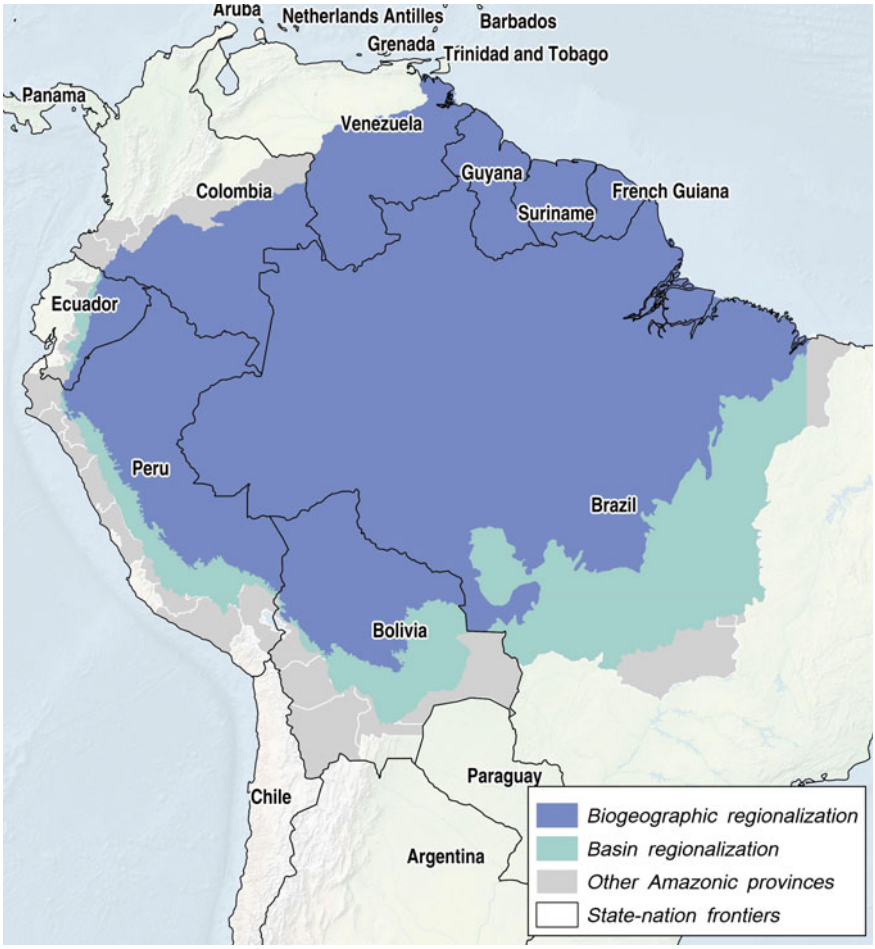

Fig. 1 Regionalization's limits and borders of the Amazon. *Source* drawn by the authors based on RAISG (2020)

countries; second, the methodologies used by each national system for counting the indigenous population are diverse and non-existent for some years. For this reason, the Economic Commission for Latin America and the Caribbean (ECLAC) had to make estimates of the indigenous population of Bolivia, Colombia, and Peru for the year 2010 based on figures from other years (ECLAC 2014).

Finally, the periodicity of the record and the methodological diversity is aggravated by regionalization problems that make comparison difficult such as the 1985 population (Domínguez 2001), with the record of 2009 and 2019 (RAISG 2009, 2019). The last two columns of Table 1 show that even with the RAISG base, different results can be obtained on Amazon's extent. In the first case, the calculation of each country's extension was made based on the regionalization by

Table 1 Data of total Amazonian and indigenous population in the Amazonian countries

Country	Total population 2010[1]	Total population 2019[1]	Indigenous population 2010[2]	Amazon population 1985[3]	Amazon population 2009[4a]	Amazonas population 2019[4b]
Bolivia[b]	10,048,590	11,513,100	6,216,026	600,000	1,233,727	6,572,024
Brazil	195,713,635	211,049,527	896,917	5,200,000	22,495,460	28,286,715
Colombia[b]	45,222,700	50,339,443	1,559,852	428,000	1,650,904	1,411,079
Ecuador	15,011,117	17,373,662	1,018,176	170,000	694,804	870,000
Guiana	749,436	782,766	ND	80,000	751,000	751,000
French Guiana[1]	208,171	259,865	ND		208,171	208,171
Peru[b]	29,027,674	32,510,453	7,021,271	1,850,000	3,675,292	4,076,404
Suriname	529,131	581,372	ND	ND	475,000	492,829
Venezuela[a]	28,439,940	28,515,829	724,592	25,000	1,907,721	2,231,932
Total	324,950,394	352,926,017	17,436,834	8,353,000	33,092,079	44,900,154

Source tabulated by the authors based on RAISG (2009, 2019); ECLAC (2014) and World Bank (2020). [1]World Bank (2020); [2]ECLAC (2014); [3]Domínguez (2001); [4a]RAISG (2009), [4b]RAISG (2019) (calculation made by RAISG based on political-administrative regionalization). [a]Official data on the indigenous population, 2011. [b]Indigenous population data estimated by ECLAC

hydrographic basins—in the second, according to each country's political-administrative divisions.

However, despite showing the first level of complexity in the data analyses and diagnoses for the Amazon (Table 1), it also allows us to trace general trends on Amazon's demographic and territorial dynamics, a topic that leads to the core of this section. In addition to the countries' population growth rate that shares Amazonian territory, Table 2 allows us to distinguish between the countries where

Table 2 Population growth and percentage of the total and protected Amazon territory

Country	Total growth (%)	Amazon growth 2009–2019 (%)	By country (%)	Amazon territory (%)	Protection area (%)
Bolivia	14.6	432.7	43.6	6.2	47.3
Brazil	7.8	25.7	58.8	64.3	26.3
Colombia	11.3	−14.5	42.3	6.2	83.0
Ecuador	15.7	25.2	46.7	1.5	45.9
Guiana	4.4	0.0	100	2.8	4.8
French Guiana	24.8	0.0	100	1.1	59.9
Peru	12.0	10.9	60.9	10.1	25.9
Suriname	9.9	3.8	100	2.1	15.9
Venezuela	0.3	17.0	49.5	5.8	66.3
Total	8.6	35.7		100.0	33.3

Source tabulated by the authors based on World Bank (2020), RAISG (2009, 2019)

the Amazonian population grows above the national demographic increase, such as Brazil, Ecuador, Venezuela, and Bolivia, where trends are even observed migratory. From those countries where the Amazonian population decreases, such as Peru, Suriname, and Colombia, the trend toward depopulation is clearer.

In the same way, we relate these data with the amount of Amazonian territory shared by each country. The second reading of Table 2 allows us to see that 100% of the territory of French Guiana, Guiana, and Suriname are located on the Amazon. However, together they only represent 6% of the total. In an intermediate situation in Bolivia, Colombia, Ecuador, and Venezuela, with an Amazonian surface between 42 and 50% and the relative combined weight of 19.7%. Finally, the Amazonian territory of Brazil and Peru together represent 74% of the Amazon. Finally, the last column of Table 2 allows us to find that Brazil and Peru have the lowest percentages of protection, while Colombia and Venezuela have the highest percentages. From this perspective, Bolivia and Ecuador are in an intermediate situation, while the situation of Guiana and Suriname is diverse. In this sense, by 2018 the 33% of Amazonian territory has some type of protection by the nation-states, around of 2.5 from 7.7 million km^2.

Figure 2 shows the expansion evolution of Amazonian protection according to a conceptualization that includes four waves or phases defined by the distinctive character of each one. These phases were plotted on an illustrative map in Fig. 3. The expansion of the protected territories began in 1942 with the creation of the Tuni Condoriri National Park in the Murillo de La Paz province, Bolivia, with 91 km^2 in the upper Amazon basin. However, it was the "Law 2a of 1959 on the Nation's forest economy and conservation of renewable resources" (República de Colombia 1959) which established the watershed for the protection of the lower basin: The Amazon Forest Reserve Zone comprises an area forest of 349 thousand km^2 in the departments of Amazonas, Caquetá, Guaviare, Guainía, and Vaupés, subject to a Forest Management Plan (art. 4), the regulation of forest exploitation by the government (art. 5) from Forest Management Plans (art. 6), and a soil study that would allow determining the sectors that could be used for agricultural activity (art. 3).

A few days later, Brazil joined this first a wave of protection of the Amazon with the Araguaia National Park creation, over an area of 5,586 km^2 of the basin of one of the most important tributaries of the Amazon. Two years later, Venezuela decreed the Imataca Forest Reserve between the State of Bolívar and the Federal Territory Delta Amacuro south of the Orinoco River's mouth in an area of 37,485 km. Similarly, in 1961 Peru decreed the Cutervo National Park on two 82 km^2 polygons in the Andean department of Cajamarca. In just three years, Bolivia, Brazil, Colombia, Peru, and Venezuela exceeded 400 thousand km^2 of National Parks and Forest Reserves.

In the following 27 years, Brazil, Venezuela, Bolivia, and Peru managed to double the extension of protection to reach 800 thousand km^2 from the diversification of the mechanisms for creating protection, among which are the Bolivian Natural Areas of Integrated Management (1972), the Venezuelan Natural Monuments (1978), the Ecuadorian Recreation Areas and Fauna Production Reserves (1979), the Biological Reserves (1979), the Ecological Stations (1981)

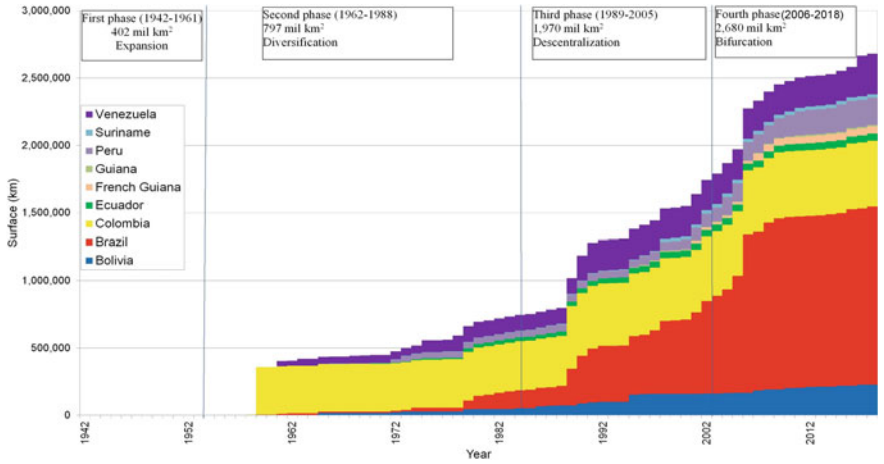

Fig. 2 Phase of the evolution of the protection of the Amazon 1942–2018. *Source* drawn by the authors based on RAISG (2020)

and the Brazilian Areas of Relevant Ecological Interest (1985), as well as the National Reserve (1972), the Historical and National Sanctuaries (1974), the Hunting Preserves (1977), and the Peruvian Protection Forests (1985). In this second wave, the strategies of three countries that had not previously participated were also integrated: the Natural Reserves of Wia Wia (687 km^2), Brinkheuvel (67 km^2), and Coppename Mouth (211 km^2) of Suriname in 1966, the Natural Site of Pointe Isére-Kanawa (13 km^2) of French Guiana and the Ecuadorian Protected Forests, which between 1970 and 1988 together added 4,086 km^2, a figure very similar to the Cayambe Coca National Park of (4,091 km^2) created in 1970.

