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ORIGINAL ARTICLE

Territories of social-environmental management and health in the Amazônia

Territórios da gestão socioambiental e saúde na Amazônia

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ABSTRACT Conservation Units (UCs) constitute strategic territorial domains for social and environmental management in the Amazônia. In this study, we question how residents and managers of a UC define their sustainability territories, specifically, in health care. Field research was carried out in a community located in the Rio Negro Sustainable Development Reserve. For data collection, techniques such as interviews, field diary and direct observation were used. As a result, their empirical data show that a large proportion of families had a livelihood based on a family production unit, with an average monthly income below the minimum wage, and generated mainly in agriculture and fishing. Considering the living and health conditions in the reserve, managers and residents interviewed problematize the sustainable assumptions that define current models of UC in the Amazônia, since they do not have strategic actions for the effective human and social development of their families. The notion of health in the Amazon is embedded in collective control over these territories, and if it is not broad enough to encompass them, it needs to be redefined.

KEYWORDS Environmental management. Health. Protected areas. Primary Health Care.

RESUMO *As Unidades de Conservação (UC) constituem domínios territoriais estratégicos para a gestão socioambiental na Amazônia. Neste estudo, questiona-se como os moradores e gestores de uma UC definem seus territórios de sustentabilidade para a Amazônia, especificamente, em atenção à saúde. Para isso, foi realizada pesquisa de campo em uma comunidade localizada na Reserva de Desenvolvimento Sustentável do Rio Negro. Para a coleta de dados, foram utilizadas técnicas, como entrevistas, diário de campo e observação direta. Como resultados, destaca-se que grande parte das famílias possuía sustento baseado em uma unidade de produção familiar, cuja renda média mensal é abaixo de um salário mínimo, e gerada principalmente na agricultura e pesca. Dadas as condições de vida e saúde na reserva, gestores e moradores entrevistados problematizam os pressupostos sustentáveis que definem os atuais modelos de UC na região amazônica, visto que não apresentam ações estratégicas para o efetivo desenvolvimento humano e social de suas famílias. A noção de saúde na Amazônia está imbricada no controle coletivo sobre esses territórios, e se ela não é suficientemente ampla para compreendê-los, precisa ser reelaborada.*

PALAVRAS-CHAVE *Gestão ambiental. Saúde. Áreas protegidas. Atenção Primária à Saúde.*

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Introduction

Conservation Units (UCs) are territories that represent socio-environmental management in the Amazon today. Socio-environmental management is understood as the participation of traditional populations in the governance of environmental protection areas for sustainable use. Guaranteeing the governability of traditional territories for the people of the Amazon is guaranteeing the reproduction of their lives in all aspects, after all, social, cultural, economic and environmental aspects are inseparable from the notion of territory[1]. Therefore, having health and well-being in the Amazon means having the capacity for collective control over the territory.

However, what can this collective control effectively represent? The participative elaboration of management plans? The regulated management of its zones and natural resources? The offensive deforestation of the Amazon has directly affected the living and health conditions of families residing in these areas, generating food insecurity, social problems and environmental unsustainability. Analyzing these scenarios involves a complexity characteristic of the Amazon region, after all, social and human indicators that focus on income will always reveal a scenario of poverty and social inequality, since, for some traditional peoples of the region, whose average monthly income is relative, it is not possible to associate the idea of quality of life with the monetary income that a family or social group may have. The majority of the population living in rural areas survives with a monthly income of less than one minimum wage, that is, below the poverty line[2].

Most of the conceptual frameworks that portray traditional and indigenous peoples of the Amazon do not allow an honest approach due to their territorial specificities. It is necessary to recognize that local worldviews are fundamental for the evaluation and elaboration of development policies aimed at the health and well-being of traditional peoples of the Amazon[1]. In this way, the Human Well-being Indicator for Traditional Peoples (IBPT) is presented, whose proposal involves a self-declared conception of well-being for these peoples. The IBPT is supported by five major capabilities: collective control over the territory; autonomous cultural agency; guarantee of food autonomy; building a peaceful environment to live in; and self-care and reproduction.

