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Forest citizens and people-centered conservation in the Brazilian Amazon

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INTRODUCTION

In this paper, we revitalize the terms forest citizenship (a socio-political process) and *forest citizen* (the status of possessing forest citizenship) as a way of seeing forest peoples as rights-holders. Schmink (2011, 2014) and Mathews and Schmink (2015), and others, have demonstrated that citizenship is a useful overarching concept for recognizing the rights of forest-dwellers in the Global South. A citizenship perspective can provoke questions such as, is a particular community conservation initiative sufficiently democratic (i.e., involving accountability and genuine participation)? How can complex socio-environmental problems be addressed in socially-inclusive ways? Are diverse peoples able to generate, refute, and modify conservation policies and projects? Is there space for protest, negotiation, and conflict resolution? These questions are profoundly important in Brazil, which re-embraced democracy in the 1980s, then developed a distinct social-environmentalism from the 1990s (de Castro 2012), and later saw a flourishing of democratic politics under Lula (2003-2011), followed by attacks on democracy under Bolsonaro (2019-2022), culminating in an attack on congress in January 2023. Brazil remains deeply socially unequal with low trust in public institutions (Pereira 2020). A broader challenge for environmental governance in Latin America is "*the lack of a democratic tradition that favors relations between state and society based on the recognition of the latter as subject of rights*" (Mora 2023:862). Mora argues that Latin American countries are characterized by a situation of differentiated citizenship, where rights tend to be realized for the wealthier classes in certain core regions. For the rest of the population, especially those from poorer and peripheral regions, including much of the Amazon rainforest, rights are often not realized on the ground. Hence, they have to struggle to access rights, in particular land and public policies, using forms of 'insurgent citizenship' (i.e., rights claims from below) (Holston 2008).

This article makes two novel contributions towards people-centered conservation in Brazil, focusing on the rights of Amazonian forest-dwellers. First, we further develop the concept of forest citizenship as a normative framework and analytical tool, defined as the claiming of rights by people who have achieved legal territorial recognition and who attempt to conserve their forests. Through this process some of Amazonia's forest-proximate people have already become forest citizens. Our conceptualization of forest citizenship builds on Brazilian *socioambientalismo* (social-environmentalism), *florestania* (a former political project in Acre state), Latin American scholarship on ecological citizenship, and Eurocentric political philosophy. For Wittman (2010:282), ecological citizenship emerges from Latin American concerns with social exclusion and inequality, as "*the discursive and active practice of relating the daily concerns of individual or family survival to that of the surrounding*

community and environmental space." We believe that forest citizenship in Amazonia already exists, having emerged through the historical struggles of social movements, and has helped guarantee (some) forest-dwellers' rights and democratize conservation in Brazil. Our second contribution is quantifying the number of forest citizens residing in different territorial categories in the Brazilian Amazon. This involves identifying and examining which territorial categories meet the criteria as foundational for forest citizenship. We then estimate the resident population of forest citizens in these territories. Finally, we draw on existing literature and unpublished documents to examine the diverse territories' creation processes across several decades, and identify major environmental threats and on-going rights struggles.

Contribution 1: Conceptualizing forest citizenship

In democracies, citizenship is supposed to guarantee people's rights, traditionally categorized into social, political, and civil rights. Citizenship refers both to someone's status as a rights-bearing member of a political community, and their set of relationships with state institutions (Staeheli 2010). However, people's rights are not always recognized (i.e., acknowledged and upheld) in these state-citizenship relationships. In Brazil, and elsewhere, traditional forest-dwellers have often experienced rights-deprivation and differentiated citizenship (Mathews and Schmink 2015), which Holston (2008:4) defines as a "*resilient regime of legalized privileges and legitimated inequalities*", based on differences in property, race, gender, and occupation. The social and historical backdrop is Amazonia's constitution by capital primarily as a space of expropriation (plunder of work, nature, and care) as opposed to exploitation (extraction of surplus value from waged labor) (Fraser 2022). Ongoing deforestation and expropriation of smallholders is interpreted as a deliberate form of violence, legitimized by former President Bolsonaro and others, in order to improve productivity via private land-appropriation and capital investment. The Brazilian state's history of selective non-compliance with law enforcement and justice in Amazonia (Barca & Milanez 2021) demonstrates why ecological citizenship is relevant to achieving long-term people-centered conservation. In Latin America, ecological citizenship is about promoting instruments to ensure participation, information access, and social control over natural resources, in relation to environmental rights and obligations (Gudynas 2009). Environmental pressure from Amazonian communities has helped shape Brazilian statecraft and environmental politics; referred to by Hecht (2011) as "nation-building from below".

Sustainable-use reserves exemplify *socioambientalismo*; societal attempts to jointly meet social and environmental goals under Brazil's 1988 democratic constitution (de Castro

2012). Such legally-protected, inhabited territories help conserve forests and biodiversity in the Brazilian Amazon (Herrera et al. 2019; Gonçalves-Souza et al. 2021) and represent federal and state-government responses to the protracted, politicized rights-struggles of forest-dwellers (Fraser 2018). *Socioambientalismo* emerged because forest-dwellers incorporated environmentalist discourse into their social justice agendas, including rubber-tappers resisting violent dispossession by cattle-ranchers (Hochstetler and Keck 2007) and river-dwellers resisting external threats such as commercial fishing by outsiders (Aleixo & ATAMP 2011). Indigenous and traditional peoples asserted their forest cultures and identities in order to gain territorial rights under constitutional Article 1968, transforming (in legal terms) from 'squatters' into 'citizens' (Hecht 2011). President Lula's first two terms between 2003 and 2010 emphasized social inclusion (Pereira 2020) and territorial expansion, including 29 new RESEX sustainable use reserves covering over 69,000 km ^{2} (Gomes et al. 2018). The variety of territorial categories reflects Brazilian cultural diversity, granting distinct social groups with different territorial rights under the jurisdiction of different government agencies (Vega et al. 2022). De Castro (2012) reasons that territory-based environmental governance in Brazil led environmental (or ecological) citizenship to emerge within Indigenous lands, sustainable use reserves, agrarian reform settlements, and Quilombola territories.

Our notion of forest citizenship builds on *florestania*, a former political project in Acre state. This neologism was coined from 'forest' and 'citizenship' by Acre's 'Forest Government' (a series of Governors and their administrations, from 1999 to 2018), to describe its ethical vision of development based on sustainable forest livelihoods. *Florestania* emerged from rubber tapper movements in the 1970s and 80s, and focused on socially-inclusive, market-oriented strategies for forest resource extraction, participation, and citizenship (Schmink et al. 2014). This differs from our territorial emphasis, albeit our conceptualization echoes *florestania's "intention of extending citizenship to previously excluded forest residents*" (Schmink 2011). *Florestania* was explicitly political, fostering a "*political belonging to the forest*" and a "*place-based collectivity*" (Latta & Wittman 2010), drawing on Acriano history and cultural identity (Schmink 2011). Yet *florestania* was dependent on a political cadre, whose power has waned and whose messaging has refocused on 'sustainable agro' (Pontes 2022). Moreover, despite Schmimk's (2011) insistence that *florestania* addressed the goals, rights, and obligations for forest-based development in Acre, the concept was never fully theorized. Finally, whereas *florestania* envisions forest-dwellers as 'partners' (Schmink 2011), we consider forest-dwellers as potential sources of resistance, opposition, and critique of misgovernance.