The third wave reached an area of 1.9 million km^2 of protected areas, but more than the magnitude and speed of the growth of protected areas (more than a million km^2 in just 17 years) what characterizes this period is the importance it acquired the strategy for the creation of protected areas at the state and municipal level: 196 areas created compared to 12 in the previous period. In this framework, most of the parks and regional, state, and municipal are registered, as well as the Environmental Protection Areas (1989), the Sustainable Development Reserves (1990), the Extractive Reserve (1990), the Wildlife Refuge (2001) of Brazil, the Wildlife Reserve (1990), the Ecological Reserve (1994), the Scientific Reserve (1996), the Natural Landscape Heritage (2000), and the Watershed Protection Area (2001) in Bolivia. This is a particularly intense period of decentralization of protection and conservation in the Bolivian and Brazilian Amazon, although it was also promoted at the national level in other countries.

Finally, the current period could be characterized by the relative stagnation in the protection of the Amazon at all scales. Of the 172 areas decreed at the national level in the two earlier periods, it went to 90; while at the departmental scale of 196 it went to only 82. However, it is observed in terms of surface, the growth reaches

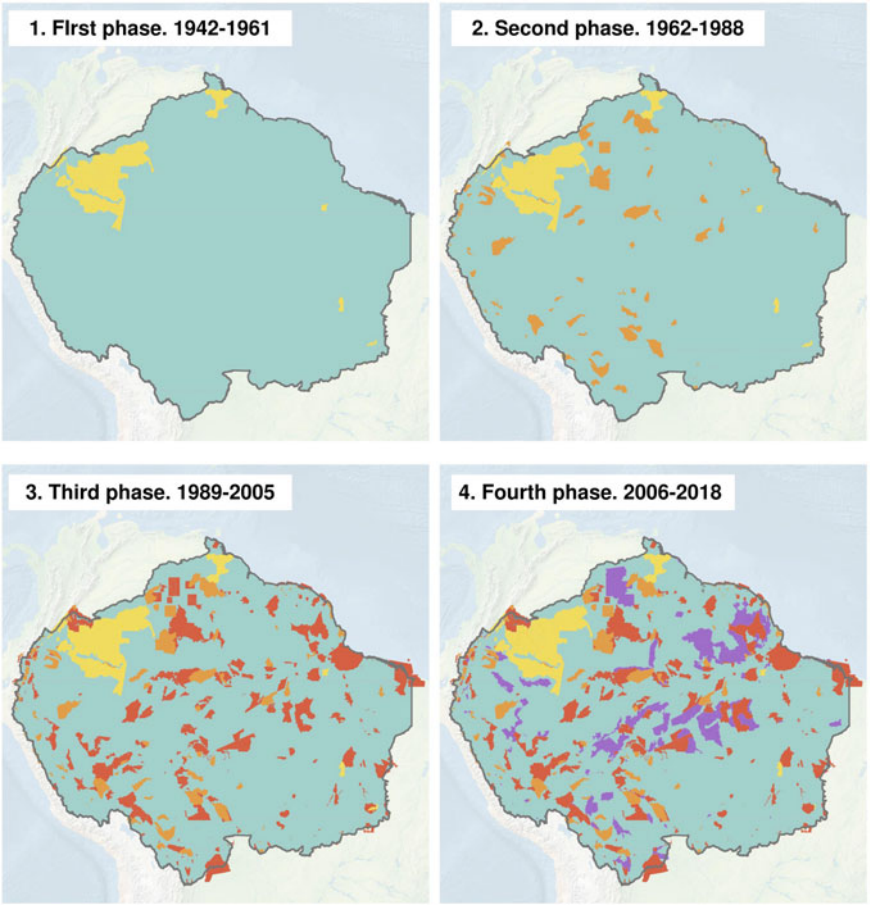

Fig. 3 Evolution of protection in the Amazon. *Source* prepared by the authors based on RAISG (2020), NaturalEarth

more than 710 thousand km in just 13 years. A novel aspect, in terms of protected areas creation, characterized this last period as a transition from biophysics elements protection to socio-environmental communities protection. This transition can be exemplified by the two new categories of the Ecuadorian government during this period: the Wildlife Refuge created in 2006 in the province of Zamora Chinchipe and the Morona Santiago Community Protection Area created in 2018. Another similar example is the Communal Reserves created in Peru since the earlier period but officially recognized since 2006, where forests are managed by indigenous communities with recognition from the state. However, the 16 Civil Society Nature Reserves created between 2014 and 2017 in the Colombian departments of Caquetá, Meta, Nariño, and Putumayo constitute an opposite example of this trend.

The cases of the Development Cooperative of Jima community, the limit of Ecuador, and the Yanesha Communal Reserve of Peru show that they are not properly protected areas focused on the communities that inhabit them. Rather the recognition by the state of the administrative-territorial carried out by social collectivities that conceive their territory as part of the common goods that sustain their community ways of life. On the other hand, the Colombian case forms a trend to the recognition of environmental protection from private property, which establishes a radically different and even contradictory conception of what was conceived as environmental conservation. In this sense, it is more right to characterize the last period as a bifurcation in which the state begins to delegate responsibility for environmental protection to both social collectives and private communities, without it being clear yet which will be the dominant trend.

2.2 *Evolution of the Recognition of Indigenous Territories in the Amazon*

In this section, the same exercise carried out with the natural protected areas is replicated for the analysis of the process of recognition of indigenous territories in the Amazon, which began in 1945 with the 47 km^2 of the Jarudore Indigenous Territory recognized by the Bororo ethnic group in Mato Grosso, Brazil. This experience was unique for 29 years until 1974 when the Peruvian state initiated a recognition policy. It included 88 Native Communities in the Loreto, Ucayali, and Cusco regions in pro of a current population of 66,104 people of eight ethnic groups, mainly Shipibo-Conibo, Machiguenga (Matsingenka), and Piro (Yine) over an area of 7,669 km^2. To this surface, another 19,334 km^2 were added in 1975, with which the current indigenous land structure of Peru was practically defined; in these two years, the Peruvian state recognized 20% of the 138 thousand km^2 of native communities in pro of 45% of the 600 thousand indigenous people whose lands are formally recognized today. Finally, in 1979 the Colombian state recognized 40 km as the Sibunduy Parte Alta Indigenous Reservation in the Putumayo department in pro of 314 people belonging to the Kamsa ethnic group.

With the incorporation of Colombia to the policy of recognition of indigenous territories in the Amazon, 51 thousand km^2 were reached in a period that lasted until 1981, when a recognized area of 62 thousand km^2 was reached in the first 37 years. In 1982, the second period of accelerated recognition of indigenous territories in the Amazon began, which is just 19 years went from 114 thousand to 1 million km^2 and from 474 thousand to 876 thousand people. Finally, between 2001 and 2016, a third wave occurred that reached 2.2 million km^2 and 1.2 million people. However, in this last period, 694 thousand km^2 and 229 thousand people are included in the Nationalities of Ecuador, the Indigenous Areas, Demarcated Indigenous Communities and Self-Demarcated Indigenous Territories of Venezuela, the Peasant Native Indigenous Territories of Bolivia, the Law Zones

Collective for Local Communities of French Guiana and the Indigenous Territories of Guiana and Suriname, of which the exact year of recognition is not available. Figures 4 and 5 show these three waves of recognition of indigenous territories in terms of surface area and population.

Regarding the area and the amount of population included in the indigenous territories, Brazil has 1.1 million km^2 of indigenous territory, distributed among 191 indigenous groups, although only six groups, among which 22,923 Yanomami stand out with 959 thousand km^2, concentrate 33% of these territories. As can be seen in Table 3, Venezuela has a self-recognized of 71% on the Venezuelan Amazon area as indigenous territories; 25 indigenous groups inhabit it, among which six ethnic groups predominate (Pemón, Yekuana, Yanomami, Piaroa, Warao, and E'ñapa) that concentrate 80% of the surface. Peru is the third most important

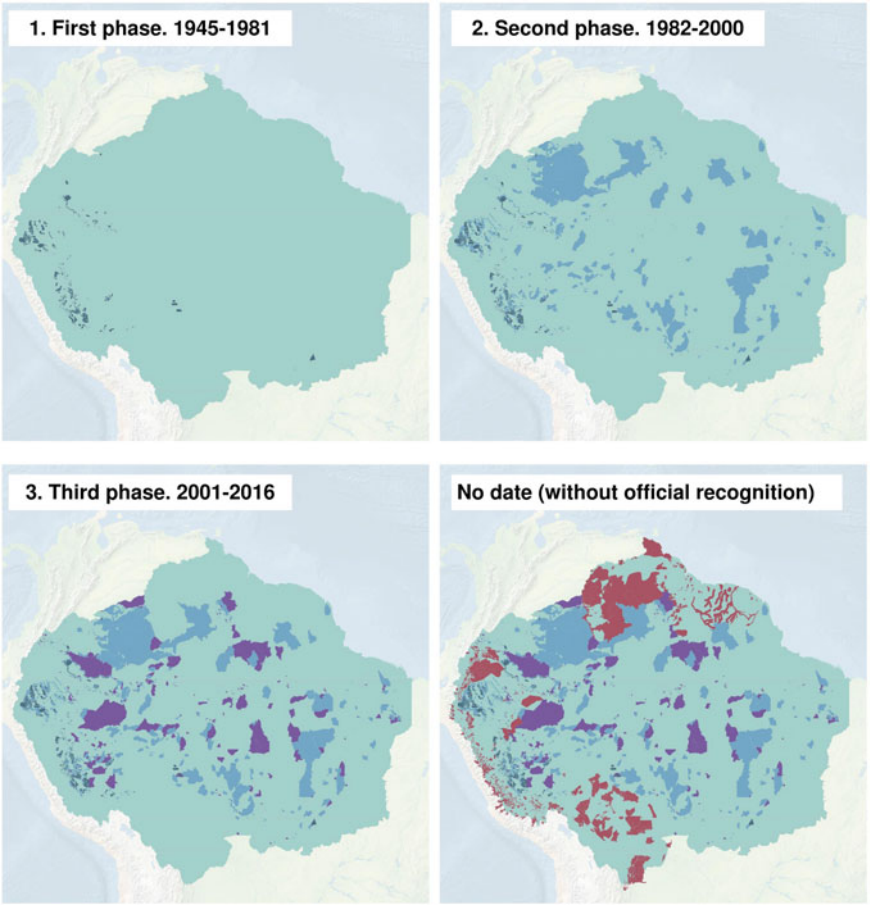

Fig. 4 Evolution phases of indigenous territories recognition in the Amazon 1945–2016. *Source* prepared by the authors based on RAISG (2020), NaturalEarth

