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Participation in biocultural diversity conservation: insights from five Amazonian examples

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Abstract

The past three decades have seen the emergence of myriads of initiatives focused on conserving, revitalizing and maintaining Indigenous and Local Knowledge (ILK) as part of biocultural approaches to conservation. However, the extent to which these efforts have been participatory has been often overlooked. In this chapter, we focus on five prominent ILK conservation initiatives in the Amazon Basin to examine the participation of Indigenous Peoples and Local Communities (IPLCs) in ILK conservation. Our review illustrates several examples of ILK conservation initiatives offering substantial opportunities for meaningful IPLC participation over the long term. Overall, our case studies suggest that the development of robust and inclusive decision-making processes is essential to optimize IPLC participation in ILK conservation, thereby increasing the legitimacy of these initiatives. Our review is not an exhaustive account of the breadth and depth of all initiatives promoting participatory biocultural conservation in this region, but it illustrates that there are many strategies that can help foster IPLC engagement and lead the participatory turn in biocultural conservation.

Keywords: Amazon, biocultural diversity, conservation, Indigenous and Local Knowledge, participation

Introduction

Just as the biosphere is being severely eroded by global change, so is the ethnosphere and probably at greater rates (Ferguson and Messier 1997; Cox 2000; Brodt 1999; Godoy et al. 2005; Brosi et al. 2007; Turner and Turner 2008; Reyes-García et al. 2007, 2013; Tang and Gavin 2016; Gavin et al. 2015, 2018). Indeed, some researchers argue that the losses of biological and cultural diversity are inextricably linked and driven by the same threats and pressures (Maffi 2005; Pretty et al. 2009; Gorenflo et al. 2012; Rozzi 2012). In response to this, a growing body of research and policy initiatives have adopted biocultural approaches to conservation (*sensu* Gavin et al. 2015). These approaches rest on the idea that the conservation of a substantial proportion of the world's biodiversity largely depends on the conservation of Indigenous and Local Knowledge (hereinafter ILK), or the knowledge, practices and beliefs of Indigenous Peoples and Local Communities (Brondizio and Le Tourneau 2016; Garnett et al. 2018). In parallel to the wide array of methods developed to conserve and manage biodiversity from the bottom-up, the past three decades have witnessed the emergence of myriads of initiatives focused on ILK conservation, revitalization, protection, documentation and/or maintenance all over the world (Aikenhead 2001; Gavin et al. 2015; Fernández-Llamazares and Cabeza 2018).

Three recent systematic reviews have identified five non-exclusive types of initiatives oriented to ILK conservation (McCarter et al. 2014; Tang and Gavin 2016, Benyei et al. 2019): (1) *community-based ILK conservation initiatives* such as those protecting and promoting traditional lifeways and/or the commercialization of ILK-based products at the community level (Little 2005; Klein 2011; Simpson et al. 2013); (2) *capacity building initiatives* aiming at strengthening IPLCs' alliances and financial autonomy to confront ILK misappropriation contributing to its protection and maintenance (Maikhuri et al. 2005; Subba Rao 2006; Jasmine et al. 2016); (3) *education and awareness efforts* such as customary education programs that integrate ILK in school curricula, contributing to strengthen ILK transmission (Kimmerer 2002; Castagno and Brayboy 2008; Ruiz-Mallén et al. 2010; McCarter and Gavin 2011, 2014; Hamlin 2013; Abah et al. 2015); (4) *policy and legislation initiatives* in which the need to preserve and integrate ILK in conservation is acknowledged and/or enforced through policy or by law (Alexander et al. 2004); and (5) *research and documentation projects* focusing on the compilation of ILK in databases and registers for its protection (Gadgil et al. 2000; Pardo-de-Santayana 2014; Bussmann et al. 2018).

Although these initiatives are as diverse as the locations and IPLCs they emanate from, they generally offer numerous opportunities for strengthening customary institutions for ecosystem management, biodiversity conservation and ecological restoration (McCarter and Gavin 2014; López-Maldonado and Berkes 2017; Ban et al. 2018; Fernández-Llamazares and Cabeza 2018; Reyes-García et al. 2018). However, participation of IPLCs in ILK conservation is a major task ahead. For example, a recent study shows that IPLCs are rarely participating in more than one phase of the ILK conservation initiatives (Benyei et al. 2019). The reasons for this lack of

participation are still not clear, and thus, there have been calls to (1) to enrich the analysis of the degree of IPLC participation in conservation initiatives (Tang and Gavin 2016); and (2) expand the types of evidence assessed in reviews to more fully and rigorously integrate rich and multifaceted qualitative insights (Sterling et al. 2017a).

