Land Use Policy 77 (2018) 652–660

Contents lists available at ScienceDirect

Land Use Policy

journal homepage: www.elsevier.com/locate/landusepol

Designing Indigenous Lands in Amazonia: Securing indigenous rights and wildlife conservation through hunting management

Pedro de Araujo Lima Constantino[a,*], Maíra Benchimol[b], André Pinassi Antunes[c,d]

[a] REDEFAUNA – Rede de pesquisa em diversidade, conservação e uso da fauna da Amazônia, SQN 416, Bloco G, 203, Brasília, DF, 70.879-070, Brazil
[b] Universidade Estadual de Santa Cruz, PPG Ecologia e Conservação da Biodiversidade, Laboratório de Ecologia Aplicada à Conservação, Rodovia Jorge Amado km 16, 45662-900 Ilhéus, BA, Brazil
[c] REDEFAUNA – Rede de pesquisa em diversidade, conservação e uso da fauna da Amazônia, Estrada do Bexiga, 2584 - Bairro Fonte Boa, Tefé, AM, 69553-225, Brazil
[d] Instituto Nacional de Pesquisas da Amazônia, Av. André Araújo 2936, Petrópolis, 69067-375 Manaus, AM, Brazil

ARTICLE INFO

Keywords:
Indigenous territorial rights
Biodiversity conservation
Brazil and Peru frontier
Indigenous land demarcation
Limit delimitation
Source-sink dynamics

ABSTRACT

In Amazonia, Indigenous Lands (ILs), created to guarantee both indigenous rights and the conservation of natural resources, are a major legal mechanism to ensure the ancestral and contemporary relationships of indigenous peoples to their territory. Additionally, these areas have been one of the most effective barriers to the large-scale agriculture and cattle ranching frontiers, strongly contributing to the conservation of Amazonia. Although several indigenous peoples have had their lands recognized by the Brazilian and Peruvian national governments, many demarcated lands are not able to ensure indigenous rights; in addition, there are still 951 claims for land demarcation or revision in these countries. In the context of intensive pressure to make the process of IL recognition essentially political, we propose a scientifically supported model based on source-sink hunting dynamics to improve the identification of the minimum size and shape of ILs required to guarantee indigenous rights. We used criteria based on hunting dynamics to test whether the current limits of the total IL of an indigenous people, the Huni Kuin, are able to ensure their constitutional rights and the local conservation of natural resources. We showed that to ensure sustainable hunting, the Huni Kuin ILs should be large enough to encompass each village's hunting territory of 78.5 km^2 surrounded by an undisturbed area of the same size, totaling 157 km^2 per village. However, their ILs are currently too small to maintain sustainable hunting if the traditional social organization of several small villages distributed along rivers is maintained, so they fail to achieve the IL goals. We discuss three hypothetical alternatives for either maintaining or reviewing current Huni Kuin ILs; however, these alternatives are unlikely to be applicable for the Huni Kuin because they either are against the current political trends or violate indigenous rights. We thus suggest that future IL delimitation studies should consider current spatial hunting patterns in order to improve the delimitation and territorial management of IL in Amazonia, by identifying the ideal shape and size of hunting territories and applying a source-sink model likely to ensure sustainable hunting activities in the long term.

1. Introduction

Disputes over land and natural resource access have been a crucial issue for indigenous people in South America for centuries, and a central aspect of this issue is the controversy related to the total land required for indigenous peoples and how the limits of Indigenous Lands (ILs) are determined. The legislation on indigenous rights has evolved, especially since the 1980 s, with the democratization process, the rewriting of national constitutions and the ratification of the ILO Convention 169, which declares that the exercise of ways of life and the maintenance of identities, norms, practices, languages and religions are among the rights of tribal and indigenous groups (Carvalho, 2000; Chirif and Garcia Hierro, 2007; RAISG, 2016; Acuña, 2015). Specifically, Brazil and Peru are two of the three Amazonian countries with the largest extension covered by ILs, containing more than 75% of all IL in the region (RAISG, 2016), ILs are titled to guarantee indigenous rights, including their permanence on traditionally occupied lands, the maintenance of traditional customs and the provision of natural resources for current and future generations (Brazil 1988, Peru, 1978). Pursuing the conservation of biodiversity in ILs is a means of ensuring those indigenous rights because it reflects the indigenous strategies of territorial occupation and natural resource use (RAISG, 2016).