Forest citizenship can be seen as a form of Latin American ecological citizenship (Latta & Wittman 2012), where major environmental challenges are "*defined by the ecological dimensions of social, cultural and economic marginalization and injustice…the politics of nature are closely interwoven with struggles for recognition and inclusion…*" (Latta and Wittman 2010). Grassroots movements in Peru have exercised ecological citizenship to demand greater inclusion, access to information, and accountability for elites in decision-making about natural resource use and misuse (Pieck 2013). In the Global North, ecological citizenship's central focus has been 'greening' democracy through people accepting their environmental duties and responsibilities (Dobson 2003) and acting on them in their daily lives through practices of citizenship (Wolf et al. 2009). Moreover, the northern notion of ecological citizenship focuses on individual agency (ecological citizens becoming synonymous with sustainable consumers; MacGregor 2014) and largely ignores ways in which someone's ability to act is constrained by social, economic, cultural, and institutional contextual factors (Saíz 2005). Nonetheless, for Amazonians living in legally-recognized forest territories, rights are interconnected with environmental responsibilities (de Castro 2012).

Forest citizenship is, then, the claiming of rights by people who have achieved legal territorial recognition and who attempt to conserve their forests. This particular form of ecological citizenship is based on the 'right to have rights': forest-dwellers have to, first, collectively struggle for territorial recognition in order to, second, be able to claim diverse rights. Inspired by Lund and Eilenberg (2017), we apply Somers' (2008) two-step conceptualization of citizenship – drawing on Arendt (1949/1979) – by specifying: (i) demands that individuals and groups of Amazonian forest-dwellers are recognised by different state and/or multilateral institutions and included within Brazil's political community, in order that they can claim rights, and (ii) the claiming of bundles of rights enshrined in the 1988 constitution through everyday practices of citizenship.

Territorial recognition is necessary to achieve forest citizenship, given the link between control over land and the exercise of citizenship rights in Brazil (Wittman 2010). Nonetheless, forest citizenship becomes tangible only if people who strive to become forest citizens are then able to successfully claim rights from state and non-state institutions through everyday practices-of-citizenship. De Castro (2012) emphasizes community involvement in territorial design and implementation, including diverse institutional collaborations and conflicts, and we therefore propose that forest citizenship is restricted to territories created through community mobilization and, later, having participatory governance. Beyond claiming their basic rights and making their voices heard in

conservation projects, the inhabitants of these territories must collectively fight for territorial survival, resisting land-grabbing, periods of political indifference, and violence (Barca & Milanez 2019). Speaking to Chigudu's (2019) analysis of citizenship and cholera in Zimbabwe, forest citizenship is meaningful only if it is *substantive*, going beyond political rights and social recognition to include improved access to high-quality public services. We contend that forest citizens claim rights through grassroots movements *and* through participatory governance within existing state institutions (Pickering et al. 2020).

Contribution 2: Quantifying forest citizens in the Brazilian Amazon

We estimate the current forest citizen population, defined as the permanent residents of four territorial categories in the Brazilian Amazon. We quantify and map the number and proportion of rural Amazonian people living in forest citizen territories to develop a measure of forest citizen intensity. Our insights about the spatial distribution of forest citizens may be of practical utility to communities, researchers, and decision-makers.

METHODS

Contribution 2a) Identify and examine territorial categories meeting criteria as foundational for forest citizenship

We identified legally-recognized state and federal territorial categories in the Brazilian Amazon which fulfilled two criteria: 1) being created through bottom-up mobilization and written manifestation of community territorial demands, and later, 2) having some level of participatory governance (i.e., during implementation). This analysis was based on scrutinizing management plans and other policy documents in Amazonas State (the site of most of our prior and on-going fieldwork); extensive Amazonian fieldwork experience of the authors; published literature; specific encounters discussing forest citizenship in theory and practice since April 2022 (Supporting Information); and additional literature. These sources also informed our conceptualization of forest citizenship. We excluded all categories of strictly protected areas, and types of sustainable-use territories where we evaluated that people are merely tolerated (rather than acknowledging dignity, worth, and identities) by state institutions (see Brown 2006).

Our analysis of forest citizen territories focuses on four categories: 1) Indigenous Lands (IL); 2) Sustainable Use Reserves (SUR) including Extractivist Reserves (RESEX) and Sustainable Development Reserves (RDS), 3) environmentally-differentiated agrarian reform

settlements (including Agro-Extractivist Settlement Projects (PAE), Forestry Settlement Projects (PAF), Sustainable Development Projects (PDS), hereafter collectively *Ecological Settlement Projects* [ESP]), and 4) Quilombola territories (QT). We analyzed the creation and implementation processes of dozens of territories, and the justification for their creation (including higher-level strategic objectives of each category, and specific threats facing particular rural populations). We examined on-going challenges that populations within particular territories face, related to category-specific institutional processes and the rights-claim challenges common to rural Amazonians. We did this by analyzing the management plans and assessments of the *Instituto Socioambiental*, a prominent Brazilian socio-environmental NGO. Our purpose was to identify ways in which practices of citizenship are enacted in the daily lives of forest citizens.

The selected territorial categories were partly justified by *regularização fundiária,* resolving insecure land tenure whose impacts include barriers to accessing credit for farming and housing (PAE). Other higher level aims include ensuring the right to land (RESEX); ensuring sustainable forest livelihoods and autonomy (RESEX; PAE); improving forest-dwellers' quality-of-life (RESEX in Amazonas; PAE), conserving high-biodiversity areas (RDS in Amazonas), and forest management (a term for selective logging; some RDS in Amazonas). These aims are in response to diverse threats perceived by rural communities, government agencies, or non-governmental partners (Section 2cii). We excluded *Florestas* (state and federal Forests) because traditional river-dwellers are merely tolerated (Supporting Information). Despite cultural and livelihood commonalities between communities in *Floresta* and the SUR categories, *Florestas* are principally created to safeguard strategically important natural resource stocks, such as minerals and timber, or attempts to limit the spatial influence of large-scale commercial operations in Amazonia. *Floresta* management includes commercial-scale extraction such as logging, albeit with community involvement.

Contribution 2b) Assess population size and distribution of forest citizens

First we assembled shapefiles of the relevant territorial categories, including only territories that (in or before 2022) had either completed the legal creation process or were sufficiently advanced to mean communities had probable *de jure* territorial rights in the case of legal disputes (Appendix 1). We used ArcGIS (ESRI) software to intersect the boundaries of the selected territories with gridded population data to estimate their population size in 2010 and 2020 (Appendix 2). Gridded population data allow for spatial and temporal comparisons and are used in conservation and development research (e.g., Venter et al. 2016, Newton et al. 2020) and diverse fields including population-environment studies, epidemiology, disaster

risk reduction, and environmental monitoring. The suitability of particular gridded population datasets is context-dependent, based on how well settlement patterns in a country or sub-national region are captured by a product's (modeled) redistribution approach and the quality and spatial resolution of the input data (e.g., national census data or satellite imagery) (Fries et al. 2021; Hierink et al. 2022) (Supporting Information). We evaluated four alternative 1km by 1km datasets: gridded data (*Grade Estatística*) from the Brazilian Institute of Geography and Statistics (IBGE; 2010 data only); 2010 and 2020 estimates from LandScan, Gridded Population of the World (GPW) v4; and WorldPop (UN adjusted). Each product applies a different method to spatially redistributing Brazilian census data to pixel level and, with the exception of the IBGE *Grade*, predicting population change post-2010.