With these goals in mind, in this chapter, we examine the participation of IPLCs in ILK conservation through an in-depth analysis of five initiatives in the Amazon Basin. Each of these initiatives was selected to characterize each of the five types of ILK conservation described above. Initiatives were chosen on the basis of availability of academic and grey literature describing them in detail. Complementing previous studies taking a more quantitative approach (e.g., Aswani et al. 2018; Benyei et al. 2019), here we prioritize a qualitative appraisal framework assessing the participation of IPLC in each ILK conservation initiative. While the in-depth analysis of these cases might provide some insights on factors enabling and challenging IPLC participation in ILK conservation initiatives, we are aware they do not represent the entire spectrum of all the existing initiatives in this vein. Although for one of the case studies (i.e., the Tsimane' case) we speak from a more insider perspective (as we have been involved in some of the phases related to this initiative), our analysis is mostly based on literature review. We thus stress that we do not speak on behalf of any of the projects described in this chapter, but rather assess them based on the literature.

While ILK conservation initiatives are found in many areas of the world (Tang and Gavin 2016), we focus on initiatives on the Amazon Basin for two main reasons. First, with over 300 Indigenous groups and more species of plants and animals than any other terrestrial ecosystem in the planet, Amazonia is largely considered as a global hotspot of both biological and cultural diversity (Hoorn et al. 2010; Le Tourneau 2015). Second, IPLC rights and livelihoods have been under threat since European arrival, but -in spite of the initiatives mentioned above-, these are escalating all over the Amazon owing to the recent sociopolitical instability in the region (Escobar 2018; Artaxo 2019; Codato et al. 2019). For instance, pledges by the Bolsonaro Government in Brazil to open Indigenous lands to mining, agri-business and infrastructure development represent a direct threat to many IPLCs and their knowledge systems (Begotti and Peres 2019). Given the crucial role of IPLCs in conserving and managing some of the most biodiverse landscapes in the region (e.g., Nolte et al. 2013; Blackman et al. 2017; Schleicher et al. 2017), there is a greater need as ever to critically evaluate IPLC participation in ILK conservation initiatives in the Amazon, thereby improving our understanding of the conceptual, procedural, and normative underpinnings of biocultural conservation efforts.

Case 1. Community-based ILK conservation: Basket weaving programs among the Kaiabi

The first initiative selected focuses on a long-term community-based project developed for the revitalization of weaving knowledge among three Kaiabi (also known as Kawaiwete)

Indigenous groups in the Brazilian Amazon. The Kaiabi are a Tupi-Guarani-speaking people who originally occupied several tributaries of the Tapajós River in the southern Brazilian Amazon. Between the 1950s and the 1960s, the Brazilian federal Government led the relocation of most of the group to the southeast, in an area that is currently known as the Xingu Park (Grünberg 2004). The resettled Kaiabi have undergone a process of social, institutional, and political innovation and have maintained a repertoire of traditional practices, knowledge and institutions (Athayde et al. 2009; Athayde and Schmink 2014). Weaving is considered as an important cultural practice by the Kaiabi, and the graphic designs represented in basketry and textiles are strong symbols of their cultural identity (Athayde et al. 2009), reflecting aspects of the group's history, cosmology, ecology and socio-economic organization (Athayde et al. 2017a).

There is well-established evidence that several important elements of basket-weaving knowledge among the Kaiabi have eroded over the past decades (Athayde et al. 2017b). The relative unavailability of one the main natural fibers used in the weaving work (*Ischnosiphon gracilis*) is considered as an important driver of knowledge loss (Athayde et al. 2006). This problem was initially identified by Kaiabi leaders, concerned about the erosion of basket-weaving knowledge among men and women (Athayde et al. 2017a). Aiming to revitalize weaving knowledge, this group of Kaiabi leaders developed a "community-based project for cultural revitalization" (see Athayde et al. 2017b, pp. 535) named Kaiabi Araa ("Design of the Kaiabi"). The project was planned and executed by four Kaiabi Indigenous Communities (Athayde et al. 2017b), as part of the Xingu Program of the Instituto Socioambiental (ISA) and in partnership with the Indigenous organizations Associação Terra Indígena Xingu (ATIX) and Kaiabi Association in the Teles Pires (Kawaip). It was funded by the Indigenous Peoples Demonstrative Projects (PDPI) from the Pilot Program to Conserve the Brazilian Rain Forest (PPG7).