ILs are among the most effective type of protected area for conserving natural resources (Note et al., 2013; Asner et al., 2017; Schleicher

* Corresponding author.
E-mail addresses: plconstantino@gmail.com (P.d.A.L. Constantino), mairabs02@gmail.com (M. Benchimol), aapardalis@gmail.com (A.P. Antunes).

https://doi.org/10.1016/j.landusepol.2018.06.016
Received 13 December 2017; Received in revised form 5 March 2018; Accepted 14 June 2018

et al., 2017), contributing enormously to the prevention of fire and deforestation, as they function as effective barriers to large-scale agriculture and cattle ranching expansion in Amazonia (Nepstad et al., 2006). However, their capacity to promote the persistence of the original biota and support landscape-scale dynamics also depends on their design and on the governance of traditional people (Peres, 2005; Nepstad et al., 2006; Note et al., 2013). Both the size and shape of ILs are crucial landscape features to guarantee the rights of indigenous people and promote conservation (Stocks, 2005; Pfaff et al., 2015). Apart from the different administrative procedures between Peru and Brazil, the process of delimiting the boundaries, sizes and shapes of ILs in both countries is based on anthropological, socioeconomic and environmental assessments that consider, among other aspects, the ancient and contemporary area used by indigenous people for productive activities (Peru, 1979; Tempesta et al., 2013).

Despite the great progress on the instruments and mechanisms for IL identification that led to 588 ILs being titled in Brazil and 1353 being titled in Peru, only 20 and three ILs have been demarcated in the Brazilian Amazonia (ISA, 2016) and the Peruvian Amazonia (IBC, 2016), respectively, since 2011. However, the current claims for land titling or limit revision number 152 in Brazil (ISA, 2016) and 799 in Peru (IBC, 2016), which indicates that the ILs in both countries do not correspond to the indigenous territories (Surrallés, 2009). South American indigenous peoples, in general, view their territory a "dynamic and versatile area" that "belongs to a social sphere" (Garcia Hierro and Surrallés, 2005), which is constructed as a consequence of the historical indigenous relation to the space (Garcia Hierro, 2005; Read et al., 2010). For western societies, however, the indigenous peoples' views on territory do not correspond to the ordinary capitalist rational of property, making it extremely difficult to incorporate the indigenous concept into the official frame of land tenure and civil rights (Garcia Hierro, 2005). Thus, until national states recognize the rights of self-determination, in which indigenous peoples determine their own territories, as expressed in the UN Declaration on the Rights of Indigenous People, ILs are going to be titled according to the national legislations (Chirif and Garcia Hierro, 2007).

Nevertheless, there is a recent trend that threatens indigenous territorial rights in both countries (Tauli-Corpuz, 2016), with agribusiness representatives pressuring the Brazilian legislation (Câmara dos Deputados, 2018) to exclude technical fundamentals of the anthropological studies required for indigenous land demarcation (Ricardo et al., 2015), and several legislative and administrative measures have recently been approved in Peru that affect the rights of indigenous people to land and the use of natural resources (AIDESEP, 2015; RAISG, 2016). A central aspect of the dispute resides in the controversy on the total land required for indigenous peoples and how the land limits are determined. One perspective, which is advocated by agribusiness defenders, puts forth the concept that the criteria used for land identification are not objective and result in "too much land for few indigenous people". Others present the idea that the titling processes are subject to political opportunities and interests, resulting in fixed limits failing to accurately provide indigenous territorial requirements (Davis and Wali, 1994; Carvalho, 2000; Araujo et al., 2006; Chirif and Garcia Hierro, 2007; Rivero, 2010; Acuña, 2015). Therefore, we need better information on how to adequately design ILs to approximately reflect the understanding of indigenous territory and provide subsistence requirements for the indigenous peoples inhabiting Amazonian areas.