Pointing out this path is already a first step towards the discussion intended here: how to ensure that these capabilities are developed in the different Amazonian territories? Thinking particularly about the object of analysis of this study, the UCs, are these capabilities included in their socio-environmental management? This research – carried out jointly by the Interdisciplinary Center for Health and Environment in the Amazon (NISA) at the State University of Amazonas (UEA) and the Research Laboratory on Comprehensive Health Practices (LAPPIS) at the State University of Rio de Janeiro (UERJ) – chose as a research unit the Rio Negro Sustainable Development Reserve (RDS) to debate, with its residents and managers, the socio-environmental management model and its sanitary and health demands.

The research was carried out in 2021 and 2022, through excursions to one of the communities located in the reserve area. This community was chosen because it assumes a strategic position in the UC, concentrating health services, tourist and management activities. It was, therefore, a type of field research, with a qualitative approach, which combined the techniques of semi-structured interviews, mapping and direct observation. 23 families and 5 leaders were interviewed (RDS manager, deputy manager, church leader, health professional and teacher).

The topics discussed with the 23 families interviewed were about their living conditions and health. The interviews were carried out in their own homes, using a field diary and semi-structured script, in addition to the use of RDS maps in the interviews carried

out with managers and health professionals, allowing the indication of characteristic aspects, demands and challenges of the reserve management.

In the end, we sought to problematize fundamental aspects involving the socio-environmental management of these territories, their main controversies and perspectives. Without a doubt, UC have constituted the most effective model of environmental sustainability for the Amazon, increasingly affirming their validity in the face of the Capital's productive restructuring processes. However, the inefficiency of social and economic policies has produced an unstable socioeconomic situation, marked by social inequalities and low quality of life. As highlighted by one of the interviewees, the representation of the UC cannot just be that of 'an imaginary line'.

Material and methods

The area chosen for the study was the RDS of Rio Negro, which is located between the municipalities of Iranduba, Manacapuru and Novo Airão, in the state of Amazonas. There are approximately 1,544 homes built on the reserve, 90% of which are located on state land; 1%, on the Union land; and 9% are not included in plots[3]. The reserve is located on the right bank of the Rio Negro, being part of the Central Amazon Ecological Corridor and the Rio Negro Protected Areas Mosaic. It has 19 rural communities in an area of 102,978.83 hectares (ha), with 81,867.86 ha (80%) located in the municipality of Iranduba, 16,613.91 ha (16%) in the municipality of Novo Airão, and 3,696.15 ha (4%) as part of the municipality of Manacapuru[3]. There are 622 families living in the reserve area. Its creation was a demand from public authorities and residents of the area after the construction of the bridge over the Rio Negro, as the bridge increased access to the reserve via highway AM 070[3].

It was a field research[4], with a qualitative approach to the data, which combined techniques such as: interview with a semi-structured script, direct observation and mapping. To carry it out, the RDS headquarters community was selected for data collection, in which the health, education and residence services of the reserve managers are concentrated. As for the research subjects, 73 families reside in the community, of which 23 were interviewed. Interview scripts were used with closed and open questions about their living conditions and health, income, main occupation, education, leisure and demands. A script with semi-structured questions was also used with the main community leaders, particularly with the reserve managers and health professionals. The interviews were carried out after clarifications about the research followed by the signing of the Free and Informed Consent Form (TCLE).

The project was approved by the UEA Research Ethics Committee, Certificate of Presentation of Ethical Appreciation (CAAE) 56840222.0.0000.5016, under Opinion No. 5,303,492. In addition, it obtained authorization from the State Secretariat for the Environment/Department of Climate Change and UC Management (SEMA/DEMUC) to carry out the research and other activities within the UC during the period of the investigation.

Results and discussion

Collective territorial control in Conservation Units in the Amazon

Although it has never left the agenda, the topic of land regularization of traditional territories returns to the center of the debate with the significant deforestation in the Amazon, estimated at 10 thousand km² between the years 2018 and 2019 alone[5]. Analyzing specifically the situation of the lands allocated and not

allocated of each Brazilian state, this issue becomes quite problematic when it comes to recognizing areas of land traditionally occupied as land regularization, as is the case with UC.