The project lasted seven years and included different activities such as weaving workshops, field trips, and ecological management of the plants whose fibers are used in basketry (Athayde et al. 2006, 2009). A total of 67 people participated in the several Indigenous-led workshops. Through this project, several weaving workshops were organized to revitalize weaving knowledge of baskets and graphic designs among the group (Athayde et al. 2017a). These workshops prioritized many-to-many knowledge transmission as a learning model, where many elders or teachers taught many apprentices in a spirit of collaborative learning (Athayde et al. 2017b), including transmission of weaving techniques across genders, explicitly recognizing the crucial role of women in safeguarding weaving knowledge (Athayde and Silva-Lugo 2018). The project also included transplanting experiments to re-grow the main natural fibers used in Kaiabi basketry (Athayde and Silva-Lugo 2018), as well as the search for substitute natural fibers to use in basketry (Athayde et al. 2006). In addition to these ILK revitalization workshops, other outcomes of the project included the production of educational materials and a participatory video documentary on Kaiabi basket-weaving knowledge (see Athayde et al. 2017b). The video-documentary was one of the winners of the "Indigenous Cultures" award from the Ministry of Culture in Brazil in 2007,

further helping to recognize the cultural value of Kaiabi basket-weaving knowledge at the national level (Athayde et al. 2017b).

One of the problems identified by Kaiabi leaders from the onset was that some basket-weaving designs were being rapidly forgotten (Athayde et al. 2017a). In partnership with local researchers, the Kaiabi leaders decided to contact several museums, libraries, and ethnographic collections to request the repatriation of several Kaiabi graphic designs that had been documented in the 1960s (Athayde et al. 2017a). These designs, which included the "ta'agap" (mythical figure), were collected and returned to the communities in both printed and digital formats, and have been compiled as part of a book on Kaiabi basketry (Athayde 2006). This book is being used to teach some of the designs that were being lost (Athayde et al. 2017b). To assess the direct impact of the Kaiabi Araa project on the basket-weaving knowledge, a comparative longitudinal assessment of knowledge dynamics was conducted before and five years after the Kaiabi Araa cultural revitalization project was developed. The results of this study show, among other things, that the project had a significant effect on the number of basketry designs known by project participants (Athayde et al. 2017a).

Case 2. Indigenous capacity-building: The COICA alliance

Our second case study refers to the Coordinating Body for the Indigenous Peoples' Organizations of the Amazon Basin (COICA), a capacity building initiative focused on promoting alliances among IPLCs in the Amazon basin so to strengthen their collective capacity to advocate for their rights, including the right over their ILK (Jacanamijoy Tisoy 2011). The COICA coordinates nine Indigenous organizations that represent around 400 Indigenous communities and an estimated population of 1.5 million people (Jacanamijoy Tisoy 2011). Funded in Lima in 1984, it now coordinates the Indigenous Peoples' organizations of all the countries that make up the Amazon Basin. These organizations represent communities from a wide range of settings and with diverse degrees of integration into the market economy and ILK erosion (Loh and Harmon 2005; Gorenflo et al. 2012).

Since its foundation, the COICA has been present as an advocacy and negotiating stakeholder in many of the international discussions on biodiversity conservation and Indigenous Peoples' rights. The COICA had an important role in the negotiation of Convention 169 of the International Labour Organization (ILO) on Indigenous Peoples' right to self-determination and the Article 8(j) of the CBD on the recognition and protection of ILK (Jacanamijoy Tisoy 2011; Varese 1995; Mato 2000). Regarding alliance and partnership building as a strategy for ILK conservation, one of the most relevant COICA-led actions has been the organization of the Amazonian Summits (*Cumbres Amazónicas*). These international meetings of Indigenous Peoples and environmentalist organizations were initiated in 1990 and replicated in 2011, 2013, 2016 and 2018, bringing together all the member organizations, as well as partners, to debate on issues that