We validated our territorial population estimates from the gridded datasets by comparing among them, and with independent data sources, including (a) all IL (official Brazilian census data from 2010 and 2022) separated by territory; (b) all QT (official Brazilian data from 2022) aggregated by municipality, not territory-specific; (c) 25 RDS and RESEX (mostly in Amazonas) based on population counts in their Management Plans (median year of population surveys was 2011) (d) Dagnino (2013) (seven RESEX in Amazonas State, based on 2007 IBGE population estimates); (e) complete population count from RDS Mamirauá in 2011 and 2019. WorldPop data provided the most reliable estimates of forest citizen population size. Compared to other gridded datasets, WorldPop-based estimates were much closer to IL territory-specific IBGE census counts (within 0.3% in 2010, and 0.4% in 2020/22), RESEX/RDS population estimates from Management Plans (WorldPop = mean 15% lower), and Dagnino's estimates (WorldPop = mean 8% lower). For QT, however, WorldPop-based estimates were 24% below the 2022 IBGE census counts. Because WorldPop is derived from census data in which a person is only counted in their principal place of residence, our forest citizen estimates exclude seasonal residents of particular territories or those multi-sited residents that spend the majority of time elsewhere.

We calculated municipality-scale forest citizen intensity (FCI) as the proportion of the rural population constituted by the current number of permanent residents within the selected territories (Appendix 2d). The municipal level represents the sum of the pixel-level estimates within municipal boundaries.

RESULTS

Population size and and distribution of forest citizens

We estimated that 1,054,102 forest-dwellers inhabited 1,411 Amazonian territories (across our four categories) that satisfied the pre-conditions for forest citizenship, in 2020. The most populous territories were IL (404,950 residents, 38% of all forest citizens), followed by ESP (394,157 people, 37%), SUR (193,608 people, 18%), and QT (61,387, 6%). IL were home to the highest number of forest citizens in six of the nine Amazonian states whereas SUR were top-ranked in Acre, ESP in Pará, and QT in Amapá (Appendix 3). Forest citizens' territories collectively covered 1,585,738 km^2, equivalent to 31% of the Brazilian Legal Amazon. IL were most numerous (613 territories), followed by ESP (512 territories), QT (151 territories), and SUR (135 territories)(Fig. 2).

Forest citizens constituted 11.6% of the total rural population of 9,114,953 people (WorldPop estimate) in the Legal Amazon in 2020, compared to 11.0% in 2010. Pará had the most forest citizens in 2020 (458,739 or 43.5% of the total) followed by Amazonas (267,853; 25.4%), Maranhão (105,428; 10.0%), Roraima (62,903, 6.0%), Acre (50,207; 4.8%), Mato Grosso (50,177; 4.8%), Amapá (30,136; 2.9%), Tocantins (14,902; 1.4%), and Rondônia (13,626; 1.3%). However, relative to the size of rural populations, municipality-level FCI was highest in Roraima (mean=0.39), followed by Amazonas (0.28), Acre (0.21), Amapá (0.18), Pará (0.12), Mato Grosso (0.06), Maranhão (0.03), Tocantins (0.02), and Rondônia (0.02) (Fig. 1; Appendix 4). Across the Legal Amazon, mean municipal-scale FCI was 0.09 in 2020, but highly variable (SD=0.16). Forty one percent (n=317) of municipalities had zero FCI whereas high FCI examples included São Gabriel da Cachoeira (Amazonas, 0.88), Marechal Thaumaturgo (Acre, 0.80), and Normandia (Roraima, 0.78). There was a negative correlation between FCI and the proportion of a municipality's remaining forest in 2001 that was lost by 2022 (Appendix 6). Some municipalities had high FCI and very low deforestation (e.g., Afuá on Ilha de Marajó), whereas others had moderate FCI and very high absolute deforestation (e.g. Lábrea, southern Amazonas) and many places with high deforestation had zero FCI (Appendix 5). The population in forest citizen territories grew by 174,801 people (19.9% increase) between 2010 and 2020, with greatest increases in IL (25%; SD=30%; Appendix 10, 11), followed by ESP (19% increase, SD=38%), SUR (15%, SD=91%), and QT (11% increase, SD=44%)(Appendix 11). Territory-specific IBGE census data for IL showed 24% overall population growth between 2010 and 2022.

Territorial creation processes, threats, and on-going rights struggles

Formal steps in the creation processes varied across territorial categories (Supporting Information). Bottom-up mobilization to demand the creation of a particular territorial category is normally only considered legible to the state if voiced through a formal Residents

Association for a given area. Where an association does not exist already, one has to be created. The impetus for proposing a territory, and/or creating a Residents Association sometimes involves external institutions as co-protagonists, but decision-making remains exclusively within the communities. One residents or producers association may succeed in creating several territories. The process of creating these forest territories, and then implementing them, may take many years.

Several land and natural resource threats to traditional communities emerged from our analysis. Major community concerns that motivated the creation of territories included wild-cat gold-mining, and resource-conflicts from outsider commercial harvesters including fishing, game hunting, river turtle harvesting, logging, and Brazil nut harvesting. Amazonian deforestation frontiers advance through a violent mix of illegal logging, illegal land-grabs by *grileiros* (exacerbated by a lack of secure land tenure by traditional populations), and related land speculation often based on clear-cut deforestation to create cattle pasture. Additional concerns related to large-scale projects include highway development and licensing of mining operations. A final motivation has been increasing communities' visibility to the state, responsive to a perceived lack of public services or support for livelihoods in rural areas.

It is unclear how rights-struggles within territories compare to the activism and experiences of forest communities without territorial recognition. However, literature and our fieldwork experiences highlight six main objectives of on-going claims-making by Amazonian communities, beyond their struggles for territorial recognition (Supporting Information). The objectives overlap between overcoming long-standing barriers to rural people achieving rights, and for those communities within a forest citizen territory, implementing the participatory management plan. First, reduce obstacles to individuals being recognized as citizens by the state, included in official registers, and able to access public services and welfare programs. Barriers have included lacking required documentation and navigating complex urban-centric bureaucratic processes. The latter is compounded by costly trips from rural areas, absence of some government offices in some provincial towns, stigmatized treatment of forest-dwellers by some public officials, low literacy, and administrative burdens imposed by public offices on low-income citizens who cannot afford documentation. Second, communities maintain their social and political organization in order to succeed with *associativismo*: working collectively and within democratic institutions to defend the interests of all residents within and across communities, or those of people with shared social or livelihood identities. Third, community leadership negotiates with municipal governments to seek improved *in situ* access to public services. Such services include education, healthcare, social work, electricity, and clean water, including the employment of local

people (e.g., as teachers), and for mobility (e.g., means of transport, fuel) to travel to urban centers when necessary. Fourth, communities attempt to overcome exploitation within economic structures to achieve fair access to markets, and improved incomes from rural livelihoods. Many bottom-up associations – often with NGOs or government institutions – have improved incomes by forming cooperatives, moving up value chains, and developing innovative wildlife management projects. Fifth, communities attempt to protect local forests from land-grabbing and deforestation by outsiders, and ensure sustainable resource use. Territorial implementation places environmental responsibilities on residents including vigilance against outsiders, limits on agricultural expansion, and commercial selective logging, and wildlife harvest. In some territories, environmental stewardship is fostered by state institutions or NGOs. Finally, Amazonian communities attempt to cope with multiple kinds of disasters (e.g., rainfall and river-level extremes, local-scale river sedimentation or riverbank collapse, political shocks, epidemics of insect-borne disease, and violence from drug-trafficking and piracy), with vulnerability shaped by multidimensional poverty and socio-political marginalization.

DISCUSSION

We have argued that forest citizenship has taken shape across the Brazilian Amazon through decades of struggles for territorial recognition. Working in equal partnership with forest citizens represents a socially-just way of achieving Newing et al.'s (2023) call for people-centered, rights-based conservation. In this paper we first developed a two-step theorization of forest citizenship based on forest communities mobilizing to demand territorial recognition from the state, and then claiming rights (e.g., to health, education) whilst attempting to conserve their forests. This idea represents a novel approach to understanding ecological citizenship in Brazil and potentially beyond. We combined the 'right to have rights' – a cornerstone in Eurocentric political philosophy (see Lund & Eilenberg 2017) – with Latin American thinking on ecological citizenship, which emphasizes confronting various forms of marginalization and injustice (Gudynas 2009; Latta & Wittman 2010), and two uniquely Brazilian influences. The latter include the fusion of social justice activism and discourse with environmentalism, which produced the policies and politics of *socioambientalismo* (de Castro 2012), and Acre State's former political experiment with *florestania*, which attempted to extend citizenship to forest-dwellers (Schmink 2011). Then, we calculated that 1.05 million forest citizens reside in territorial categories meeting democratic preconditions. Here, we discuss forest citizens' contribution towards emancipatory (i.e., empowering and challenging oppression) and democratic conservation.