According to a study[5(12)], "28.5% of the Amazon territory does not have information about its land destination". Therefore, there is no clear public information about the destination of these areas, or whether there are records, titles or any type of registry. Titles or registrations issued before 2002, when georeferencing became mandatory, were not systematized, which makes it difficult to survey the property historically and, therefore, to regularize it. It is observed that the lack of land definition in these areas generates overlaps in use, occupation and rights to land. Currently, 40% of deforested land in the Amazon is located in areas with undefined land ownership, and even in areas that supposedly have definition, such as UC, regularization is pending.

The first aspect of health raised here, which concerns the capacity for collective control over the territory, is already threatened. The main instrument to seal the pact for biodiversity conservation is the Real Right of Use Concession Contract (CCDRU), provided for in Law No. 9,985, of July 18, 2000, which establishes the National System of Nature Conservation Units[6]. This contract grants traditional communities the management of the territories of a UC, as long as the protection of the local natural heritage is ensured, through their sustainable ways of life.

Amazonas has 42 state UC, 34 of which are Sustainable Use and 8 are Full Protection, of which 16 are RDS. Of the total, 36 have published management plans, and only 15 have the CCDRU. Although land regularization is a prerequisite for its implementation, many are implemented without their ownership situations being understood and resolved. The consequence of this is the expansion of UCs in overlapping areas of public and private lands and rural communities[8].

Around 60% of the land in Amazonas is dedicated to biodiversity conservation: 27.07% indigenous lands, 16.97% federal UC, 12.13% state UC and 1.13% municipal UC. The State Secretariat for the Environment (SEMA) manages state UC in Amazonas. According to data from the secretariat, there are 26,431 families in 1,030 communities[7]. When creating the UC, the first step is the preparation of the Management Plan, a document that establishes ecological-economic zoning areas and usage rules. This is valid for a maximum of five years, and must always, in each re-elaboration, include new strategies and demands for the management of its territory[3].

Brazil innovated with the creation of new modalities of UC, which make human presence compatible with state control and regulation of areas, which were divided into two groups: integral protection units and sustainable use units. RDS Mamirauá was the first environmental protection proposal that sought to reconcile biodiversity conservation and human habitation[8].

Between the end of the 1990s and the first decades of the year 2000, there was a leap in the expansion of UCs throughout the national territory. According to the National Register of Conservation Units, 18.4% of the Brazilian continental area is protected by different categories of UCs, with

> 28.5% of the Amazon, 7.8% of the Caatinga, 8.7% of the Cerrado, 10.3% of the Atlantic Forest, 2.8% of the Pampa, 4.6% of the Pantanal and, since 2018, approximately 25% of the marine area[9(9)].

The Amazon biome has the most UC, with 316 federal and state UC, approximately 1.4 million km², distributed in 234 UCs for sustainable use and 82 UC for integral protection[9].

In recent years, Brazil has suffered an offensive to reduce or extinguish its UC. In the Bolsonaro government, for example, no UC were created; Worse than that, there was an effort in his management to dismantle bodies

responsible for the process of implementing environmental policies in the country, in particular, the National Institute for Space Research (INPE) and the Brazilian Institute for the Environment and Renewable Natural Resources (IBAMA)[10]. Without effective monitoring by environmental agencies, areas that have land overlaps and unclear ownership status are the most affected, as is the case with sustainable use UC. The RDS modality, for example, encompasses the hybrid public-private regime, that is, it allows conciliation with private properties in its territory[8].

According to data from the Amazon Institute for Man and Environment (IMAZON), in 2022 (January to December)[11], deforestation in the Amazon was 10,573 km², considered the greatest destruction in the last 15 years. The Amazon lost the equivalent of almost 3,000 football fields per day. From 2019 to 2022, 35,193 km² were deforested, an area that exceeds the size of two Brazilian states combined, Sergipe (21 thousand km²) and Alagoas (27 thousand km²). The states with records in deforested areas were Pará (3,874 km²), Amazonas (2,575 km²) and Mato Grosso (1,604 km²). The most serious case was in Amazonas[4], where devastation increased by 24% compared to the previous year, when 2,071 km² were devastated.