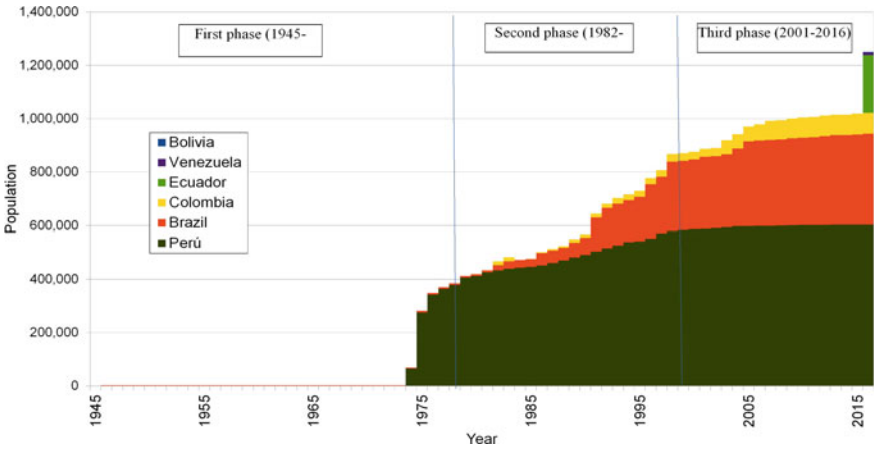

Fig. 5 Phases of evolution of the indigenous population in the Amazon 1945–2016. *Source* prepared by the authors based on RAISG (2020)

country and has 54 ethnic groups with more than 600 thousand inhabitants in recognized indigenous territories, among which the Aguaruna (Awajun), Asháninka, Mashco Piro, and Machiguenga (Matsigenka) ethnic groups stand out, which account for 20% from 35% of indigenous territories. In the case of Colombia, 6 of the 67 ethnic groups concentrate 72% of the indigenous territories and 46% of the population, among them the Witoto, Cubeo, Curripaco, Puinave Nuk, Cubeo, and Yacuna ethnic groups stand out. In Bolivia, the Guarayo, Guaraní Isoseño, Chiquitanos, Ava Guaraní, Itonamas, Yucarés, Mosetén, and Trinitario ethnic groups concentrate 50% of the indigenous territories, while in Ecuador, the Kichwa,

Table 3 Population and areas recognized as indigenous territories in the Amazon by country

Country	Amazon population 2019	Indigenous population (%)	Indigenous groups	Amazon surface (km^2)	Indigenous surface (%)
Brazil	6,572,024	5.14	191	5,006,316	23.10
Venezuela	28,286,715	0.04	25	453,915	71.78
Peru	1,411,079	42.78	54	782,820	35.96
Colombia	870,000	10.57	67	483,164	54.41
Bolivia	751,000	0.39	32	479,264	39.23
Ecuador	208,171	100	11	116,284	66.76
Suriname	4,076,404	ND	2	163,820	38.98
Guiana	492,829	ND	4	214,969	14.73
French Guiana	2,231,932	ND	16	86,504	8.27
Total	44,900,154	2.81	402	7,787,056	30.76

Source tabulated by the authors based on RAISG (2020)

Waorani, Shuar, Achuar, and Sapara ethnic groups concentrate 90% of the surface and 98% of the indigenous population considered. Finally, in the cases of Suriname, Guiana, and French Guiana, there is no information on the amount of the indigenous population that lives in indigenous territories.

2.3 The Andean–Amazon Region

The Andean region and the Amazon are intimately connected. Therefore, a co-dependency goes from the rivers coming from the Andes that drain their waters to the Amazon region and the aerial rivers that transport water to the Andes, having a beneficial climatic effect. However, these territories are being altered by the development of hydroelectric plants (Anderson et al. 2018), which go from the headwaters of the main rivers in the Andean region, this undoubtedly affects the connectivity of the Amazon and the inter-territorial interconnection, substantively threatening biodiversity and especially native and migratory species.

The Andean zone faces substantive problems related to the change in climatic seasonality, flow reduction in dry seasons with implications at the local level for common activities, extractive and exploitation activities, which has generated conflicts between locals and companies (Vuille 2013). Due to the increasing demand for energy and the abundant untapped potential, the construction of dams in the Andean–Amazon region has gained an important role, as many governments have chosen to design long-term energy plans; however, the lack of Strategic planning is presented as a challenge given the links between the Andes and the Amazon plain (Finer and Jenkins 2012). These actions may cause environmental damage in the upper basin of the rivers that threaten the diversity of the hydrographic basins that link The Andes and the Amazon, since the construction of 150 hydroelectric plants in this territory, considered as having a high environmental impact, is planned. This region provides a large amount of sediment, nutrients, and organic matter to the Amazonian plain, making this space one of the most productive ecosystems on the planet. Many species of fish travel many kilometers to spawn and reproduce near the Andean mountain range. These actions can give to the reduction of vegetation cover due to the construction of roads, electrical transmission lines and downstream floods, as well as changes in the yield of fish upstream and downstream, sedimentation of the reservoir, emissions of greenhouse gases, and mercury contamination (Forsberg et al. 2017).

3 Territorial Management and Governance of Indigenous Peoples

The discussion that comprises the forms of use and relationship with space has a direct link with the forms of use, recognition, and management of power. And when we deal with power, we inevitably associate it with an open field that refers to the idea of power and strength (Raffestin 1993). Power is related to the ability to impose a will or want and strength in the form of executing an order, directed by a person or emanating from a social group (Gonçalves 2009). Thus, in white, patriarchal, and western society, the state-organized civil society identifies a threat and a counterpoint to be removed. It dedicates its strength and power to isolating and blocking the initiatives and creative possibilities of social, union, and popular movements. It is clear that a vertical and hierarchical society exercises hegemony. Social relations are always developed either in the form of complicity or in the authoritarian way and obedience between a superior and an inferior (Chauí 2011).

3.1 Territorial Management

Thus carrying out the management of the territory also implies considering the asymmetric relations of power and the situation of domination in politics. Furthermore, political power is a type of relationship between subjects that needs to be completed with the definition of power as possession of the means that allow a programmed advantage or effect to be achieved. Therefore, to understand and exercise territorial management and governance in the first aspect, it is necessary to distinguish between governance and governability (Santos 1997). In theory, governability is related to ways of identifying absences and social problems. In this sense, it seeks to transform them into public policies that meet the demands in society, converging and solving the problems to be solved or at least to live with them (Kersbergen and Waarden 2004). But in practice, this is not what we find in reality, as it is common within the state to watch political interest groups from circumstantial party alliances that are convenient to a minority in the name of coalition and governability. In its turn, in the liberal perspective, governance is understood as the capacity of action that the state has for the development and implementation of public policies and achieving collective goals. In this context, governance reveals experiences of the public power in reversing clientelistic practices; that is, good governance helps dismantle interest groups (Gonçalves 2008).

When we focus our attention on power relations and the issue of management and territorial governance in the Amazon region, it is important to mention the Treaty for Amazonian Cooperation (TAC) signed between Brazil, Bolivia, Colombia, Ecuador, Guiana, Peru, Suriname, and Venezuela (OTCA 1978). This region comprises 40 million people occupying 40% of South American territory. It

is home to the largest mega-diverse forest in the world, which is home to 20% of all existing species of fauna and flora (Carrasco 1978). The Amazon hydrographic basin has about 20% of the fresh water on the planet's surface. The Amazon hydrological cycle feeds complex aquifers and groundwater system, which can cover an area of almost four million km^2.

Formally, Amazonian regional cooperation was originated in 1978. The eight Amazonian countries in Brasilia signed the TAC with the goal of promoting the integral development of the region and the well-being of its populations, in addition to strengthening the sovereignty of the countries over their Amazonian territories. Subsequently, the legal instrument of a technical nature was reaffirmed in 1995 by the foreign ministers of the member countries, meeting in Lima, Peru, who agreed to create the Organization Treaty Cooperation Amazon (OTCA), to institutionally strengthen the OTCA and give international personality. In turn, the amendment to the treaty was endorsed and approved in Caracas, Venezuela, in 1998, allowing the establishment of the permanent OTCA secretariat in Brasilia. With this, we have a tool for the national states with resources and information to check the region and carry out projects in areas such as the environment, indigenous affairs, water resources, science and technology, health, tourism, and social inclusion. It is 42 years since the signing of the OTCA, and in 2010, the strategic agenda of Amazonian cooperation was revised with planning and delimitation of the organization's aims for the next decade (OTCA 2011). So far, we have described the management of the territory that was and is exercised hegemonically and holds the structure of the Western model of a modern colonial state.

3.2 Territorial Governance

Next, we will bring some perspectives. A little more different from the one presented above. These are experiences of territorial governance in the hybrid form of control between the state and indigenous communities and which are also being developed in the Amazon region exclusively by people from different organizations and indigenous nations. It is important to note that such experiences are not restricted to the border of a nation-state; on the contrary, they are referenced in community groups and associations that develop specific forms of dominance and government in their territories (Gonçalves 2008). We would like to draw attention to the experiences that emerged from meetings of exchanges of knowledge triggered by organizations and social movements around the end of the 90s in the region on the border between Brazil, Peru, and Bolivia (Diegues 2000) and were added later in more regions in Brazil (Gavazzi 2007). Such exchanges brought contributions both to the practices of handling natural assets and people and actions with the surroundings and territorial management.

The Indigenous Lands (ILs) tenure regime outlined in legal texts, although stated in less explicit terms than other South American Constitutions (Bolivia, Ecuador), in Brazil the idea of cultural pluralism, or multiculturalism, enjoys constitutional

recognition, and indigenous peoples hold significant rights over their territories and natural resources (Lauriola 2013). The first Territorial and Environmental Management Plans for Indigenous Lands appeared initially in the Brazilian part of the Ethnomapping Workshops, and activities carried out by the state government of Acre in conjunction with the Association of the Movement of indigenous agroforestry agents (Correia 2007; Grupioni and Kahn 2013). The Ethnomapping project intended to promote territorial ordering, conservation, and the rational use of natural and agroforestry assets in the ILs, and to provide answers or at least minimize the serious conflict scenario experienced by some indigenous peoples with Peruvian loggers, traffickers, and others, in the border region, where there are many ILs and Conservation Units, both on the Brazilian side, on the Bolivian and Peruvian side. The themes dealt with in the Territorial Management Plans (Grupioni and Kahn 2013) seek to apprehend the specific realities of each indigenous community more generally, related to issues such as forest and floristic resources, hunting, fishing, agroforestry plantations, management and creation of wild and domestic animals, water resources, village organization, norms and rules including community rights and duties, community planning, environmental health, garbage, and basic sanitation, surveillance and inspection, culture, language issues, differentiated bilingual intercultural school education, ethnourism, communication, processing, community planning, monitoring deforestation, controlling the entry of outsiders into indigenous land, protection of isolated people, cross-border situation, climate change and environmental services, biopiracy, and review of indigenous land boundaries.