Quantifying forest citizen populations

Amazonia's forest citizens constitute a large, culturally-diverse group of people with a vitally important and outsized impact on conserving its ecosystems and biodiversity. Our paper identified the territorial categories which satisfy the criteria for forest citizenship; being created through bottom-up demands by Amazonian communities, and then having participatory governance. Forest citizens have unique relationships with these territories, which encompass not only the physical space and forest visible in spatial analysis but are imbued with social, legal, political, and economic significance (Aleixo & ATAMP, 2011). Our territorial selection of IL, SUR, ESP, and QT is coherent with existing analyses into Amazonian sites of ecological citizenship (Wittman 2010; de Castro 2012). In Brazil, legal recognition of territorial rights is the means by which laws and state institutions come to meaningfully acknowledge people's right to citizenship and land (Fraser 2018) potentially overcoming differentiated citizenship (Holston 2008). Territorial demands 'from below' sometimes manifest through "autodemarcation"; acts of resistance and popular participation by IPLCs including the production of maps (Vega et al. 2022). Territorial claims emerged in response to threats including resource conflicts with outsiders (e.g., logging, fishing), wildcat gold-mining, land-grabs and deforestation, state abandonment, or state-sanctioned mega-projects. Territorial boundaries reflect and shape the inhabitants' identities, social relations and political actions (Little; 2003; Hecht 2011; Schmink 2011). We show how, during embryonic phases of territorial struggle, institutions such as churches and NGOs may serve as co-protagonists with Amazonian communities to strengthen their political organization, but decision-making power must remain with communities. Hence, forest citizenship should not empower NGOs to talk on behalf of forest-dwellers, which would be undemocratic (Pieck 2013). In many territories, elected Residents Associations play central roles in forming councils, and developing and implementing management plans. These institutional structures have democratized conservation and natural resource management (*sensu* Pickering et al. 2020) in the Brazilian Amazon.

Democratic environmental governance involves forest-proximate people in several territorial categories. Foremost, IL were home to 38% of all forest citizens, but ESP (37%), SUR (18%), and QT (6%) were also important. The relative importance of different territories varied in space; in Pará most forest citizens lived in ESPs. Creation of forest territories slowed markedly after 2010 (Appendix 3; Gomes et al. 2018), yet we found their total resident population grew 20% in the decade to 2020. This likely exceeds the potential natural rate of increase and may reflect forest-dwellers relocating back from urban areas to their communities of origin (BLANKED). Creating 1411 territories covering 31% of the Legal

Amazon is emblematic of enormous collective success of bottom-up mobilization by Amazonian communities (*sensu* de Castro 2012) yet only 12% of rural people in the Brazilian Amazon live in conditions foundational to forest citizenship. Understanding spatio-temporal variation in forest citizen intensity could be useful to researchers studying diverse kinds of environmental outcomes or human welfare issues, and to decision-makers deciding where to prioritize or target funding, projects, or policies.

Practices of forest citizenship

Forest citizenship becomes tangible through rights-claims of Amazonian communities that have achieved territorial recognition (i.e., nascent forest citizens). We demonstrated that Amazonian communities must work collectively to overcome challenges including precarious provision of education (Pereira et al. 2022) and healthcare (Garnelo et al. 2020), unfavorable access to markets and trade (Supporting Information), resisting violent resource-grabs by outsiders (Lobo & Cardoso 2023; Nepomuceno et al 2019), and growing risks from climatic extremes (Chacon-Montalvan et al 2021), drug-trafficking, and piracy (IPEA 2023). To address these challenges, Amazonian community leaders seek, attract, and maintain relationships within communities, and with other communities and external institutions (Mathews 2021). Rural internet access also allows for new forms of engagement and, potentially, claims-making. For example, "Ribeirinhas da Amazonia", a youth-led YouTube channel based in RDS Amanã has >135 million views and 420,000 subscribers. Can successful strategies and tactics of forest citizenship (following Shankland 2010) from particular territories be nourished elsewhere? Ultimately, understanding practices of forest citizenship requires in-depth, mixed methods research in diverse territorial contexts. Research should establish whether the rights-claims of forest citizens are more extensive, organized, or successful than those of other rural communities.

Forest citizenship needs to be substantive (Chigudu 2019), leading to tangible improvements in people's lives, including through greater access to high-quality public services. On the Rio Juruá, livelihoods, access to basic services, and infrastructure are all enhanced inside the SURs compared to outside (Campos-Silva et al. 2021). To fulfill its democratic promise, benefits should emerge through enhanced agency and participation, though the latter can be tokenistic. Preliminary findings from our qualitative fieldwork show that forest citizens face many burdens created by the state in order to access public services, from documentation, to transportation, to the language and practices of bureaucrats disconnected from rural realities. Moreover, the collectivity central to the creation and management of these territories places some limits on the freedoms of individual forest citizens. A forest citizen's right to territorial security is dependent on the strength and unity of their Associations.

Likewise, a single resident in a sustainable use reserve cannot, alone, gain the right to commercially harvest *Arapaima* fish. Forest citizens' realistic opportunities for achieving their rights appear mostly-dependent on community-level claims, and less-so on individuals. Is forest citizenship therefore best-conceived as a form of *collective* ecological citizenship?

Sub-citizenship in Brazil

Currently, it is unclear which conditions are necessary for forest citizenship to be emancipatory and which turn it into a new form of domination - both could be present even within a single territory. Souza (2003) explored the concept of sub-citizenship in Brazil, emphasizing how the normative idea of citizenship is often publicly asserted yet denied in everyday life through diverse forms of violence and segregation. Influenced by Fernandes (e.g., 2006), Souza asserts that Brazil retains deep social divisions rooted in centuries of slavery. A social structure that has not changed its basic form since the colonial period will clearly be a barrier to full realization of citizenship. In modern societies, citizenship rests on States recognizing individuals' rights and distinguishing social groups that have, or lack, access to rights and guarantees. Construction of the citizen as a subject of rights and duties is only possible within the legal space defined by the State. Castro-Gomez (2011) posits that the State fulfills its judicial-political function of inventing citizenship, setting criteria and boundaries for qualification; the resulting identity categories enable a state to exercise control over a population. Discrimination against different citizens reflects societal marginalization and is perhaps inherent to modern government. In Latin American states, citizenship was historically built on hegemonic ethnic identity, violating the physical and moral existence of Indigenous and Black communities. Despite the 1988 Constitution, Brazil's authoritarian past has lasting effects on Amazonian peoples, resulting in "differentiated citizenship" (Holston 2008).

How realistic, then, is the image of forest citizens claiming rights by holding public officials to account given the country's high levels of state-sanctioned violence, and shortcomings in the democratic rule of law (Pereira 2020)? For Souza (2009), the exploitation of Brazil's sub-citizens takes economic and symbolic forms including the function of humiliation in daily life, eroding self-confidence and reactive capacity. The effects of institutional and social stigmatization on people's sense of self-worth are well demonstrated by research into healthcare access among Brazilian street-dwellers (Teixeira et al. 2019; de Queiroz et al. 2022). Souza engaged with Bourdieu's work on social distinction to argue that sub-citizenship is often perpetuated through unconscious prejudice around skin color, clothing, accent, language, or tastes in music or food. The stigmatization and humiliation of rural Amazonians in their interactions with public institutions is commonplace (e.g., Nepomuceno

et al 2019:129-130), and the continued dominance of historical elites in provincial Amazonian municipalities (Abel 2022) necessitates reconfiguration of social and political relations, beyond territorial boundaries.