The effectiveness of the socio-environmental model of biodiversity conservation is an indisputable and non-negotiable fact. However, the controversial aspect still lies in the restricted way in which people are perceived within it. Is the concept of humans broad enough to understand sustainability, development and the environment? For Amartya Sen, it is necessary to investigate whether the citizenship that has accompanied environmental policies is purely instrumental or whether this citizenship really constitutes part of what is intended to be sustained[12].

With regard to the RDS of Rio Negro, its residents and managers drew attention to the few changes that are engendered in its UC modality. They highlighted that, in the last five years, they did not obtain sufficient support or strategic partnerships to streamline the management of the reserve and guarantee improvements in the lives of their families. Given this, a question asked by one of these leaders echoed in the discussions of this study: 'What guarantees do we have to live in a conservation unit?'. When asked what a UC represented to him, the answer was: 'an imaginary line'. A line that establishes regulations and sanctions for the use of natural resources, however, which has not offered guarantees and compensation for the environmental and sustainable management carried out by these subjects.

The issue of health in the socio-environmental management of RDS do Rio Negro

A controversial aspect is that the region that concentrates the greatest biological and social diversity in the country is also one of the regions with the greatest social inequality. According to the Social Progress Index (IPS) Amazônia 2023, prepared by the Imazon Institute, the IPS Amazônia 2023 is 54.32, lower than the national average of 67.94 since 2014. Components such as nutrition, basic medical care, housing, health and well-being showed progress, but indicators such as access to higher education, access to information and individual rights remain stagnant[13]. A brief assessment of living conditions in the North region shows a very discouraging scenario: only 31.1% of the total population has sewage access through a collection network or septic tank connected to the general network, the worst indicator in all of Brazil – in addition, 40% of these inhabitants do not have water supply from a general network and 24.8% do not have garbage collection by cleaning service[14].

In the context of health, these aspects need to be interrelated and problematized. For Garnelo et al.[15(82)], the principle of universality of the Unified Health System (SUS) is compromised due to the reproduction of regional

inequalities and provision of health services, given the "high concentration of professionals and health actions in urban spaces". The North region has the worst rates in this regional distribution, having one doctor for every thousand inhabitants. Amazonas, for example, has the lowest percentage of doctors working in the countryside (6.9) while Manaus, its capital, has 50% of all health establishments in the state.

Given this scenario, in the COVID-19 pandemic, the health system in Amazonas collapsed in April 2020, the beginning of the first wave, a crisis that spread throughout all its municipalities when no available Intensive Care Units (ICU) were left. Manaus was the protagonist of the worst pandemic scenario in the country, as it accounts for 58% of the total beds and 91% of the total ICU beds, highlighting the precarious regionalization of the state's health services and assistance networks[16].

Entering the context of the Rio Negro RDS, these data become even more consistent, as they show the everyday picture of living and health conditions in the Amazon. Of the 23 families interviewed in the survey, the majority have an average monthly income below the minimum wage (64%), coming from agriculture, fishing and public service, as teachers, health professionals and managers were also interviewed. As it is a floodplain community, the average monthly income is affected by seasonality, February to July (flood) and August to January (low water). During the flood period, families are unable to produce, as their production is from vegetable farming (short cycle) and in floodplain areas.

In 2023, Amazonas recorded the state's greatest historical drought in 121 years. Its 62 municipalities are still in emergency conditions during the drought, affecting more than 630 thousand people. In the period from January to October, 17,691 hot spots were recorded in the state. In this context, Manaus experienced pressure due to the accumulation of smoke and intense heat for consecutive days. This framework resulted in situations of isolation for riverside families, without means of subsistence and without meeting basic human needs[17]. The panorama of a life of abundance with rich biodiversity and natural resources became a scenario of uncertainty and scarcity. In this logic, well-being based on abundance is only possible with the construction of a peaceful environment to live in[1].