With some country variations for parents, national legislation recognizes ILs that are called native communities (Medeiros 2013), indigenous territories (Cavalcante 2016), indigenous reserves, or even indigenous safeguards (Bello 2011a). Although

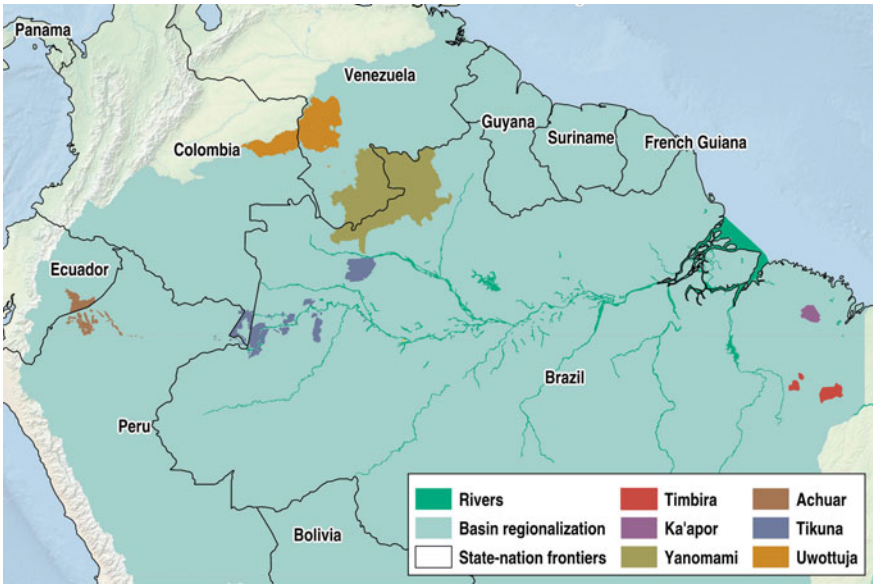

Fig. 6 Some indigenous peoples about territorial governance in the Amazon region. *Source* drawn by the authors based on RAISG (2020)

linked to a national state's legislation, they are spaces for the reproduction of life and which are inalienable for collective use and community practices guided by a special autonomy statute that follows custom, tradition, culture, and its own agenda. The ILs involves two complementary levels (Lauriola 2013): (1) full recognition of the collective dimension of indigenous territoriality, in forms and scales sufficient for their commons' status to be preserved; and (2) respect, understanding, value and support for local internal organizations, which empower indigenous juridical and political systems through adapted public policies set within a framework enabling juridical pluralism.

In this sense, we will bring some experiences of territorial governance in the Amazon region as a whole represented from the territorialities (Fig. 6): Ka'apor, Yanomami, Timbira, Achuar, Tikuna, and Piaroa. With this, we hope to illustrate that some peoples are carrying out on their own initiative the organization of their territories and the territories bordering their own since the state does not always assume its political-legal function.

3.2.1 Territoriality Ka'apor

The territory inhabited by the Ka'apor, in Alto Turiaçu Indigenous Land, in Brazil, was demarcated with an area of 530,524 ha (Camarinha 2019). It is formed by approximately sixteen local groups, in an area comprising seven municipalities located in two sub-regions of Maranhão: Gurupi and Pindaré. It constitutes the vast territory occupied by this ethnic group which, due to factors specific to the group and external to it, lead family units to make permanent changes or displacements within the territory, among them, by the constitution of marriage bonds, internal conflicts between family groups, conflict situations with invaders in the territory, search for food looking for nature goods such as fruit and seed collection, among other factors.

The Ka'apor give importance to the relations established with their territory, where the traditional knowledge acquired in relation to the forest turns them into guardians of their place of belonging. The local groups have different types of houses, most of which are characterized by a closed room made of clay, leaves of buriti, or babassu palms. However, some houses have only a cover of palm leaves with their sides fully open, as is the case of those present in the nuclei with a smaller population. They are houses built basically by family groups that carry out permanent displacement in the territory. In addition to the houses, the space of the nucleus, especially of the nuclei with a larger population, includes other constructions, such as the health unit post, the flour house, and the schools.

The local Ka'apor groups are constituted in their social organization by family units formed by uterine residences, determining the political power. Therefore, the number of chiefs will be determined by the number of residential units (Ribeiro 1996). It was found that in most residential units, there is a predominance of uxorilocal residence, where men are forced to leave their first home to join their wife's family members. Thus, residential units tend to have a political power of control and decision based on co-residence regarding the precept of descent. The author points out that the chief's political power is limited to arranging the

marriages of his royal and classificatory sisters to men willing to marry in their family unit. In the same way, marriage contracts of the same model can occur, now with the father's sister's daughter and the sister's daughter.

The Ka'apor's relationship with their territory is guided by the reproduction of knowledge, environmental, and cultural practices aimed at the social reproduction of the group. The group has a particular relationship with all forms of life in its territory, giving them a social function in its defense. With that, they transform the sources of knowledge into elements that affirm a symbolic identity, but, above all, ethnic. Among the expressive cultural languages of the Ka'apor being is the art of featherwork historically developed by the group. In addition to birds, other nature beings are present in their lyrics, sounds, and handicrafts. Different cultural languages have great symbolic power that guides life projects in this society, as is the case with materials made by parents to be delivered to children after birth when they are embedded in them, something designed for the child's future when becoming an adult. In the case of boys, most of them receive bows, wooden-tipped arrows, in miniatures, to become good warriors. And, the girls receive a hammock, basket, sieve, to become able to make domestic utensils.

3.2.2 Territoriality Yanomami

The Yanomami inhabit a territory of approximately 22 million hectares between Brazil and Venezuela, north of the Amazon rainforest. There are approximately 32 thousand people who speak at least five different languages of the Yanomami linguistic family on 700 communities (Tillett et al. 2014). The communities are spread over environments ranging from "altitude fields," which are characterized by savanna vegetation located at more than 1,000 m altitudes, from the mountains covered with dense forests to the plains cut by meandering rivers and forest vegetation.

The Yanomami territories on the Brazilian side suffer from situations of conflict with farmers-ranchers who illegally occupied the interior of the reserve. Settlement projects impulsed by the government in the 1970s tried to promote the economic growth of the region, concentrating new populated cities on the eastern border of the Yanomami indigenous territory, and this resulted in an increase in the number of invasions by loggers and illegal fishermen (Barbosa 1993; Barni et al. 2015). This happens in a region of low population density of the Yanomami on a border of more than 750 km, making inspection very difficult. Another problem was the invasion by miners since the late 1980s in the Yanomami territories (Rocha and Andujar 2007). It is estimated that at the time, more than 40 thousand illegal miners (garimpeiros) worked in the central region of TI, in contrast to the 10,000 Yanomami that occupied it, and this caused a serious ecological and health impact (Bello and Tillett 2015).

The Yanomami's managed to articulate forms of resistance and defense of their territories. With support from organizations such as ISA (Instituto Socioambiental), HAY (Hutukara Associação Yanomami), Wataniba and HOY (Horonami Associação Yanomami) are developing essential monitoring actions for territorial management and governance (Benfica et al. 2017). Such territorial security and

protection actions consist of systematizing and forwarding complaints of invasions to the responsible institutions. The basis of this process is a radio network implemented and maintained internally and coordinated by the natives. Due to the great distances that separate the communities from the communities' headquarters, the complaints arrive via radio and are forwarded to Fundação Nacional do Índio (FUNAI) and the Federal Police, on the Brazilian side, and stored in a database. Another strategy to hinder invasions is the distribution of the Yanomami to occupy more distant territories and on the borders of the indigenous territory. Thus, they can use resources in regions that are the gateway for invaders—garimpeiros, loggers, and fishermen. In the Ajarani region, the Territorial Management Project does activities to structure the collection and trade of Brazil nuts. The collection areas, which are at strategic points to prevent invasions, are being used frequently by the communities.

Finally, it is important to highlight the systematization and storage in a database of georeferenced information. The Yanomami georeferenced information system covers the Yanomami territory in both Brazil and Venezuela and has helped both in the surveillance and control of the territory as well as to guide the public policies and actions of national governments.

3.2.3 Territoriality Timbira

The Timbira peoples who belong to the Jê linguistic family live in Brazil, and in the states we now call Pará (Gavião Parkatejê and Kuykatejê), Maranhão (Krikati, Gavião Pykobjê, Canela-Apanjekra, Canela-Ramkokamekra, Krepynkatejê, and Krênjê) and Tocantins (Apinayé and Krahô) (Grupioni and Kahn 2013). Although in contact with non-indigenous society for more than 200 years, they retain their own language and political autonomy. It has a general population of approximately nine thousand people, living in more than 50 villages. Its territories represent important areas of preservation and conservation of the Cerrado. Unfortunately, it has been suffering from the gradual advance of the agricultural frontier in the region, plus development and infrastructure projects centered on the modern colonial model of destructive capitalism.

Among the main problems affecting the Timbira territories, we highlight the major works designed by the state, such as municipal, state, and federal highways (Transamazônica and Belém-Brasília), power transmission lines, railways of the Ferro-Carajá Project and North-South, waterway Araguaia-Tocantins, soy and eucalyptus monocultures, construction of hydroelectric plants (Estreito, Serra Quebrada, Santa Isabel, and Marabá) (Grupioni and Kahn 2013). This results in the growing change in indigenous territory, generating: soil losses and silting of rivers, contamination of the soil by the use of pesticides and chemical fertilizers, loss of extensive areas of fruit occurrence for collection, due to the flooding caused by dams (Grupioni and Kahn 2013). In turn, the advancement of the agricultural frontier disrupts the land network in the region, intensifying conflicts and heating up the land market. The big beneficiaries are the big soy producers who start to put pressure on the areas bordering the ILs and threaten food autonomy and local

production. These impacts directly affect the well-being of the Timbira peoples, as they interfere with the communities' means of production.

In this context, the *Timbira Wyty Catë Association* created in 1994 and the *Centro de Trabalho Indigenista* play an important role in training and preparing young people for exchanges and in territorial governance. In the tradition of the autonomy of the Timbira peoples, educational activities are developed such as the training of young Timbira researchers using ethnomapping as a methodological tool to address the issue of nature in the Timbira Indigenous Lands (Grupioni and Kahn 2013). Participatory mapping is carried out within the scope of the Timbira School to be used as tools for discussion and reflection of problems and for the production of teaching materials also diagnosing and planning for territorial and environmental management of Indigenous Lands. In fact, they are treated in a complementary way to the traditional management strategies exercised for centuries by the Timbira, based on the practices and techniques of use and management of nature.

Among other territorial management actions practiced by Tibira, we highlight: monitoring the surroundings of indigenous territories, monitoring and reporting irregularities in major development work for the region and/or participating in the preparation of Environmental Impact Studies, specifically the power plants of Estreito, Santa Isabel, Serra Quebrada and the Araguaia-Tocantins Waterway and the Ferro-Carajás Project, among others (Grupioni and Kahn 2013). Also, the monitoring of land issues, regularization and review of boundaries of the Timbira Lands such as ILs Apinajé (TO) and ILs Kricati (MA) in the 1980s/1990s, ILs Canela (MA) and ILs Porquinhos (MA) in the 2000s and currently ILs Governador (MA). For a recovery of degraded areas, planting, and densification of areas with native species. The actions are priority strategies for guaranteeing the sustainability and integrity of territories, for strengthening traditional knowledge systems, ways of using nature and reproducing Timbira territoriality as a whole.

3.2.4 Territoriality Achuar

The territory of the Peruvian Amazon has concentrated environmental pressures, due to state concessions to extractive companies such as oil, mining, and logging companies (Martínez et al. 2007). In this context, the Achuar people had to reinvent strategies for the protection of their territory to the constitutional forms, promoting the implementation of life plans as a legal instrument to establish the guidelines of territorial management and governance before the state (Espinosa 2014).