The limits of forest citizenship

There is a tension between citizenship's inclusionary promise and exclusionary tendency (Kabeer 2005). As Fraser (2018:729) observed when comparing struggles for recognition on the Rivers Madeira and Tapajos "*the state emerges as complex and Janus-faced* [duplicitous]*: its institutions can facilitate as well as be an obstacle to emancipatory struggles.*" This is partly because inclusion through participation in spaces provided by the state can create differentiated access - for example, where forest-dwellers face long journeys to reach government buildings. Not everyone may speak the political language, including acronyms used by public servants (Cornwall & Shankland 2013); participation may harm participants (de Souza Santos 2019) and - as territorial advocates – community leaders have been targets for extreme violence. Using territorial boundaries to define forest citizens may also create a "dynamic of exclusion" (Staeheli 2010) in relation to other forest-dwellers. Dialogue on forest citizenship should avoid inadvertently portraying the millions of rural Amazonians living outside of particular territories (IL, QT, SUR, ESP) as non-citizens, somehow less deserving of rights. In addition, Bryan (2012) has contended that territory makes space governable through the recognition of rights and distribution of political authority, and that rights make people governable.

Forest citizenship will only achieve its transformative potential by being insurgent and empowering marginalized people (Holston 2008). Citizenship from below challenges citizenship's exclusionary tendency, and emphasizes legal recognition (i.e., of land rights), intersubjective recognition (mutual acknowledgment of existence and worth) (Vega et al 2022), and self-determination, justice, and solidarity (Lister 2007). Nonetheless, forest citizenship might be co-opted by the state, capital, and larger NGOs given that it involves state-sponsored forms of participatory governance (*sensu* Latta & Wittman 2010, de Souza Santos 2019). In Peru, for instance, ecological citizenship channels protest and citizen participation into recognized institutional forms, subject to rules laid down by the state (Pieck 2013). Moreover, the collective actions of forest citizens should not replace the state's own duties towards its populace, and they should not bear the significant costs of managing and defending Amazonian forest territories (Brondizio et al. 2009). Although forest citizen territories have participatory governance, rural Amazonians' livelihood opportunities remain influenced by governmental regulations on the circumstances in which harvesting particular natural resources is considered sustainable and permissible (Antunes al. 2019). Together

with economic boom-bust cycles and changing priorities of the institutions financing Amazonian conservation, environmental regulations have compelled forest citizens and other forest-dwellers to adapt their livelihoods.

Forest citizens elsewhere?

To our knowledge, no countries have replicated Brazil's post-1988 policies of creating particular kinds of common-use territories for marginalized populations. Yet, fostering territory-based forest citizenship could benefit people living elsewhere, especially in Latin American countries where post-1970s environmentalism has been linked to struggles for democracy, including community land rights (Latta & Wittman 2012). Brazil has much in common with its neighbors, including multiculturalism, a colonial history of oppression and slavery, emergence from authoritarianism in the 1980s, and social and environmental concerns about development centered on export of agricultural products and natural resources (Latta & Wittman 2010). The role of territorial rights in Brazil's social-environmental history and class struggle has similarities with Mexico's rights-recognition of forest peasants (Kashwan 2017). For example, Brazil's Extractivist Reserves (originally, rubber-tappers fighting dispossession by cattle-ranchers) and agrarian reform settlements (reflecting bottom-up activism against landlessness).

Our conceptualization of forest citizenship could be applied universally given that it draws on Arendt's (1949/1978) internationally well-established political theory and is coherent with a classic perspective of rights-based citizenship. Intriguingly, at least 313 million people lived within 1km of a forest in a low- or middle-income country that is a liberal democracy (≥0.40; author calculations, based on V-Dem [2023] and Newton et al. [2022]) in 2019. Yet, forest citizenship's relevance is contingent on territorial arrangements, national and (post)colonial histories, democratic structures, land-rights, and contemporary political circumstances. The kinds of legally-recognized forest territories within a given country will reflect the spatial distribution of cultural groups such as Amerindian populations, Afro-descendants of enslaved people who resisted slavery, traditional forest extractivists, and landless people. Colonial legacies also influence whether forest-dwellers can obtain land tenure or use-rights (Kaskwan 2017). For instance, Mexico's communal lands reflect Castilian philosophy of social production through common land ownership, contrasting with India and Tanzania's tendency for fortress conservation, following a British preoccupation with land's economic productivity.

Policy implications for Brazilian people-centered conservation

The efforts and successes of forest citizens in protecting their forests and fauna (e.g., de Assis Barros 2022; Campos-Silva et al. 2018) appear to show that citizenship as a democratic practice can coexist with another normative framing, sustainability (*sensu* Pickering et al. 2020). Forest citizens have demonstrated a strong commitment to their territories through long-term investments of time, political energy, and other resources into livelihoods-based sustainability initiatives in their forests, lakes, and rivers – not true of all Amazonian rural populations. People-centered conservation, however, must focus on power relations and decision-making structures as much as on conservation outcomes. If it is indeed transformative, forest citizens should already have reconfigured their social relationships with NGOs, researchers, state institutions, and other outsiders; upending hierarchies in which they have frequently been subordinate. Echoing praise of ecological citizenship in Latin America (Oliveira 2014), we believe forest citizenship helps avoid two false, unhelpful characterizations of Amazonian forest-dwellers as either, "*agents of degradation"* or as "*docile stewards of nature conservation*". Conservationists must recognize and support the diversity of these social groups and their territories.

Achieving people-centered conservation requires that conservationists respect the rights of forest-proximate peoples (Newing et al. 2023). Implementation of this under the Kunming-Montreal Global Biodiversity framework may benefit from drawing on key insights from decades of social science scholarship. First, conservation initiatives in the Global South must ensure genuine participation (see Cooke & Kothari 2001) and recognition at all stages (Martin et al. 2016). As Fleischman and Solorzano (2018) show for India and Mexico, oppression of the rural poor in post-colonial states can hamper meaningful participation in conservation projects. Second, confronting marginalization and rights-violations – including of forest-dwellers – means tackling imbalances in the exercise and distribution of power. Achieving rights-based conservation requires looking beyond ecological sustainability and communities' material economic needs, and engaging with the social and political dimensions of forests (Hecht 2011; Vandergeest & Peluso 2015). Third, some conservation projects can, inadvertently, impinge democracy and reproduce social marginalization. For example, some REDD+ projects commodify benefits from nature and recruit Indigenous people to be unwitting custodians of carbon credits (Latta & Wittman 2012). Fourth, history matters; in many regions of high conservation interest, the perceptions, attitudes and wariness that rural people may have of state institutions and international actors is shaped by experiences of state-sanctioned violence (Nixon 2011). Such violence ranges from enslavement, colonial exploitation, and forced migration to more recent dispossession, police violence, or premature death through ill-health and disease.

Our conceptualization of forest citizenship emphasizes rights access and democratizing conservation in Amazonia, rather than the environmental duties and responsibilities associated with ecological citizenship in the Global North (Pickering 2020; MacGregor 2014). The existence and visibility of the institutions within identified territories provide easy points of entry for external actors and agendas, raising opportunities and risks for forest citizenship's emancipatory potential. Risks include green-washing and carbon finance schemes that may provide forest-dwellers with "precarious inclusion" (Greenleaf 2021), accruing benefits for intermediaries. Conservation science and practice can have profound impacts on how forest peoples see themselves, and how they relate to and use nature. Agrawal (2005) showed how forest-dwellers can become environmental subjects. Amazonian territories risk being treated as laboratories in which NGOs and researchers can experiment with behavioral change techniques to alter forest-dwellers' environmental attitudes and behaviors. Merely working with forest-dwellers does not mean that a conservation intervention is necessarily democratic, or just.