Hunting is one of the most widespread subsistence extractive activities of indigenous and traditional people in Amazonia; thus, it requires the largest area (Fa et al., 2002). Moreover, hunting and wild meat have significant spiritual, cultural and social importance for many people in Amazonia (Fausto, 2007). Therefore, an IL large enough to guarantee the presence of wildlife and sustainable subsistence hunting is likely to maintain traditional, cultural and social features and enable the sustainable use of other natural resources. Ensuring sustainable hunting inside ILs might function as an umbrella for guaranteeing indigenous rights and conservation, in addition to providing many other ecosystem services.

The sustainability of subsistence hunting is highly dependent on the spatial dynamics of hunters and prey (Salas and Kim, 2002; Levi et al., 2009; Sirén et al., 2013; Weinbaum et al., 2013; Constantino, 2015). For instance, ecological models and empirical evidence suggest that source-sink dynamics of wildlife populations are relevant to hunting sustainability in Amazonia, where animals from a population in an undisturbed source area (i.e., 'no-take' areas) disperse into the hunted sink area, rebuilding depleted populations (Novaro et al., 2000; Salas and Kim, 2002; Naranjo and Bodmer, 2007; Levi et al., 2009; Hansen, 2011; Shepard et al., 2011; Antunes et al., 2016). In such cases, sustainability is more likely if a small hunted area is surrounded by an adequate amount of undisturbed and non-harvestable area, which would enhance the dispersal chances into the whole hunted area through the long perimeter of contact between the hunted and undisturbed areas (Salas and Kim, 2002).

Although policymakers recognize the importance of hunting for indigenous people, and participatory zoning has been encouraged by recent Brazilian policies (Brasil, 2012), this activity is still poorly considered in IL delimitation and zoning. For instance, the current guidelines for IL delimitation in Brazil and Peru require the identification of subsistence activities, but they fail to identify geographical patterns of hunting in Brazil (Tempesta et al., 2013), whereas the uncertainty related to the jurisdiction in charge of titling ILs in Peru has led to the adoption of different methodologies that often disregard the areas where indigenous people perform traditional activities such as hunting and collecting (Peru, 2014; Vega and Cerrón, 2014; AIDESEP, 2015; RAISG, 2016). Meanwhile, the IL zoning by indigenous people frequently considers the location of future villages and establishes restricted areas, where hunting is limited or banned. Most indigenous people understand that faunal species reproduce in such zones and repopulate the adjacent zones under hunting regimes (e.g., Constantino et al., 2008; Zapata-Rios et al., 2009). Nevertheless, these restricted areas are often too small to fulfill this ecological function and are delimited too far from the villages or outside ILs, where indigenous people lack governance (Gilmore and Young, 2012).

Here, we intend to contribute to the definition of IL boundaries and demarcation in Amazonian areas by providing guidelines for indigenous territorial planning and the management of natural resources. We propose the use of a scientifically supported criterion based on source-sink hunting dynamics and test it using an entire indigenous peoples inhabiting both Brazil and Peru, the Huni Kuin, evaluating whether the size and shape of their ILs are able to ensure indigenous rights. We then suggest a simple framework for improving the current instruments of IL delimitation and management for the Huni Kuin that can also be applied to many other indigenous peoples in Amazonia.

2. Materials and methods

2.1. The Huni Kuin people and hunting patterns

The Huni Kuin indigenous people, also known as Kaxinawa or Cashinaua, are one of the many Panoan-speaking peoples that inhabit the upper Juruá and Purus river basins, near the border between Peru and Brazil. Historically, they have fought for their rights to access natural resources and their traditional territory since the arrival of non-indigenous people during the rubber cycle, and these efforts currently continue with the expansion of cattle ranching, logging and mining concessions, and the development infrastructure projects in the region. In Brazil, there are currently 7663 Huni Kuin inhabiting 86 villages within and outside the eleven titled ILs, demarcated from 1970 to 2000. Peru has a smaller population, with 1615 people inhabiting 22 villages in 12 ILs. All their villages are located alongside main rivers or roads. The governments of Brazil and Peru also recognize the existence of three Huni Kuin groups that have territorial rights, but the