The Achuar people occupy the national states of Peru and Ecuador, which leaves the people divided according to modern states, but they maintain and exercise their spatial continuity as a people. According to data from the Peruvian government (2007), there are an estimated 11,000 people. Likewise, the Ecuadorian government (2010) estimates 8,000 people, a total of 19,000 people from the Achuar people (Espinosa 2014).

In the Peruvian case, there are different forms of use, possession, management, access, and the administration that define the socio-economic relationship of the

indigenous people with their habitat, maintaining territorial unity. This guarantees the protection of all elements: surface, subsoil, forest canopy, waters, and lakes, fauna, and flora, genetic resources, the different ecosystems, regardless of their economic classification (FENAP 2018).

In Peru, life plans have been drawn up as a form of governance and territorial protection. It was carried out with the participation of the majority of the Achuar communities. Interacting in the fieldwork and internal debates, with the support of local Achuarti Irúntramu (ATI) organizations in the area of the Huitoyacu River and tributaries of the Morona, the Achuar Chayat Organization (Orach) in the Huasaga River basin and the Federation of Native Communities of the Corrientes River (Feconaco) in the Corrientes River basin, all grouped in turn in the Federation of the Achuar Nationality of Peru (FENAP) participated in this process that culminated in early 2003 (FENAP 2003).

The Achuar people, starting from the elaboration of their systematized life plan, address critical issues such as territory, political organization, and civil and political rights, health, food and traditional medicine, identity and culture, education and economy (FENAP 2003). Proposals lay their foundations in the coordination bodies of the different communities and organizational bases to work under a common objective. Highlighting important details in their plan with a vision of the future includes those legal mechanisms that would allow them to achieve the proposed goals.

3.2.5 Territoriality Tikuna

Colombian legislation since 1991 includes the Indigenous Territory Entities (ETI), creating a figure of indigenous protection of national order. The areas targeted are indigenous reservations and associations that can access public resources within the framework of their own life plans, which must be incorporated and/or adjusted to the national development plans.

The Tikuna people are distributed between Colombia, Peru, and Brazil, which in sum exceeds a population of approximately 67,000 inhabitants. In Colombia, they are located south of the Amazon on the Cotuhé River, Ventura channel, Santa Lucía, Buenos Aires, and in the Leticia area of influence. They settle in the reservations of San Antonio de Los Lagos, San Sebastián, El Vergel, Macedonia, Mocagua, and Cothué-Putumayo, in the Department of Amazonas (ONIC 2016). The DANE census reported (2018) 13,842 people registering a significant increase compared to the 2005 data that 7,879 people were registered (DANE 2019).

Regarding life plans, they present limitations for describing its territory in the format of the surrounding society. The Tíkuna people think the territory is based on cosmological and ontological principles, whose perspective is poorly understood by western culture. In this sense, they had to adapt their understanding of the territory toward a less complex vision, in order to achieve a dialogue with society and the state. In order to be included in the design and implementation of socio-productive projects, within the discursive scheme of biodiversity, conservation, sustainable

development, natural resource management, and others (Vieco Albarracín 2010), territorial governance is based mainly where the communities of each sector are included; this allows structured planning for each community.

The communities have been planned in sectors, assigning them productive activities (a) near Puerto Nariño of an artisanal productive nature; (b) area of influence of the Amazon river of a less the productive character of fish farming and livestock; (c) San Juan del Socó with tourist activities and raising small animals. This form of planning allows maintaining a difference between the reservations located in the Amazonian trapezoid and contributes to the construction and governance of their ancestral habitats.

3.2.6 Territoriality Piaroa

In Venezuela since 1999, the rights of indigenous people have been widely recognized, considering in the constitutional text, developing their main requirements, in their confirmation as subjects full of collective and specific rights with cultural and individual identities, different from the surrounding national society (Bello 2011b).

The Piaroa (*Uwottuja*) in the Amazon state of Venezuela has border with Colombia, living in this two countries but maintaining its cultural integrity, with a population of 19,293 people (INE 2011) and 1,127 inhabitants Colombian (DANE 2019). The organizational experience of the in Venezuela has allowed the government of its territories. Many situations in the face of the invasion of Piaroa territories by different projects and activities are not allowed in indigenous sacred places.

The life plan of the Piaroa in Venezuela was an ethno-cartographic experience that started parallel to the demarcation process and from an autochthonous work among indigenous inhabitants. This was a planning instrument for their future, aiming to safeguard their ancestral culture against the constant besiegement of territorial invasion for mining (Rodd 2018). These actions ensure the continuity of the generation indigenous and also guarantee the existence of the ecosystems where they live, self-managing, and conserving the natural resources of these ancestral territories (Morales and Quispe 2014). For practical purposes, the territory has been divided into five areas: Cuao, Autana, Sipapo, Guayapo, and Orinoco medium, according to this division, each space corresponds to a vital area for the survival of Piaroa culture. This territory represents large areas of land use: (a) forest, (b) water resources, (c) agrofood supply, (d) biological diversity as animals and phyto-medical resources (Aguilar Castro et al. 2014). From these proper characteristics, it is recognized that there is an ancestral property management that results in a proper territorial government built from community work in communities and actors that collaborate in systematization.

4 Amazonian Territory Pressures

The Amazon basin is home to rich biodiversity with many rare, endemic and unknown species, and this diversity is extremely vulnerable to large-scale human actions (Azevedo-Santos et al. 2016). The expansion of large territories of concessions for exploitation, exploitation and prospecting will aggravate the ecological and biodiversity disaster scenario in the Amazon. It will suffer irreversible losses in a short period of time on a wide scale with global impacts.

An example is the oil exploitation in territories of the western Amazon (Finer et al. 2008), the spills that have occurred have significantly affected freshwater biodiversity, ecosystem services and the livelihoods of local populations throughout the river bed. The constructions of large dams in Brazil have affected local populations and their livelihoods on a high-impact scale.

The Amazon biome is intimately related to natural and anthropic actions (Claudino-Sales 2019), however, the presence of fire at such alarming scales has as its exclusive source the anthropic action, in that sense, and heat sources are closely related to agribusiness, mining and the logging sector.

These impacts imply the need for changes at many levels in Amazonian countries. Measures are needed to provide alerts to environmental authorities and development planners. Implementing a system to monitor water quality and pollution levels is a minimal first step in promoting political action. The Amazonian countries must establish sustainable limits to the geographical expansion of extractive and energy activities. Development plans should avoid concessions for exploration, prospecting and exploitation in hydrographic bases and stretches of rivers that provide essential services (e.g., fishing, wetlands, nutrient cycling) or that have high endemic biodiversity.

More importantly, fundamental changes are needed in the decision-making process to arrive at decisions that involve the voice of local populations from a timely, free, and informed perspective. These decisions must be made with information on environmental and social impacts in hand and with institutional mechanisms for the democratic discussion of the issues involved before making the decision to implement a project in practice. Unfortunately, this is not the case yet in any of the Amazonian countries. The recent history of Amazonian hydroelectric dams provides clear examples of the lack of such a procedure and order of events in Brazil (Fearnside 2014, 2015). The authorities of the Amazonian countries must reconsider the unprecedented development schemes envisaged for the Amazon basin, which will cause major changes in hydrology, land use, and water quality. The international community could and should actively participate in these agendas, particularly as the Amazon provides services on a global scale (for example, the climate).

4.1 Ecosystem of Amazonia

The Amazon as a whole presents the ecological, sociological, and cultural diversity that links different actors and indigenous populations, extractivist, quilombolas, riverside, among others (Antunes et al. 2019). The Amazonian biodiversity exploitation is palpable at every step, and day after day it is clear that biological diversity is rapidly disappearing (Nobre et al. 2016). Biodiversity in the Amazon is threatened by a model of exploitation prevailing, which does not adequately consider its intrinsic characteristics. Globalization accentuates the agriculture advance that is reducing the forest mass. The destruction of habitats is the main cause of the loss of biodiversity (Pasquis 2006).

In the Amazon, the general condition of the ecosystems is still relatively good on average. However, unsustainable economic activities, weak cross-sector planning, and mounting pressure fronts advancing carry critical threats to the biome. The importance ignored and the idea that Amazon was an empty space has allowed colonization and occupation policies to multiply. The lack of knowledge of the specificities of this particular region caused the large numbers of populations that arrived there, and in some cases ambitious agricultural projects, to install unsuitable production systems. This process much affected local socio-environmental systems. Numerous conflicts for land or for access to natural resources arose and acculturation of local populations caused traditional knowledge to begin a lost more rapidly than biodiversity itself.

Currently, biodiversity in the Amazon region is being lost at a high rate. One example of this is the recent alarming rates of deforestation. This means that many unique ecosystems and endemic species have become extinct and irretrievably lost (de Area Leão Pereira et al. 2019). The change in the use of the Amazonian land due to the growth of economic activities, at the adoption of new forms of extractive development, the infrastructure construction, and the establishment of human settlements, are only a small part of its transformation (RAISG 2012). The situation has led to a significant change in the use of its natural resources, causing deforestation processes that result in the fragmentation of the landscape and the loss of biodiversity throughout the region. The result is the loss of environmental goods and services, which have as a final result fewer development opportunities for the populations settled in the region (Siqueira-Gay et al. 2020).

4.2 Biodiversity Loss

Biodiversity is essential for human well-being, but biodiversity has declined throughout human history. Species loss and ecosystem degradation are likely to accelerate even more in the coming years (Johnson et al. 2017). The loss of environmental biodiversity is critical at a global level, and conservation strategies have been seriously affected, mainly due to the lack of socio-spatial data that

evidence threats to biodiversity (Joppa et al. 2016). Research indicates a high chance of sharp declines in biodiversity due to habitat reduction to low levels in the landscape. On the other hand, scientific evidence indicates that the development of anthropic activities minimizes biodiversity in landscapes with little contact or little fragmentation.

The Amazon rainforest is possibly the most the species-rich terrestrial ecosystem in the world, a product of geology (lifting of the Andes), it had a fundamental impact on the Amazonian landscape creating drainage patterns and a large influx of sediments throughout this territory, this process enriched the Amazon regions mainly the western Amazon (Hoorn et al. 2010). Amazon rainforests have disappeared at an accelerating rate in the last 50 years due to deforestation into areas open to agriculture, posing a high risk of irreversible changes in biodiversity and ecosystems. Climate change presents other risks to the stability of the forests. Studies suggest that "tipping points" should not be transgressed: 4 °C of global warming or 40% of the total deforested area (Nobre et al. 2016).

The hydroclimate variability in the Amazon is fundamental to understanding its interrelationships and the relationship between the impacts of climate change and people perceptions at different scales (Becerra et al. 2020). In this sense, according to scientific data demonstrating the coherent variability of rainfall in tropical–subtropical South America, the variability of rainfall on an orbital the scale between western and eastern Amazonia exhibits a quasi-dipole pattern. However, during the last ice age, the records imply a modest increase in the amount of precipitation in the western Amazon but a significant drying in the eastern Amazon, suggesting that greater biodiversity in the western Amazon, contrary to the "hypothesis of refuge," is maintained in relatively stable climatic conditions. In contrast, glacial–interglacial climate disturbances (Cheng et al. 2013) could have been cases of less than the gain of biodiversity in eastern Amazonia, where forests may have been more susceptible to fragmentation in response to big changes in the hydroclimate.