Limitations of this study

Several limitations in our study reinforce the need for more conceptual and empirical research on this topic. Citizenship is present in some bottom-up discourse (e.g., Aleixo & ATAMP 2011) but does forest citizenship resonate with Amazonian people's own interpretation of their activism and struggles for territory and other rights? We are receptive to disagreements about our choices of forest citizen territories, and highlight that relatively little research has been conducted in ESP or QT. Perhaps we overestimated participatory governance in some categories, or erroneously concluded that forest citizenship is not fostered in others. The prospect of forest citizens emerging through novel kinds of territory (e.g., *Territórios de Uso Comum*) is exciting. The unavailability of territorial polygons or phased progress of the SUR and ESP territories not yet-fully created means we may have overlooked the bottom-up practices of citizenship playing out in those places. Future research could refine our binary classification based on category and analyze democratic processes in specific territories (e.g., having an approved management plan). Our assumption that forest citizens live all or most of the time in their rural homes is contestable given that decades of rural-urban migration in Amazonia have resulted in complex, multi-sited lives and livelihoods for many people. Cases of seasonal resource-users or households living between rural and urban locations add a shade of gray to the territory-based conception of forest citizenship. Finally, we lacked a consistent source of recent population data, pending future availability of gridded data from IBGE's 2022 census.

Conclusions

Forest citizens are a large, diverse group of people with outsized conservation importance due to their commitment to protecting forests and sustainably harvesting natural resources. Environmental governance in their territories must be democratic, rights-based, and genuinely participatory. People-centered conservation means conservationists need to avoid false and simplistic characterizations of forest citizens and recognize the diversity of these social groups and their territories. We positioned territorial recognition and the 'right to have rights' as a profoundly important democratic achievement in the Brazilian Amazon, and the basis of forest citizenship. The bottom-up territorial struggles of peasant and Afro-indigenous movements, often in partnership with environmentalists, have created a socio-environmental frontier in Amazonia, slowing forest loss and degradation (Domingues & Sauer 2022). We have argued that forest citizenship in Amazonia – as a normative framework and way of understanding what is already happening – should emphasize rights, not environmental responsibilities, given the historical marginalization, oppression, and exploitation of Indigenous and traditional populations. Forest citizenship is therefore a distinctly Latin American form of ecological citizenship, where rights-struggles for marginalized rural people are fundamentally linked to struggles for territory, and livelihoods (Latta and Wittman 2012). Some skepticism is needed about the concept of citizenship in highly unequal contexts (Latta & Wittman 2012), and forest citizenship's emancipatory, radical potential is contingent on its ability to tackle entrenched inequalities. Beyond Brazil, our paper's theorization and population estimates of a particular kind of ecological citizen contributes to work on democratizing environmental and natural resource management, the so-called democracy-environment nexus (Pickering et al. 2020).

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REFERENCES

Abel, M. (2022). The struggle for health: medical brokerage and the power of care in Brazil's Amazon Estuary. *Cultural Anthropology*, 37, 421–449.

Agrawal, A. (2005). *Environmentality: Technologies of government and the making of subjects*. Duke University Press.

Aleixo, J. & Associação dos Trabalhadores Agroextrativistas do Médio Purus (ATAMP). (n.d.). *Memorial da Luta pela Reserva Extrativista do Médio Purus em Lábrea-AM: Registro da mobilização social, organização comunitária e conquista de cidadania na Amazônia*. Instituto Internacional de Educação do Brasil (IEB), Brasilia.

Anderson, P. (2019). *Brazil Apart: 1964–2019*. Verso Books, London.

Arendt, H. (1948). *The Origins of Totalitarianism*. Harvest, New York.

de Assis Barros, L., Venter, M., Ramirez-Delgado, J.P., Coelho-Junior, M.G. & Venter, O. (2022). No evidence of local deforestation leakage from protected areas establishment in Brazil's Amazon and Atlantic Forest. *Biological Conservation*, 273, 109695.

Barca, S. & Milanez, F. (2021). Labouring the commons: Amazonia's 'extractive reserves' and the legacy of Chico Mendes. In: *The Palgrave Handbook of Environmental Labour Studies*. Springer, Cham, Switzerland, pp. 319–338.

Brondizio, E.S., Ostrom, E. & Young, O.R. (2009). Connectivity and the governance of multilevel social-ecological systems: the role of social capital. *Annual Review of Environment and Resources*, 34, 253–278.

Brown, W. (2006). *Regulating Aversion: Tolerance in the Age of Identity and Empire.* Princeton University Press, Princeton, US.

Bryan, J. (2012). Rethinking territory: social justice and neoliberalism in Latin America's territorial turn. *Geography Compass*, 6, 215–226.

Bustos, A.M.F., Hall, O., Niedomysl, T. & Ernstson, U. (2020). A pixel level evaluation of five multitemporal global gridded population datasets: a case study in Sweden, 1990–2015. *Population & Environment*, 42, 255–277.

Campos-Silva, J.V., Hawes, J.E., Andrade, P.C. & Peres, C.A. (2018). Unintended multispecies co-benefits of an Amazonian community-based conservation programme. *Nature Sustainability*, 1, 650–656.

Campos-Silva, J.V., Peres, C.A., Hawes, J.E., Haugaasen, T., Freitas, C.T., Ladle, R.J. & Lopes, P.F.M. (2021). Sustainable-use protected areas catalyze enhanced livelihoods in rural Amazonia. *Proceedings National Academy Sciences*, 118.

Castro-Gómez, S. (2011). *Crítica de la razón latinoamericana*. 2nd. Editorial Pontificia Universidad Javeriana, Bogotá, Colombia.

de Castro, F. (2012). Multi-scale environmental citizenship. In: *Environment and citizenship in Latin America: natures, subjects and struggles*. Berghahn Books, Oxford, UK, p. 39.

Chacón-Montalván, E.A., Taylor, B.M., Cunha, M.G., Davies, G., Orellana, J.D.Y. & Parry, L. (2021). Rainfall variability and adverse birth outcomes in Amazonia. *Nature Sustainability*, 4, 583–594.

Chigudu, S. (2019). The politics of cholera, crisis and citizenship in urban Zimbabwe:'People were dying like flies.' *African Affairs*, 118, 413–434.

Cooke, B. & Kothari, U. (2001). *Participation: The new tyranny?* Zed Books, London, UK.

Cornwall, A., & Shankland, A. (2013). Cultures of politics, spaces of power: contextualizing Brazilian experiences of participation. *Journal of Political Power*, *6*(2), 309-333.

Dagnino, R. (2013). População dentro de Unidades de Conservação Federais no Estado do Amazonas, Brasil. Olam*: Ciência & Tecnologia*, 13, 356–374.

de Souza Santos, A.A. (2021). Trading time and space: Grassroots negotiations in a Brazilian mining district. *Ethnography*, *22*(2), 184-206.

Dobson, A. (2003). *Citizenship and the Environment*. Open University Press, Oxford, UK.

Domingues, G. & Sauer, S. (2023). Amazonian socio-environmental frontier: struggles, resistance and contradictions in confronting the agrarian extractive frontier. *Third World Quarterly*, 44, 2208–2226.

Fernandes, F. (2020). *A revolução burguesa: ensaio de interpretação sociológica*. Editora Contracorrente, São Paulo, Brazil.