range from land rights to climate change or pollution generated by extractive industries (Mato 2000; COICA 2018, 2016, 2013, 2011). Although ILK conservation has not been the main focus of any of these meetings, the meetings have proven to be effective for the strengthening of Indigenous networks and the production of declarations that are a powerful way of collectively denouncing violations of Indigenous rights and propose consensual actions to confront them (Herrera 2016). Moreover, some declarations have specific sections on the importance of protecting and maintaining ILK as basic for the Indigenous lifeways and economies under the "*Vida Plena*" paradigm. More specifically the Manaus declaration (COICA 2011) proposed securing ILK and preventing its unrightful appropriation and commercialization as a key action to be promoted.

The COICA board is formed by representatives of all the organizations and countries, for which the initiative seems to be inclusive of the different regional perspectives overcoming past communication and hierarchical issues reported (Varese 1995). However, there has been a recent call from youth sectors of the Indigenous organizations to be further included in the COICA board (Comunicaciones COICA 2018). Finally, COICA's foundation and functioning is somewhat reliant on external funding from western NGO's, specifically Intermon Oxfam which founded the inception meeting in 1984 (Mato 2000; Herrera 2016). This means that despite the high level of Indigenous control over this initiative, its financing is not fully in the hands of IPLCs.

Case 3. Education and awareness: Tsimane' educational programs

The coordinated work of a partnership of researchers and Tsimane' Indigenous peoples over almost two decades constitutes an example of an education and awareness building ILK conservation initiative. The Tsimane' are a population of hunter-horticulturalists who live in a territory mostly covered by *terra firme* lowland rainforests, extending from the Andean piedmont to the savannas of Moxos in the Department of Beni, in the Bolivian Amazon (Paneque-Gálvez et al. 2013; Guèze et al. 2015). The Tsimane' number approximately 14,000 people living in about 125 villages, mostly concentrated along riverbanks and logging roads (Reyes-García et al. 2014). Since 1999, the Tsimane' lifestyle and knowledge have been profusely documented by a team of researchers interested in cultural change (Godoy et al. 2009; Leonard et al. 2015; Reyes-García and Huanca 2015; Díaz-Reviriego et al. 2016). This research has highlighted the great deal of ILK across different domains maintained by the Tsimane' (e.g., Reyes-García et al. 2003; Fernández-Llamazares et al. 2015), but also the rapid erosion of Tsimane' knowledge (Reyes-García et al. 2013, 2014) largely associated to the lack of intergenerational knowledge transmission (Fernández-Llamazares et al. 2015, 2016).

In this context, over the last fifteen years, a partnership of researchers working with the Tsimane' and in coordination with Tsimane' local institutions (i.e., the *Gran Consejo Tsimane',* the legitimate political organization of the Tsimane') and community leaders have developed a

number of *in situ* educational activities aiming at revitalizing Tsimane' knowledge and raising awareness of the multiple values of ILK. This set of initiatives has used a large range of methods and tools including: 1) printed, oral, or visual educational materials on Tsimane' culture and knowledge; 2) exhibitions for the general public featuring Tsimane' culture; and 3) workshops oriented to empower Tsimane' and to raise awareness of the value of Tsimane' knowledge systems.

The partnership of researchers working in the area and Tsimane' local institutions has produced many printed, visual, and oral material featuring different aspects of Tsimane' culture. Indeed, this has been a very popular way to return research results to local communities. For example, soon after the team started research in the area, and following a request expressed by some Tsimane' and the *Gran Consejo Tsimane'*, researchers secured funding to elaborate a book on Tsimane' ethnobotany. The idea was discussed in meetings with a Tsimane' community and the execution counted with the participation of all the community. This initiative resulted in a book led by a Tsimane' researcher (Nate et al. 2001), which was distributed in all Tsimane' schools as an educational material. Other printed materials that have been produced as a result of this partnership include posters on uses of plants, edible fruits, and seasonal calendars. In 2003, the partnership also produced a video on Tsimane' fire making which continues to be extremely popular in local communities. In 2013, this partnership led the recording of a local radio program in Tsimane' language aimed at revitalizing different aspects of Tsimane' culture, including ILK. The program received good feedback, with some people even claiming that it had helped to "rescue from oblivion" several songs that had not been heard for years in the area (Reyes-García and Fernández-Llamazares 2019).