The increase in deforestation dramatically increases the probabilities of classifying species as threatened and so in decline, and its effects are mainly high in little-intervened territories, already fragmented forests have greater effects on biodiversity (Betts et al. 2017). In this sense, it should aim to increase efforts to protect intact forests to cut deforestation rates and avoid a wave of extinction on a global scale.

The Amazon and its diversity are being threatened as a result of extractive and energy activities (Azevedo-Santos et al. 2016), creating a real biological and river deterioration in the region, with important effects on local populations. Examples of extractive and energy activities in protected natural areas that overlap with indigenous territories—or not—are clear in Brazil due to the large dams construction, mining activities, and expansion of the agricultural frontier, in Ecuador oil spills, in Venezuela the Mining activities (legal and illegal), just to cite a few examples, in this sense, these activities would be much affecting ecological services and environmental flows as well as the local livelihoods of the populations that live in the vast Amazonian territory.

4.3 *Effects of Deforestation and Extractive Activities on Local Livelihoods*

From the point of view of policies for solving the issue of deforestation and other extractive actions in the Amazon, they have focused mainly on reducing deforestation as a biodiversity conservation strategy; however, little has been considered the impacts anthropogenic in forests, where selective logging, smaller-scale (controlled) forest fires can be considered locally. This new approach allows knowing the effects on primary forests and evaluating the disturbances to which they are subjected, as well as knowing the loss of forests (Barlow et al. 2016). Considering this scenario, it is possible to show that there is an urgent need for the application of pertinent and adequate policies not only as direct actions to keep up forest cover but also to consider the hyper ecosystem diversity of the Amazon.

The cultural and linguistic diversity of the Amazon may be at risk, many linguists have described that the loss of the world's languages may be between 50 and 90%. It is also highlighted that there is a strong link with biological diversity, although this may vary much in each region, although the strong geographical agreement between biological and linguistic diversity in many areas advocates some form of functional connection (Gorenflo et al. 2012). It is interesting how languages and regions with high biodiversity can coexist with one or more specific conservation priorities, here defined as endangered species and protected areas, which mark particular locations important for maintaining both forms of diversity. However, in the Amazon, many protected areas are subject to strong pressures and threats that hinder their purpose (Paiva et al. 2020).

Oil and gas concessions now cover vast swaths of the western Amazon, including protected areas and indigenous territories. The Yasuní Initiative—ITT, Ecuador's innovative proposal to leave close to one billion barrels of oil locked beneath the Yasuní National Park, is the first major effort to reverse this trend. We give a concise description of the initiative, including an in-depth look at its widely praised goals of protecting biodiversity, about indigenous people' territory, and combating climate change. We also discussed the persistent caveats of the proposal, such as technical issues on the generation of financial resources to replace lost oil revenues. We conclude that the Yasuní—ITT Initiative is a breakthrough that could set a precedent to prevent damage to oil and gas development in sensitive areas (Finer et al. 2010).

4.4 *Agricultural Land-Use Changes*

The Amazon basin is home to a mega-diversity of terrestrial and aquatic plants and animals. The mechanisms that sustain this biodiversity are the fluctuations of the water level, the fluvial dynamics, and the intense flow of genes due to the permanent integration of the climatological, geomorphological, and biological

components of the system (Tundisi et al. 2014). The Amazon rainforest is the largest reserve of plant and animal diversity on Earth, and it has been subject to especially high rates of land-use change, mainly for cattle grazing. This conversion has had a strongly negative effect on biological diversity, reducing the number of plant and animal species and homogenizing local communities (Rodrigues et al. 2013).

The construction of reservoirs in Brazil and other Amazonian countries will interfere with the ecological dynamics of this ecosystem by changing fundamental hydrological and hydro-social processes. Furthermore, the construction of reservoirs in the Andean–Amazon foothills can interrupt connectivity with the lower Amazon ecosystem (Tundisi et al. 2014). It is there where there is an impact with large-scale reaches defined by the change in river flow, the migration of fish and other animals, and the amount of water available to the communities that live near the main rivers.

More than one hundred hydroelectric dams have already been built in the Amazon basin, and many proposals for the construction of more dams are under consideration. The cumulative negative environmental effects of existing dams and proposed dams, if constructed, will trigger massive hydro-physical and biotic disturbances that will affect the floodplains, estuary, and sediment column of the Amazon basin (Latrubesse et al. 2017). The dam environmental vulnerability index was introduced to quantify the current and potential impacts of dams in the basin. The scale of the foreseeable environmental degradation indicates the need for collective action among nations and states to avoid long-range cumulative impacts. Institutional innovations are needed to assess and avoid the possible impoverishment of Amazonian rivers.

Indigenous people have experienced substantive changes that harm the provision of important ecosystem services severely impacting their traditional livelihoods, and these showed in the supply of raw materials, food and medicinal resources; however, the demand for food and raw materials has been exponentially increased, generating in the Amazon territory a change in the spaces of exploitation and strong pressures on the reserve of ecosystem services (Ramirez-Gomez et al. 2015). These pressures do not come only from local people but from large corporations associated with food production, oil exploitation, mining exploitation, among others. This reveals that the generations of income, the change in subsistence practices and consumption patterns have changed in the Amazon, it is necessary to strengthen management strategies based on the existing ecosystems used by the Amazonian inhabitants.

5 Sustainable Development of Amazonian Territories from Indigenous People

The literature surrounding the sustainable development theme has generated a conceptual fan that enriches the debate and generates new heterogeneous conceptualizations around the economic theme, with emphasis on the forms of capital and the provision of natural resources (Arrow et al. 2004). This is where important areas of knowledge converge to create new paradigms and concepts that sustainably define the new reality surrounding environmental development.

The concept of a bio-based economy is promoted in the light of oil, gas, and carbon reserves that are expected to run out quickly. Bioeconomy is a term that originated in the 1960s, mainly to reconcile the biological bases of economies; later, it was at the beginning of 1970 when the term that represented a concern that the unlimited growth in the series would be compatible with the basic laws of nature (Bonaiuti 2014). Bioeconomy could boost the transition to a more sustainable economy by addressing some of the world's major challenges, including food security, climate change, and scarce resources.

Bioeconomy approves new resources building on renewable biomass. Through this, the introduction of innovative and efficient production technologies in the use of resources and the transition to a sustainable society helps to reduce the use of limited fossil resources, thereby contributing to the mitigation of climate change (Zilberman et al. 2018). The great current world trends, in the framework of the globalization of the environmental problem, are orienting themselves in a credible and irreversible way to the environmentally sustainable production, to the biotechnology, and to the business with eco-efficiency (Brack Egg 2018). However, within this the context it is essential to consider the social movements and development of local communities that are the basis for the maintenance and strengthening of various initiatives.

The Amazonian case can host a sustainable based economy, which has an important component of ethics, society, and nature. A new economy that recognizes the limits of ecosystems and they guide development (society–nature relationship), and promotes innovation understood as "improving, above all, how energy, materials, and diversity itself are obtained and transformed into products," substituting transactions that propitious deforestation with transactions capable of "guaranteeing permanence and regeneration of the services that ecosystems provide" (Abramovay 2012). The Amazon territory can host a sustainable economy (Pinasco 2015), which improves the quality of life of its inhabitants, generating profits from a sustainable approach, adapted to global demands from a local approach (Fig. 7).

According to this vision, and economic performance adjusted to sustainability considerations is possible, evaluating prices, adjusting appropriate and pertinent policies, adapted to local needs, so that the populations are significantly the beneficiaries. It is necessary to consider the interactions of resource dynamics with macroeconomic considerations (Arrow et al. 2004). It is, therefore, necessary to

Fig. 7 Sustainable economy approaches. *Source* authors

have strong institutions that are capable of managing windfall profits from the commercialization of products (Van der Ploeg 2011). To achieve these goals and develop a robust bioeconomy, research in agricultural and resource economics is essential for the development of policies that guide the evolution of the bioeconomy (Zilberman et al. 2018).

5.1 Natural Resources of the Amazon

The people of the Amazon have traditional and ancestral knowledge that has undoubtedly enriched the landscape. They have domesticated plants and animals for their consumption, as well as the use of the products of the forest to make their homes, different hunting and fishing arts. This has allowed them to survive,

maintain, and inherit their culture. However, the multiple pressures on the Amazonian territory for exploitation are growing rapidly in issues such as the expansion of the agricultural frontier, oil, hydroelectric plants, mining, logging, and mega-projects (Little 2013). A series of threats loom over this territory that undoubtedly drastically alters the panorama. Legislation in many Amazonian countries has made it possible to accelerate some mega-projects, generating significant pressure on the Amazonian territories.

To know the experiences of sustainable use of resources is to enter a world governed by infinite possibilities of action and of doing that has been plagued by multiple successes and mistakes that have laid the foundations for discussion and allows addressing the issues from another field or concept. Possibilities of sustainable use (Wearn et al. 2012). In this sense, the Amazonian countries have not given sufficient importance to the potential of biodiversity in their territories and have not yet discovered its value to achieve sustainable economic, social, and ecological development (Brack Egg 1996). Over time, some communities in Amazonian countries with the support of allies have made interesting advances in relation to the sustainable use of biodiversity and Amazonian genetic resources and have positive experiences in various aspects (Brack Egg 2018).

In this sense, the Amazonian countries face a decisive challenge to take advantage of biodiversity resources based on the social, economic, and environmental development of their countries and of the inhabitants of their respective Amazonian territories. This challenge implies urgent decisions in the near future, which in some cases they must be agreed as a united bloc of the Amazonian countries given their common interest (OTCA 2011). The delay in decisions may result in industrialized countries winning the race to take advantage of the resources of Amazonian biodiversity, to strengthen their economic position, and that the retribution for Amazonian countries is minimal, with clear technological and economic disadvantages.

For different countries, the formulation and implementation of new policies that take into account the socio-environmental specificities of the Amazon are gradually building an institutional political a framework that proposes to lay the foundations for the integral development of the Amazon. Thus, the strengthening of social actors in the sustainable management of natural resources is prioritized, and an increasingly relevant status is given to biodiversity as a strategic component of development.

In this context, indigenous organizations have been strengthened, regionally or nationally, Coordinator of Indigenous Organizations of the Amazon Basin (COICA) and its associated national organizations, particularly in processes of management and order of the territory (territorial management) at the same time as the Civil society gained political prominence around the issues of defense of the environment and indigenous populations in the Amazonian context.

On the other hand, there are communities, local governments, sub-national governments, corridors, networks, and thematic tables that have been promoting territorial management initiatives toward sustainability, making visible

improvements in the quality of life of local populations. In this sense, initiatives imposed by the Amazon biome are visible (Pinasco 2015).

The Bolivian case presents a synergy between the municipality and its allies, where the producer organizations make a symbiosis and generate a land-use plan that leads to the empowerment of the organizations and they believe that they improve access to production, but it goes further thereby proposing climate change strategies, supported by the beauty of its ecosystems, creating productive spaces for its population through tourism as a window.