Fleischman, F. & Solorzano, C.R. (2018). Institutional supply, public demand, and citizen capabilities to participate in environmental programs in Mexico and India. *International Journal of the Commons*, 12.

Fraser, J.A. (2018). Amazonian struggles for recognition. *Transactions of the Institute of British Geographers*, 43, 718–732.

Fraser, N. (2022) *Cannibal Capitalism: How our System is Devouring Democracy, Care, and the Planet – and What We Can Do About It*. Verso Books, London.

Fries, B., Guerra, C.A., García, G.A., Wu, S.L., Smith, J.M., Oyono, J.N.M., Donfack, O.T., Nfumu, J.O.O., Hay, S.I., Smith, D.L. & Dolgert, A.J. (2021). Measuring the accuracy of gridded human population density surfaces: A case study in Bioko Island, Equatorial Guinea. *PLOS ONE*, 16, e0248646.

Garnelo, L., Parente, R.C.P., Puchiarelli, M.L.R., Correia, P.C., Torres, M.V. & Herkrath, F.J. (2020). Barriers to access and organization of primary health care services for rural riverside populations in the Amazon. *International Journal for Equity in Health*, 19, 54.

Gomes, C.V.A., Alencar, A., Vadjunec, J.M. & Pacheco, L.M. (2018). Extractive Reserves in the Brazilian Amazon thirty years after Chico Mendes: social movement achievements, territorial expansion and continuing struggles. *Desenvolvimento e Meio Ambiente*, 48.

Gonçalves-Souza, D., Vilela, B., Phalan, B. & Dobrovolski, R. (2021). The role of protected areas in maintaining natural vegetation in Brazil. *Science Advances*, 7, eabh2932.

Greenleaf, M. (2021). Beneficiaries of Forest Carbon: Precarious Inclusion in the Brazilian Amazon. *American Anthropologist*, 123, 305–317.

Gudynas, S. E. (2009). Ciudadanía ambiental y meta-ciudadanías ecológicas. Revisión y alternativas en América Latina. In: *Urgencia y utopía frente a la crisis de civilización*. Javier Reyes Ruíz y Elba Castro Rosales (comp.), 58-101. México: Universidad de Guadalajara.

Hecht, S.B. (2011). The new Amazon geographies: insurgent citizenship, “Amazon Nation” and the politics of environmentalisms. *Journal of Cultural Geography*, 28, 203–223.

Herrera, D., Pfaff, A. & Robalino, J. (2019). Impacts of protected areas vary with the level of government: Comparing avoided deforestation across agencies in the Brazilian Amazon. *Proceedings National Academy Sciences*, 116, 14916–14925.

Hierink, F., Boo, G., Macharia, P.M., Ouma, P.O., Timoner, P., Levy, M., Tschirhart, K., Leyk, S., Oliphant, N., Tatem, A.J. & Ray, N. (2022). Differences between gridded population data impact measures of geographic access to healthcare in sub-Saharan Africa. *Communications Medicine*, 2, 1–13.

Hochstetler, K. & Keck, M.E. (2007). *Greening Brazil: environmental activism in state and society*. Duke University Press, Durham, US.

Holston, J. (2008). *Insurgent citizenship: Disjunctions of democracy and modernity in Brazil.* Princeton University Press.

Instituto de Pesquisa Econômica Aplicada (IPEA), M.P. (2023). Dinâmicas da violência no estado do Amazonas (Publicação Preliminar). Instituto de Pesquisa Econômica Aplicada (Ipea), Brasília, Brazil.

Kabeer, N. (2005). *Inclusive citizenship: Meanings and expressions*. Zed Books, London.

Kashwan, P. (2017). *Democracy in the woods: Environmental conservation and social justice in India, Tanzania, and Mexico*. Oxford University Press, Oxford, UK.

Latta, A. & Wittman, H. (2010). Environment and citizenship in Latin America: A new paradigm for theory and practice. *Revista Europea de Estudios Latinoamericanos y del Caribe/European Review of Latin American and Caribbean Studies*, 107–116.

Latta, A. & Wittman, H. (2012). *Environment and citizenship in Latin America: Natures, subjects and struggles*. Berghahn Books, New York, US.

Little, P. (2003). Territórios sociais e povos tradicionais no Brasil: por uma antropologia da territorialidade. *Anuário Antropológico* 28:251-290

Lister, R. (2013). Inclusive citizenship: Realizing the potential 1. In: *Citizenship between past and future*. Routledge, London, UK, pp. 48–60.

Lobo, M.S. de C. & Cardoso, M.L. de M. (2023). Lessons from urgent times: the experience of Yanomami health care then and now. *Cadernos Saúde Pública*, 39, e00065623.

Lund, C. & Eilenberg, M. (2017). *Rule and rupture: State formation through the production of property and citizenship*. John Wiley & Sons, Chichester, UK.

MacGregor, S. (2014). Ecological citizenship. In: *Handbook of political citizenship and social movements*, 107–132. Edward Elgar Publishing, Cheltenham, UK.

Martin, A., Coolsaet, B., Corbera, E., Dawson, N.M., Fraser, J.A., Lehmann, I. & Rodriguez, I. (2016). Justice and conservation: The need to incorporate recognition. *Biological Conservation*, 197, 254–261.

Mathews, M.C. (2021). How village leaders in rural Amazonia create bonding, bridging, and linking social capital configurations to achieve development goals, and why they are so difficult to maintain over time. *World Development*, 146, 105541.

Mathews, M.C. & Schmink, M. (2015). "Differentiated citizenship" and the persistence of informal rural credit systems in Amazonia. *Geoforum*, 65, 266–277.

Mora, D.L.G. (2023). Conceptual and Analytical Diversity of Environmental Governance in Latin America: A Systematic Review. *Environmental Management*, 71, 847–866.

Nepomuceno, Í., Affonso, H., Fraser, J.A. & Torres, M. (2019). Counter-conducts and the green grab: Forest peoples' resistance to industrial resource extraction in the Saracá-Taquera National Forest, Brazilian Amazonia. *Global Environmental Change*, 56, 124–133.

Newing, H., Fisher, M., Brittain, S., Kenrick, J. & Milner-Gulland, E.J. (2023). How can we advance equitable, rights-based conservation? *Oryx*, 57, 273–274.

Newton, P., Castle, S.E., Kinzer, A.T., Miller, D.C., Oldekop, J.A., Linhares-Juvenal, T., Pina, L., Madrid, M. & de Lamo Rodriguez, J. 2022. The number of forest- and tree-proximate people – A new methodology and global estimates. Forestry Working Paper No. 34. Rome, FAO.

Newton, P., Kinzer, A.T., Miller, D.C., Oldekop, J.A. & Agrawal, A. (2020). The Number and Spatial Distribution of Forest-Proximate People Globally. *One Earth*, 3, 363–370.

Nixon, R. (2011). *Slow Violence and the Environmentalism of the Poor*. Harvard University Press, Cambridge, US.

Oliveira, G.D.L.T. (2014). Book review: Environment and citizenship in Latin America: natures, subjects and struggles. *The Journal of Peasant Studies*, 41, 440–444.

Pereira, A.W. (2020). *Modern Brazil: A Very Short Introduction*. Oxford University Press, Oxford, UK.

Pereira, H.C., Nascimento, A.C.S. do, Moura, E.A.F., Corrêa, D.S.S. & Chagas, H.C. das. (2022). Migração rural-urbana por demanda educacional no Médio Solimões, Amazonas. *Revista Brasileira de Educação*, 27, e270029.

Pickering, J., Bäckstrand, K. & Schlosberg, D. (2020). Between environmental and ecological democracy: theory and practice at the democracy-environment nexus. *Journal of Environmental Policy & Planning*, 22, 1–15.