This partnership has also conducted exhibitions of Tsimane' culture for the wider public. An exhibition composed of the main Tsimane' handicrafts and photograph posters showing the Tsimane' way of life was set up during the annual town festival in 2001 and 2002. Handicrafts and photographs were collected in several communities in the Tsimane' territory and the material was organized around Tsimane' productive activities (e.g., hunting and fishing, maize and cassava beer making) and cultural expressions (e.g., bags and carrying tools, plant weavings, musical instruments). After the festival, the exhibition was taken to the Beni Biological Reserve Headquarters in San Borja, the main town in the Tsimane' area, and later moved to the National Ethnography and Folklore Museum in La Paz (i.e. the capital city of Bolivia). While the idea of the exhibition emerged from the researchers, all its contents were collaboratively convened with the local communities through Free, Prior and Informed Consent, and an extensive consultation strategy with village leaders and elders. The exhibition served a purpose in publicly celebrating the biocultural heritage of the Tsimane', while also empowering them on the value of their own cultural knowledge.

Finally, over the years, the partnership has also fostered a number of workshops oriented to empower Tsimane' and raise awareness of the value of Tsimane' culture. For example, within the framework of a project oriented to analyze whether enhancing cultural empowerment contributes to the adoption of new farm technologies, between February and December 2001, the team conducted different types of workshops. These covered topics on (a) agriculture (the introduction of a leguminous cover crop that fitted with the traditional system of farming), (b) cultural empowerment (i.e., self-esteem; territorial rights), (c) marketing skills (aiming to improve the benefit that Tsimane' obtained in their economic exchanges -- sale and barter -- with traders), and (d) health (i.e., diarrhea prevention and treatment). Insights from the workshops were included in a short booklet with drawings and pictures with short commentaries in both Spanish and Tsimane' that was also widely distributed among Tsimane' communities.

Case 4. Policy/legislation: the recognition of Rio Negro traditional cultivation systems as cultural heritage

Our fourth case study refers to the process that led to the recognition of the Rio Negro traditional cultivation systems as 'intangible cultural heritage' by the Brazilian Government, a policy/legislation initiative to protect these systems and the ILK associated to them. The Negro River is one of the major tributaries of the Amazon River, and the middle and upper Rio Negro (the focus of this case study) are situated in the northwestern Amazon region, stretching from the municipality of Barcelos until the triple border between Brazil, Colombia and Venezuela. Due to its relative geographical isolation and limited accessibility, the region is still largely covered by native vegetation, composed of a mosaic of *terra firme* forests, flooded forests, as well as savannas and grasslands growing on white sand (Anderson 1981; Pires and Prance 1985; Goulding et al. 2003). The middle/upper Rio Negro is also one of the most ethnically diverse regions of Amazonia, home to at least 23 ethnic groups belonging to the linguistic families Tukano, Arawak and Maku (Cabalzar and Ricardo 2006).

The traditional cultivation system practiced in the region is shifting cultivation, in which a relatively short cropping period is alternated with a longer fallow period that may be occasionally reopened for the establishment of new plots (Moran 1995; Clark and Uhl 1987). The most culturally and economically important crop is bitter manioc (*Manihot esculenta*) and the Rio Negro, where hundreds of landraces are cultivated, is recognized as an agrobiodiversity hotspot for the crop (Emperaire and Peroni 2007). Similarly to other regions in Amazonia, several other annual and perennial species are also cultivated and/or managed either during the cultivation or the fallow phase, resulting in landscape mosaics composed of cultivation fields and managed fallows enriched with useful and domesticated plants (Balée and Gely 1989; Junqueira et al. 2010). Beyond their notable inter- and intra-specific biological diversity, the traditional cultivation systems of the Rio Negro comprise also the traditional knowledge and practices associated with planting, breeding and management techniques, tools and utensils used in cultivation and

processing, food products and recipes, and the social networks through which plants and associated knowledge are shared (Fig. 1). However, just as in many other areas in Amazonia, in the middle and upper Rio Negro, the traditional cultivation systems and associated ILK are changing. Although the region is still little affected by large-scale deforestation, other changes such as rural-urban migration, increased access to the market economy, changing diets and lack of intergenerational ILK transmission are reshaping local livelihoods and cultivation systems, often leading to the loss of ILK and genetic resources (Eloy and Lasmar 2011; Ricardo and Ricardo 2011; Emperaire and Eloy 2015).