In the Colombian case, there are experiences in strengthening indigenous autonomy and traditional forms of land management (Rivas 2019), guaranteeing the conservation of diversity and local sustainable use, based on traditional knowledge that becomes a vehicle for the implementation of rational epistemology and logic. On the other hand, grassroots organizations manage municipal parks in order to ensure the supply of water resources for local populations, this municipality of Belén de Los Andaquíes is a municipality with a great diversity of flora, fauna, landscapes and water resources, which make it worthy of the title of being one of the most biodiverse municipalities in the department, not only because it belongs to the Amazon, but it was also declared a green water protector municipality (Coronado Bustos and Santos González 2016). In this municipality, important processes of grassroots social organization are highlighted and recognized, which shows a strengthening social capital, being one of the most representatives municipalities in this type of action.

In this regard, Brazil has managed to establish the Mondé-Kawahiba ethno-environmental corridor, which occupies the states of Rondonia, Amazonas, and Mato Grosso (Santos and Mendonça 2016), where indigenous peoples, municipal governments, and NGOs have converged, they have carried out a territorial management process, which aims to reduce poverty, protect socio-environmental services, and improve quality of life, through the strengthening of local governments in coordination with protected natural areas and indigenous peoples, based on the economic development and cultural appreciation of indigenous peoples and local communities.

Brazil has made important advances in sustainable development programs through the mapping of biodiversity and in work with genetic resources through Instituto Nacional de Pesquisas da Amazônia (INPA), Centro Nacional de Recursos Genéticos (CENARGEN), and the Museu Paraense Emílio Goeldi. The works on pijuayo or pupunha (*Bactris gasipaes*), on Amazonian tropical fruits, and on fisheries are recognized throughout the world (quote). In addition, it has advances in the isolation of active principles and alligator farms (Dumith 2012). Even the vast coastal area of the Brazilian Amazon is used by mangrove fisherman of crabs and shrimp (Fernandes et al. 2018), whose waste can be transformed to obtain biopolymers such as chitin and chitosan (Tovar et al. 2018). Biopolymers used for biotechnological and environmental applications (Tovar-Jimenez et al. 2020). In this country, the experiences of extractivism, through the Extractivist Reserves, are important and are opening interesting possibilities for the sustainable use of biodiversity by local inhabitants.

The Venezuelan case the indigenous populations maintain the use of their agricultural technologies that has been inherited from generation to generation, and that serves as a basis for the conservation and protection of forests, sacred places, ultimately their culture (Morales and Quispe 2014). This territory presents serious threats as a result of illegal mining and extractivist policies. However, its cultural identity has allowed the creation of spaces for organizational strengthening for the defense and control of its territory, through the self-demarcation of its habitats and territories.

The Ecuadorian experience based on the Sumaco Biosphere Reserve has been organized through cacao and its cocoa table (Moreno et al. 2011). They have managed to consolidate strategic alliances, through space for dialogue and coordination of actions, where not only producers are integrated, but also public and private entities, which resulted in the management of fine aroma cacao in the Sumaco Biosphere Reserve.

In the Peruvian case, governance of natural resources has been proposed in the Pichanaki Model Forest process, in the Central Forest of Peru, through the characterization of indigenous peoples, local governments present in the territory (Buendía Martínez 2018). The actors are distinguished in the organization of agricultural producers; independent farmers; state institutions related to the environmental and agricultural sector; sanitation institutions; commerce; political authorities and local communities.

Environmental entities have an increasingly global approach, systematically addressing the environmental problem of water resources, biodiversity, and climate change (Pasquis and Mikkolainen-Del Aguila 2014). The rights of nature are also recognized, and the right of citizens to a healthy environment is identified as one of the fundamental conditions for human life. In this way, an "Amazonian" institutionality is progressively being strengthened at the same time that the levels of governance are being improved.

5.2 Sustainable Management of Natural Resources

The knowledge and understanding of the process of regeneration of the forest and the use of its diversity of species and ecosystems has guaranteed a sustainable management of the Amazonian environment by the indigenous groups that have inhabited it since ancient times.

Amazonian indigenous groups have developed adaptive models to the Amazonian environment, within a cultural framework with a high capacity to regulate human activity. These subsistence models are based on the multiple and extensive use of natural spaces (for the collection of resources: fruits, hunting, and fishing) and on the intensive use of transformed cultural spaces (cultivation areas and home gardens), guaranteeing the maintenance ecological diversity (Walshburger 1990). The indigenous peoples of the Amazon show patterns of adaptation to the natural environment (Fig. 8).

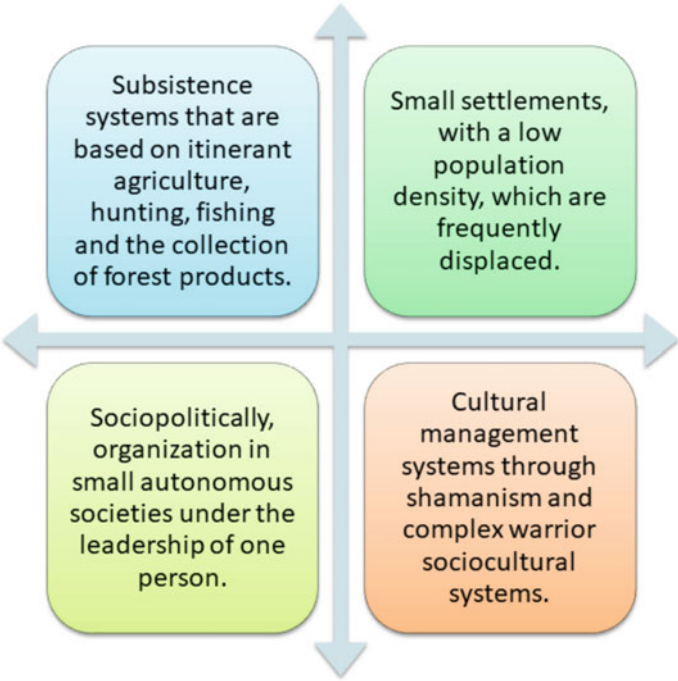

Fig. 8 Characteristics of the adaptation patterns of indigenous communities to the Amazonian environment. *Source* authors

Both the production and use of natural resources systems and the socio-cultural dynamics of indigenous groups respond adaptively to the ecological limitations of the Amazonian environment, which may be (a) the intrinsic poverty of the soil that limits agricultural production; (b) the scarcity of arable land or hunting territories, which generates inter-ethnic competition; (c) the general scarcity of animal protein in the environment. The combination of these factors according to the intensity determines the density and permanence of the towns; it is worth noting that the spatial heterogeneity of the Amazon has different soil levels, water quality, patterns of flooding of forests, precipitation and many other factors that determine a complex mosaic of habitats made up of different animal and plant species.

Considering this characterization, some elements are raised, which can increase the vision of an optimal use of the Amazon from a holistic approach (Álvarez and Shany 2012), in which they consider (a) productive conservation, conservation as a business, that is, recover resources of wild flora and fauna and conserve them productively for people, generating income; (b) adaptive management, simple management measures designed and progressively adopted by the communities themselves with the support of technicians, following the participatory research model; (c) ecosystem approach, conservation of large landscapes, especially basins and complete ecosystems, including prioritized ecological processes, such as

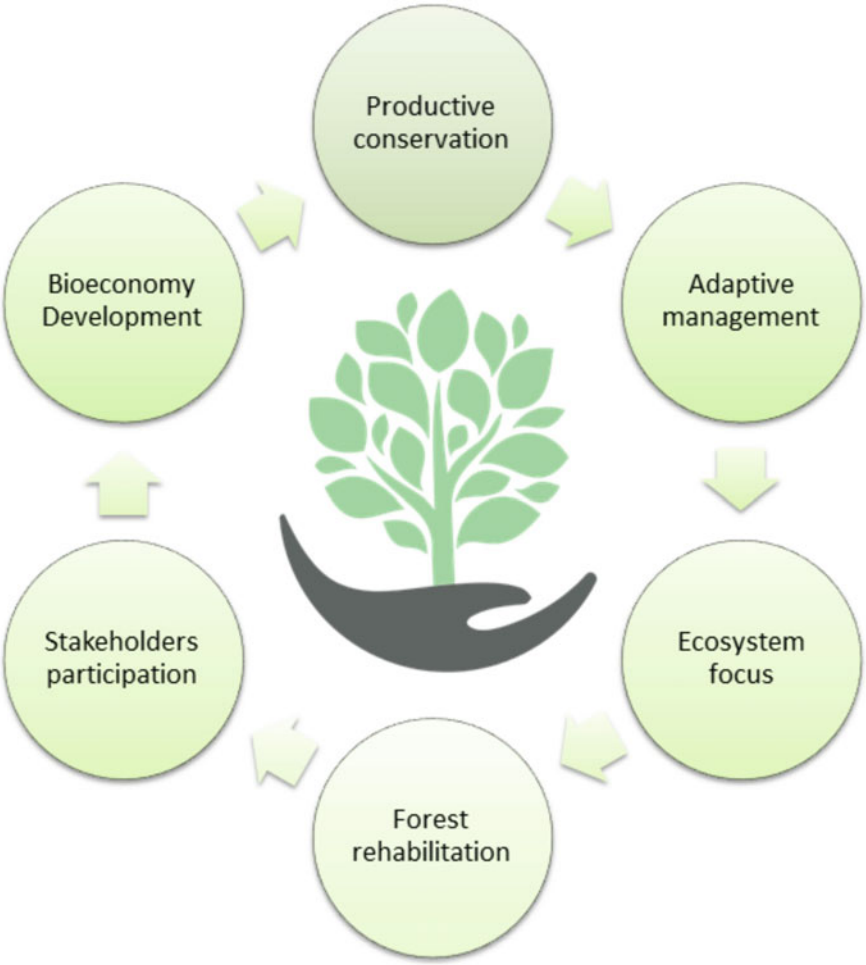

Fig. 9 Holistic approach to the optimal use of the Amazon. *Source* authors

seasonal migrations of fish, and conservation of source areas; (d) use and profitability of the standing forest, prioritize the generation of income from managed wild resources versus change of forest use; (e) participation of all actors, from duly consulted organized local communities to private companies, public institutions, and decision-makers; (f) development of complete productive chains, adding value to biodiversity products and articulation to the market; (g) adaptive management, decisions taken locally, and progressive adaptation of institutions and regulations according to the capacities of the communities. Figure 9 shows an illustrative scheme of this consideration.

Considering these elements, traditional systems of use can be rescued, modernized, and disseminated for implementation by the same local populations. The

effort to synthesize local knowledge and experiences is vital in this regard, in addition to the development of new systems suited to the environment of the region. This implies a close work between official entities, in charge of science and technology, with local people and private companies, in the broadest sense.

There are aspects that refer to decisions to direct the sustainable use of biodiversity. Much has been insisted rather on forbidding the use of resources, rather than on promoting their management and sustainable use. For example, in several countries the closures of flora and fauna species, with the possibility of exporting them live or as processed products, have not been accompanied by initiatives to establish crops, hatcheries, or similar actions for the benefit of the region's inhabitants.

The use of biodiversity, from a sustainability perspective, is an opportunity for Amazonian countries, such as ecosystem services, forest resources, aquatic resources far from the destruction of areas and with minimal or few alterations unlike what happened in the past. There are alternative approaches for taking advantage of the Amazon "Pertinent," without neglecting the socio-economic benefits for the inhabitants of the Amazon regions. This proposal is innovative in the framework of the new world context.