Pieck, S.K. (2013). Asphalt Dreams: Road Construction and Environmental Citizenship in Peru. *Development and Change*, 44, 1039–1063.

Pontes, F. (2022). Da florestania ao agronegócio sustentável, PT do Acre tenta voltar ao governo estadual. *((o))eco*. https://oeco.org.br/reportagens/da-florestania-ao-agronegocio-sustentavel-pt-do-acre-tenta-voltar-ao-governo/

de Queiroz, G.V.R., do Vale Silva, T.B., da Silva Corrêa, R. do S., de Brito Mota, M.J.B. & Germani, A.C.C.G. (2022). “Viver na rua é a minha doença”: o processo saúde-doença sob a ótica de pessoas em situação de rua. *Saúde e Pesquisa*, 15, 1–18.

Sáiz, V. A. (2005). Globalisation, Cosmopolitanism and Ecological Citizenship. *Environmental Politics*, 14, 163–178.

Schmink, M. (2011). Forest citizens: changing life conditions and social identities in the land of the rubber tappers. *Latin American Research Review*, 46, 141–158.

Schmink, Marianne, Duchelle, A., Hoelle, J., Leite, F., d’Oliveira, M.V., Vadjunec, J., Valentim, J. & Wallace, R. (2014). Forest Citizenship in Acre, Brazil. In: Forests under

pressure: Local responses to global issues. International Union of Forest Research Organizations (IUFRO), Vantaa, Finland, p. 31.

Shankland, A. (2010). The Indigenous Peoples' Movement,'Forest Citizenship' and Struggles Over Health Services in Acre, Brazil. In: In VSP Coelho & B von Lieres (eds) Mobilizing for Democracy: Citizen Action and the Politics of Public Participation. London: Zed Books, 10.

Somers, M. (2008). *Genealogies of citizenship. Markets, Statelessnes, and the Right to Have Rights*. Cambridge, UK.

Souza, J. (2003). *A construção social da subcidadania: para uma sociologia política da modernidade periférica*. Editora UFMG, Belo Horizonte, Brazil.

Souza, J. (2009). *A ralé brasileira: quem é e como vive*. Editora UFMG, Belo Horizonte, Brazil.

Staeheli, L.A. (2011). Political geography: Where's citizenship? *Progress in Human Geography*, 35, 393–400.

Teixeira, M.B., Belmonte, P., Engstrom, E.M. & Lacerda, A. (2020). Os invisibilizados da cidade: o estigma da População em Situação de Rua no Rio de Janeiro. *Saúde em Debate*, 43, 92–101.

Vandergeest, P. & Peluso, N.L. (2015). 12. Political forests. In: *The International Handbook of Political Ecology*, 162. Edward Elgar Publishing, Cheltenham, UK.

V-Dem (2023) – with major processing by Our World in Data. "Liberal democracy" [dataset]. V-Dem, "Democracy and Human rights, OWID based on Varieties of Democracy (v13) and Regimes of the World v13" [original data]. Available at: https://ourworldindata.org/grapher/distribution-liberal-democracy-index-popw-vdem

Vega, A., Fraser, J.A., Torres, M. & Loures, R. (2022). Those who live like us: Autodemarcations and the co-becoming of Indigenous and *beiradeiros* on the Upper Tapajós River, Brazilian Amazonia. *Geoforum*, 129, 39–48.

Venter, O., Sanderson, E.W., Magrach, A., Allan, J.R., Beher, J., Jones, K.R., Possingham, H.P., Laurance, W.F., Wood, P., Fekete, B.M., Levy, M.A. & Watson, J.E.M. (2016). Sixteen years of change in the global terrestrial human footprint and implications for biodiversity conservation. *Nature Communications*, 7, 12558.

Wittman, H. (2010). Agrarian Reform and the Environment: Fostering Ecological Citizenship in Mato Grosso, Brazil. *Canadian Journal of Development Studies / Revue canadienne d'études du développement*, 29, 281–298.

Wolf, J., Brown, K. & Conway, D. (2009). Ecological citizenship and climate change: perceptions and practice. *Environmental Politics*, 18, 503–521.

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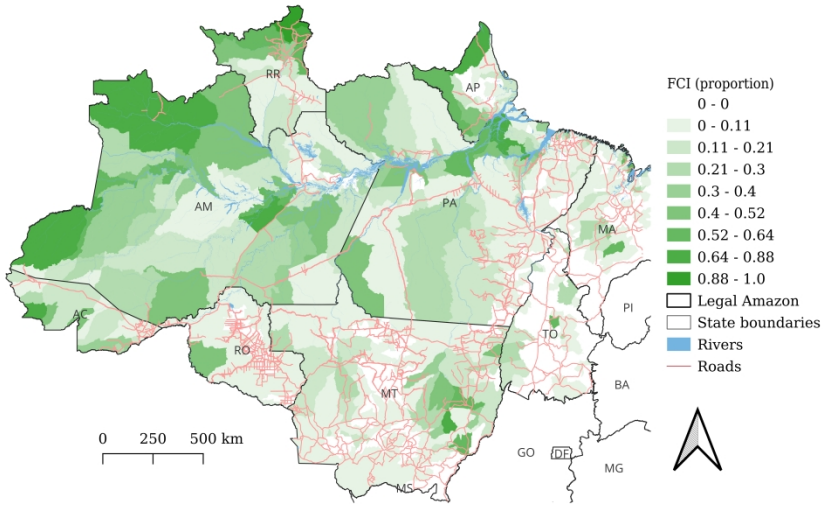
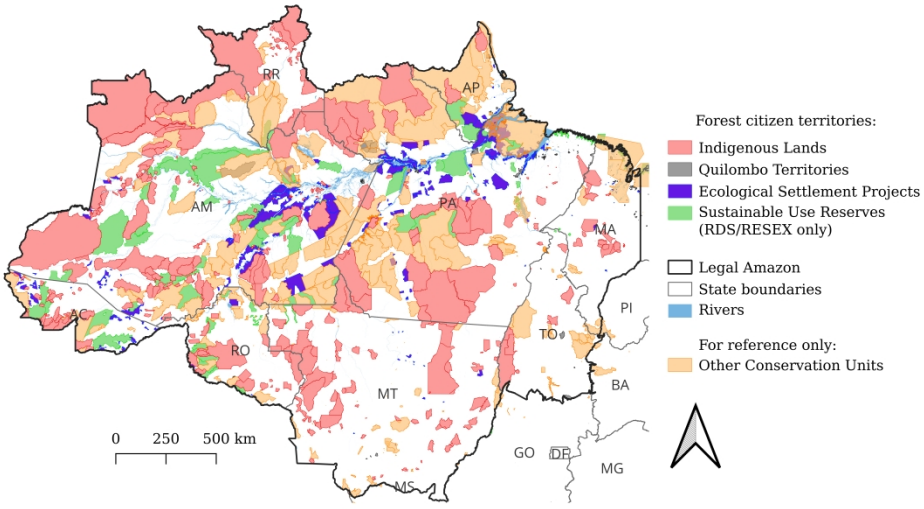


Map of forest citizen intensity (FCI) across the Brazilian Amazon, calculated as the proportion of a municipality's rural population in 2020 resident in forest citizen territories. Letters refer to states (Acre (AC), Amazonas (AM), Amapá (AP), Mato Grosso (MT), Pará (PA), Roraima (RR), Rondônia (RO), Tocantins (TO).

755x533mm (236 x 236 DPI)



Map of forest citizen territories in the Brazilian Amazon. Letters refer to states (Acre (AC), Amazonas (AM), Amapá (AP), Mato Grosso (MT), Pará (PA), Roraima (RR), Rondônia (RO), Tocantins (TO).

755x533mm (236 x 236 DPI)