The process that led to the recognition of Rio Negro agricultural systems as cultural heritage resulted from a dynamic interaction between local Indigenous associations, NGOs and research and a governmental institution (Emperaire et al. 2010). Since 1998, interdisciplinary research projects aiming to understand the process through which agrobiodiversity and ILK are constructed were developed in the region through a partnership between the Institut de Recherche pour le Développement (IRD), Instituto Socioambiental (ISA) and University of Campinas (UNICAMP) (Emperaire et al. 2010; Ricardo and Ricardo 2011). Since the start, the projects established close partnerships with local Indigenous organizations (particularly with the Association of Indigenous Communities of the Middle Negro River –ACIRMN-, the Federation of Indigenous Organizations of the Negro River - FOIRN – and the Indigenous Association of Barcelos ASIBA), which evolved into a strong regional institutional network.

As a result of this articulation, and in the face of the growing threats to traditional cultivation systems, the need to develop strategies to guarantee the protection of these systems and associated ILK emerged. In 2007, the ACIRMN submitted a request to the Brazilian Institute for the Historic and Architectonic Heritage (IPHAN) for the recognition of the Rio Negro traditional cultivation system as 'immaterial cultural heritage'. This legal instrument, created by the Brazilian government in 2000, was designed to provide legal and policy support to the conservation of national cultural heritage, defined as the 'doings, expressions, practices and their products, that refer to the history, memory and identity of a given people' (Decree 3551/2000; IPHAN 2000). Once this process started, IPHAN coordinated a series of meetings and participatory research activities aiming to document the knowledge, the agrobiodiversity, and the practices associated with the regional cultivation systems which, together with the outcomes of the previous research projects, formed the basis for a dossier that finally resulted on the official recognition of the Rio Negro cultivation systems as cultural heritage in 2010 (Emperaire et al. 2010).

Beyond the increased visibility brought to the Rio Negro cultivation systems by their recognition as cultural heritage, this status also has practical implications. As part of the safeguarding strategy, the institutions involved in the process developed a detailed plan containing a series of initiatives to safeguard this heritage, and established a permanent committee to monitor and evaluate the status of the system and the effectiveness of the safeguarding actions. The planned

actions included, for example, activities to foster intergenerational knowledge exchange, the participatory definition of future research priorities, and the promotion of local markets with products coming from traditional cultivation systems (Emperaire et al. 2010).

Case 5. Research/documentation: The Biozulua database

The Biozulua database is considered as an example of a documentation initiative. This initiative took place simultaneously in 24 communities of the Venezuelan Amazonas State, an area with high biocultural diversity hosting about 75% of the country's plant species and most of the country's Indigenous ethnic groups (Zent and Zent 2007). Despite the socio-economic and demographic changes these Indigenous populations have been experiencing in the past decades, some of the Indigenous populations still live in small communities with subsistence livelihoods based on shifting cultivation and foraging, activities that are rooted in the community's traditional knowledge. For instance, the Piaroa people of the Middle-Orinoco grow hundreds of landraces of manioc and the Hoti people of the Sierra Maigualida know at least 220 wild edible species and 180 medicinal plants (Zent and Zent 2004, 2007; Heckler and Zent 2008). However, as in other case studies presented above, the knowledge system in the area is threatened by a continuous erosion process derived from the integration into the market economy and the adoption of the Western medicinal system, the lack of intergenerational knowledge transmission, and the exclusion of the communities from the biodiversity management plans (Zent and Zent 2007). Moreover, as in many cases around the world, the unrightfully private appropriation of this knowledge by pharmaceutical and agri-food corporations is also threatening its conservation (Vivas Eugui and Ruiz Muller 2001; Poorna et al. 2014).