In these territories, the hydrological resources, are essentials for supply on rural and urban populations, especially on fisheries. In some countries (Brazil, Colombia, and Peru), there is a constant improvement of technology that has been developed for the use of fishery resources. The potential of breeding species for food and ornamental purposes (aquariums) must be considered, both for local, regional, national, and international markets. Certainly, some meat-producing species (such as paiche or pirarucú, among others) are not only of local and regional interest but also international.

The use of forest products other than wood is an activity of certain local importance, as is the case of the chestnut or Brazil nut for Brazil, Bolivia, and Peru. Also, the use of Copo azu (*Theobroma grandiflorum*), Acai (*Euterpe oleracea*), Moriche (*Mauritia flexuosa*), Pupunha (*Bactris gasipaes*) is some products adapted to the conditions of the Amazon. The potential of Amazonian crops has been little valued locally since there are dozens of plants that produce exotic fruits, perfumes, aromas, oils, drugs and ornamentals, among others, that have not been considered in development programs with a vision for the future. Likewise, the potential of biodiversity (flora and fauna species) as a supplier to the national and international industry of new pharmacological products, cosmetics, chemicals, and others derivatives has been scarcely perceived by the Amazonian countries, putting them in a very weak position compared to the industrialized countries.

The countries have concentrated their efforts on promoting and fostering Amazonian development based on systems and products "imported from abroad," but not on seeking the true possibilities of the region. These have remained indifferent or very timid in exploring them and seeking their integration into the national economy. We advocate for a new development paradigm, far from attempting to reconcile maximized conservation versus the intensification of traditional agriculture and the expansion of hydroelectric capacity, in which we

research, develop, and scale a high-tech innovation approach that sees the Amazon as a global audience well of biological assets that can allow the creation of high-value innovative products, services, and platforms through the combination of advanced digital and biological technologies (Nobre et al. 2016).

The debate on regional development has focused on trying to reconcile the maximization of conservation with the intensification of traditional agriculture. The large reductions in deforestation in the last decade open opportunities for an alternative model based on seeing the Amazon as a global public good of biological assets for the creation of high-value ecosystem products and services (Nobre et al. 2016).

5.3 Genetic Resources in the Amazon Bioeconomy

First, it is necessary to understand that a large part of the Amazonian biodiversity, especially genetic resources and plants with great pharmacological potential, is not exclusive to a single country, but rather is shared resources. This implies that their conservation and the recognition of the intellectual rights of the Amazonian inhabitants must be dealt with in conjunction with regional agreements. The exit of genetic resources, for example, can be very much legislated in one country, but not in the neighbor, which allows the leakage of resources to the outside without any benefit for the inhabitants and the countries.

The importance of the genetic resources of domestic plants is increasing in relation to the wild and primitive species and varieties of cultivated plants such as corn, wheat, barley, potato, rice, tomato, and others (cocoa, papaya, achiote, vanilla, and many others). This aspect of genetic resources has an international network through FAO and the Consultative Group on International Agricultural Research (CGIAR). This network, integrated for 13 institutions, has offices in Latin America the International Center for Tropical Agriculture (CIAT, Cali, Colombia), the International Potato Center (CIP, Urna, Peru) and the International Center for Corn and Wheat Improvement (CIMMYT, El Batán, Mexico).

The International Board for Genetic Resources (IBPGR, Rome, FAO) is giving increasing importance to the plant genetic resources of Latin America and has an office for South America at CIAT; a Seed Management Unit (SMU) at CATIE-Costa Rica, and Taxonomic and Ecogeographic Studies in Cucurbits at UNAM-Mexico. The IBPGR promotes national, regional, and international programs on genetic resources and supports actions of (i) characterization, evaluation, and documentation; (ii) germplasm exchange; (iii) training and research; (iv) work networks by crops; (v) inter-institutional relations, and (vi) publications.

Sustainable development is established as a production model, whose goal is to keep natural resources, based on three premises: (a) human well-being, actions on

issues such as health, education, housing, security, and protection of the rights of childhood; (b) ecological well-being, actions around the care and preservation of air, water, and soil; and (c) the interactions established through public policies in matters of population, equity, distribution of wealth, economic development, production and consumption, and the exercise of government (Alcocer 2007).

5.4 Economic Development in the Amazon

In the economic line, we find that the main productive sectors of the Amazon depend directly on their endowment in natural resources such as agriculture, mining, forestry, and hydrocarbon production, more to other activities such as illicit crops and the illegal trafficking of wild fauna and flora. However, the region shows very different production systems in terms of scale, production processes, formality, and market articulation. For example, in the agrarian sector, on the one hand, there has been a significant increase in monoculture agriculture (soy) and intensive livestock farming on deforested lands, while on the other we find huge areas of family farming and extensive livestock farming. We can see a similar situation in the mining sector.

As is known, mining exploitation has always been a major threat to the aquatic and terrestrial ecosystems of the Amazon, and gold mining, the most widespread, is even more destructive on a small scale, given that a greater proportion of industrial operations are subject to increased regulation (UNEP 2009). In the area of hydrocarbons, the Amazon has large deposits of oil throughout the basin, although the exploitable fields are mainly concentrated in Ecuador, the country with the highest record of exploitation of the resource. The gas and oil fields of the rest of the area are concentrated in the Amazon foothills of the four countries. It should be noted that in the past, some oil exploitation areas were ruled out due to their inaccessibility, but the high prices of oil and natural gas have allowed exploration work to be reactivated.

In terms of road infrastructure and given the need to respond to the needs to make the best use of the potential of natural resources in the region, a good number of initiatives are proposed for accessibility and development of the area, which will entail impacts on forests and biodiversity (RAISG 2012).

Is it necessary then to ask the dichotomy in reference to the natural resources of the Amazon, are these positive for the region, on the contrary, are they substantively negative? Both scenarios can be evaluated by pointing to the positive scale, recognize that based on coherent and adequate fiscal rules are based on the well-being of the population to take advantage of the extraordinary gains in developed resources and developing economies. However, the costs are industrialization, growth prospects not consistent with the Amazon, fragile institutions, and the rule of law with questions, and financial development that is still growing (Van der Ploeg 2011).

Analyzing the macro-level of sustainable development for the Amazon can offer a more refined point of view on the economy of the region and enables a quantitative consideration for environmental policies, a detailed approach is necessary at the micro-level (countries and regions) to develop strategies and relevant sustainable development policies. Microeconomic approaches to sustainability must recognize heterogeneity between locations and between people considering economic and biophysics factors. In order to guarantee adequate sustainability (Barbier 2016), the protection of biodiversity and support special locations and ecosystems (Biosphere Reserve, National Parks) are needed.

At the end of the 90s, there were strong movements to strengthen sustainability in its applicability, since it sought to become a solid sustainability strategy, it was then proposed to show specific restrictions to make sustainable economic development, having as a vision that could be mainly controversial for groups seeking to keep intact environmental and social services (Brown and Shogren 1998). The civil society experience through its different forms has established criteria for the preservation and protection of biodiversity to sustainable development adjusted to the Amazon region.

Interestingly, there is a difference between the popular notion of sustainability that develops policies that aim to meet specific conservation goals and can be socially costly, and the notion of sustainable development that aims to improve well-being subject to environmental and social constraints (Zilberman 2014). On the other hand, the importance of suggesting that there is an explicit consideration of irreversibility effects in the evaluation of sustainability should be emphasized to avoid excessive investment and excessive depletion of natural resources (Wesseler 2015).

6 Concluding Remarks and Future Considerations

The analysis of demographic dynamics in the Amazon to the growth of natural protected areas and the recognized indigenous territories in the last 60 years forms a recently opened field of study thanks to the database available. The results of this analysis show that there are three phases in the environmental protection of the Amazonian territory and three phases of recognized indigenous territories. Regarding environmental protection, the first phase (1942–1961) corresponds to a sudden expansion of the protected territory, 405,660.8 km^2 in just 19 years. The second phase (1962–1988), in which 797,060.6 km^2 of environmental protection were reached, corresponds to the diversification of the protection mechanisms adopted by various countries, such as the Integrated Management Areas (Bolivia), the Natural Monuments (Venezuela), the Recreation Areas and Production and Fauna Reserves (Ecuador), Biological Reserves (Brazil) and Protection Forests (Peru). The third phase (1989–2005) corresponds to the decentralization of protection mechanisms. During this period, the departments and municipalities were the main ones in charge of expanding environmental protection, reaching the figure

of 1,970,005.6 km^2. Finally, the current phase (2006–2018) shows a contradictory trend in which the state gradually delegates responsibility for environmental protection, both to organized communities and to private owners. In this way, the environmental protection of the 2,680,785.3 km^2 of Amazonian territories can be divided between state protection (57%), departmental-municipal (28%) and community-private (13%). Subsequent comparative studies will be able to determine the effectiveness and the main problems that each type of environmental protection presents.

The recognition of indigenous lands in the Amazon has not clearly distinguish the expansion phases. However, the data available on the Indigenous Territories of Brazil, the Indigenous Reservations of Colombia and the Native Communities of Peru show a first phase (1945–1981) in which territorial rights were recognized for 434,005 people out of a total of 62,310.1 km^2. The second phase (1982–2000) reaches 876,223 inhabitants and 1,052,065 km^2; while the third phase (2001–2016) incorporates a population of 1,250,966 and 2,254,040.3 km^2. In this sense, the differences on the growth of environmental protection, either by the state at any of its three scales, also by the community or private entities. While the growth of recognition of the Amazonian indigenous territory shows that the relations of Power are unequal even between the different types of territorial management and governance.

The experiences of political autonomy and governance from Ka'apor Yanomami, Timbira, Achuar, Tikuna, and Piaroa territoriality show the community organization of social processes. Such processes based on territorial management plans that are dynamic, interactive, and participatory, and that help to define the specific goals, goals, and activities planned by indigenous communities. If the communities are not organized and mobilized, the autonomies and forms of resistance and defenses in the territory will not happen. Although protected natural areas and indigenous territories are subject to pressures such as urban and agricultural expansion, and infrastructure projects (roads, highways, dams and land division), mining, illegal logging, cattle ranching, among others, the effects of extractive activities that fiercely an attack such a sensitive and highly diverse territory must be countered in many ways.

Respect to Amazonian cultures should be deepened, promoting mechanisms to guarantee social equity and inclusive opportunities to lower poverty (design indexes for evaluation of Amazonian population's development). Also, promoting the knowledge traditional allows lower the vulnerabilities of Amazonian environments, and fostering adaptation measures in the face of climate change. It is necessary a participatory management that includes local actors, supported by governance instruments designed at the local level with the people, as well as activating and about the mechanism of earlier, free, and informed consultation of projects that may be developed within their territories.

Agree to these considerations is necessary to develop a dynamic economy own. This aim to generate work networks, based on value chains, adjusted to the potentialities of the territories, which are fair competitive activities within the local framework, and national and international markets with responsibility, solidarity, and social justice. It considers the management and conservation of biodiversity and

ecosystem services, which allows resilience and adaptation to climate change, as well as the recovery of degraded areas that allow guaranteeing productive activities.

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