In response to these threats, in the past decades international mandates to which Venezuela subscribed have been pushing for further integrating ILK-holders in environmental conservation programs and for protecting this knowledge and encouraging the sharing of any benefits associated to it (Popova 2014; Sanghera et al. 2016). In this context, in 1998 some researchers from the Venezuela Sciences Academy, who were also part of the FUDECI scientific NGO, started a project called Biozulua (Royero 2001). The project aimed at collecting knowledge in Indigenous communities via ethnobiological prospections (i.e., interviews and field visits) and storing this knowledge in a database. According to the project leaders' statements, this database would follow international mandates and protect the ILK by 1) demonstrating its existence and 2) claiming benefit redistribution to those multinational corporations interested in using it (Royero 2001; Vivas Eugui and Ruiz Muller 2001; Johnson 2002). The database collected multimedia files including descriptions of plants and plant uses, plant photos, and videos of traditional practices related to the use of those plants. These files were searchable through a specific software interface designed for the project that facilitated searching for specific knowledge in the database (Royero 2001). Plant material was also collected and stored in national herbariums and genebanks. In total the database

hosted about 20,000 data entries and the project managed to collect approximately 3,000 biological specimens (Zent and Zent 2007).

Despite their key role in providing the content of the database and several mechanisms put in place to protect this content from potential misappropriation, the low participation of the IPLCs has been criticized by several authors (Zent and Zent 2007; Ochoa 2009). Criticisms include (1) the lack of participation of community members or representatives in initial stages of the project, (2) the fact that the software and structure of the database were under private property, (3) the lack of access to the database from the communities, and (4) the lack of a transparent and inclusive process to obtain Free, Prior and Informed Consent. Moreover, concerns about this projects' capacity to keep confidentiality and to empower the communities have arisen throughout the years (Long 2011; Mattie 2007). Even though the communities have property rights over the individual contents of the database, the lack of a proper regulatory framework for property rights over data compilations could imply a lack of effective property rights protection. Furthermore, the fact that the researchers act as intermediaries between interested corporations and the communities has risen alarms about the real ability of indigenous peoples to control this information. Finally, there is an overarching concern related to the de-contextualization of this knowledge, related also to the controversy over using ILK for the scientific and industrial development of the global north (Mattie 2007).

Discussion

The five ILK conservation initiatives described in this chapter illustrate some different approaches envisioned to maintain, revitalize, protect and/or document ILK across the Amazon, one of the most important biocultural hotspots in the planet. Although we do not intend to provide an exhaustive account of the breadth and depth of all initiatives promoting participatory biocultural conservation in this region, the examples we presented indeed illustrate that there are many strategies that can help foster IPLC engagement in ILK conservation. In the following paragraphs, we will critically reflect on some factors enabling participation in these cases and draw some lessons from them.

First, the main finding that arises from this work is that different types of ILK conservation initiatives can be participatory, at least to certain degree. In other words, although the scholarly literature has shown that there is a participation gap in most ILK conservation initiatives (e.g., Benyei et al. 2019), our case studies illustrate that this participation gap can be filled. Given that ILK conservation initiatives initiated, led and/or managed by IPLCs are potentially more legitimate than externally-controlled ones (Fernández-Llamazares and Cabeza 2018), devising mechanisms to ensure IPLC participation in all phases of the ILK conservation initiatives is often a critical factor determining their success. IPLC participation requires the establishment of multi-stakeholder collaborative partnerships, which in turn requires horizontal decision-making

processes that enable all voices, and in particular those of IPLCs, to be heard. In this regard, some of the initiatives described in this chapter started by (1) identifying common interests between IPLCs and other stakeholders (e.g., researchers, NGOs); (2) negotiating co-research agreements; and/or (3) outlining a mutually agreed-upon working agenda (Pert et al. 2015; Fernández-Llamazares and Cabeza 2018). In general, ILK conservation approaches are most successful when articulated from the bottom-up and/or with a strong participatory component (Packer et al. 2007; Singh et al. 2010; Gavin et al. 2015; Ryan 2015).

However, as shown in this chapter, even in those cases where the initial goals of the initiatives do not directly emerge from the local communities themselves, a number of tools and methods can be proposed to promote different levels of collaboration, participation, dialogue, co-management and/or power sharing around these initiatives. Bringing together IPLCs, NGOs, researchers, practitioners and governmental authorities through inclusive strategies can help to reduce the power asymmetries that have often hampered IPLC participation in ILK conservation initiatives. Yet, inclusivity requires paving a process that is considered legitimate, transparent, and equitable by the IPLCs involved and whose knowledge systems are at the core of these initiatives. To move from rhetoric to practice, several frameworks have been developed in recent years to lever power across different knowledge systems and levels of governance, such as the Multiple Evidence Based approach or the Whakatane mechanism, among many others (Tengö et al. 2015; Gavin et al. 2018). Overall, these noble goals can be best served by constant efforts to recognize and value the agency of IPLCs in these processes, challenging those approaches in which IPLCs were merely viewed as recipients or passive subjects of external initiatives. Within the Convention on Biological Diversity, there are several Indigenous codes of ethical conduct to ensure full involvement of IPLCs while respecting their cultural and intellectual heritage (e.g., Akwe: Kon Guidelines and The Tkarihwaié:ri Code of Ethical Conduct; CBD 2004; 2011). Initiatives bridging across levels of governance and with horizontal decision-making structures, such as the COICA example discussed in this chapter, are essential to better engage IPLCs in ILK conservation for reasons of social justice and more inclusive governance.

Second, our five case studies suggest that participation in ILK conservation initiatives is likely to be best achieved by *in situ* approaches than externally-based ones. In this regard, the examples shown in this analysis indicate that *in situ* initiatives guided by IPLC epistemologies, needs and views have more potential to be inclusive (Singh et al. 2010; McCarter et al. 2014; Tang and Gavin 2016; Sterling et al. 2017b). Our review aligns with a growing body of literature arguing that ILK conservation should not overlook the local social-ecological context in which ILK is generated, shared and transmitted (Agrawal 2002; Gómez-Baggethun and Reyes-García 2013; McCarter et al. 2014). While policy and legislation support to conserve ILK is needed at multiple scales (Tang and Gavin 2006), *in situ* approaches are crucial in leveraging policy and legislation initiatives that are suited to local contexts and demands, as exemplified in the Rio Negro case study. The documentation of the five cases examined generally emphasizes the importance of

respecting the customary mechanisms of community control, ownership and transmission of ILK, and explicitly recognizing IPLC rights and institutions, as key to the success of these initiatives.

Finally, a main lesson from all the cases reviewed is that an effective IPLC participation strategy does not happen overnight and it often requires planning it with a long-term perspective. The literature has often highlighted that punctual one-off ILK conservation initiatives are likely to be less participatory than collaborative projects developed out of sustained long-term relationships and social capital built over the years (e.g., Mulrennan et al. 2012; Sterling et al. 2017a). This is so because engaging IPLC leadership and establishing partnerships with the legitimate IPLC governance structures requires building and nurturing relationships of mutual trust over time, as shown in the Tsimane' example. Similarly, in Rio Negro, policy changes emerged as a response to the demands of IPLCs, constructed with their strong involvement and catalyzed by a long-term collaboration with research institutions and NGOs. However, long-term access to financial and technical support is often needed to build this social capital, as observed in the weaving knowledge program among the Kaiabi. Capacity-building and sustained funding support are often critical conditions to ensure IPLC engagement in these projects over long periods of time.

Conclusions

The recent changes in the Amazon's political climate suggest that the role of IPLCs in conserving the world's largest standing rainforest will be more critical than ever (Begotti and Peres, 2019). As a result, there is an urgent need to devise and strengthen mechanisms not only to conserve and revitalize ILK across the whole Amazon Basin, but also to actively promote IPLC engagement and support their collective action in these endeavors. Our review illustrates several examples of ILK conservation initiatives offering substantial opportunities for meaningful IPLC participation over the long term. Overall, the examples selected suggest that the development of robust and inclusive decision-making processes is essential to optimize IPLC participation in ILK conservation, thereby increasing the legitimacy of these initiatives. We believe that the lessons derived from this chapter can inspire new avenues for leading the participatory turn in biocultural conservation. Continuous political and financial support for ensuring IPLC participation in ILK conservation initiatives is therefore crucial to safeguard biocultural diversity in the Amazon and elsewhere.

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Fig. 1 The Rio Negro traditional cultivation systems. Left: one of the hundreds of landraces of manioc (*Manihot esculenta*), the most important and diverse crop cultivated in the region. Right, above: a woman roasting manioc flour, one of the several products derived from the processing of the crop. Right, below: an example of a diversified cultivation field, where annual and perennial crops are cultivated in shifting cultivation systems.