These conditions of social vulnerability were noticed on site in the RDS of Rio Negro and reported by its residents. Several families interviewed highlighted persistent food insecurity, given the difficulties of agricultural and extractive production. This situation of instability in income generation is, in part, due to the location of the reserve in the metropolitan area of Manaus, which generates greater human pressure, land speculation and tourist attraction in its territory. Antagonistically, the scenic beauty of the researched community contrasts with the precarious living and housing conditions of their families. The majority live in stilt houses without sewage systems, water pipes and septic tanks; uses water from collective artesian wells (80.8%) or collected directly from the stream (19.2%), without any type of treatment for consumption. Lastly, the delay in public garbage collection (every 15 days) encourages its burning and accumulation.

In the context of extreme climate events, health risks become more severe for populations that are in conditions of social vulnerability in the Amazon region. Given the increase in the number of hot days and nights, heat waves and fire outbreaks, there is a greater risk of heatstroke, circulatory and respiratory diseases. Similarly, changes in temperature, humidity and rainfall increase the risk of diseases transmitted by food, water and vectors[18].

When relating these scenarios to the low coverage of Primary Health Care (PHC) in the Amazon, the horizon for regional governance becomes unlikely. The obstacle lies in the unequal distribution of the assistance network between urban and rural areas, justified by a deterministic vision that associates

operationalization difficulties with the "configuration of Amazonian natural-geographical spaces"[19(1225)].

In the RDS of Rio Negro, for example, there is a single Basic Health Unit (UBS) to serve the 19 communities throughout the reserve, with an approximate area of 102,978.83 ha. On Tuesdays, the Riverside Family Health team (eSFR), made up of a doctor, dental surgeon, nursing technician and oral health technician, arrives in the community. On that day, the service takes place at the UBS itself. On Wednesdays, the team travels to other communities in the reserve, and, after the service, returns to their homes in other municipalities. On other days of the week, the UBS is managed by the nurse and the Community Health Agent (ACS) who reside in the community. UBS has a team of 10 ACS distributed across the 19 communities in the RDS.

The ACS are an important interlocutor for families in these communities, after all, throughout the day, they are the ones who offer some type of assistance and care, even in communities furthest from the UBS. When the eSFR team arrives at one of the reserve communities, the ACS already has a survey of data in hand, indicating the main demands and specificities of care. According to an ACS interviewed, her work is hampered by the lack of logistical infrastructure.

> *One of the demands of the communities in the provision of health services is that there is difficulty in logistics for the ACS, and every month they have a meeting here, then there are complaints about the logistics of home visits, because these communities in Rio Negro are very far away. to get. And the Community Health Agent uses his own small vessel, and is only given 15 liters of gasoline to use throughout the month. They need more gas!*

The biggest challenge of socio-environmental management in the Amazon is to change the scenario of ineffectiveness of public policies that do not yet take into account the dynamics of each territory. In the field of health, the provision and establishment of professionals in remote and difficult-to-access areas constitute the biggest obstacle to guaranteeing universal access to all levels of public health19. In particular at PHC, an overview of the RDS of Rio Negro reveals the urgency in expanding its physical and professional network, so that distances are shortened and access is guaranteed for all 19 communities within its coverage. The two-day medical care schedule, one at the UBS and another in other communities, is not enough. Furthermore, the residents interviewed report difficulties in adapting to the high turnover of professionals and their different ways of working.

Revisiting socio-environmental sustainability models for the Amazon

The management model proposed for sustainable use UCs, based on the principle of socio-environmentalism[20], presupposes the exercise of territorial governance. Within the scope of global environmental agendas, governments have made a commitment to create and expand UC in all countries. Under the umbrella of sustainable development, these protected areas would be guided by territorial governance of combined actions between civil society, public authorities, non-governmental organizations and social movements. Although this governance suggests an interactive management path, with agendas negotiated, sanctions and regulations discussed, there are many controversies in the understanding of the responsibilities and co-responsibilities of each sector[21].

In the case of health, there seems to be a consensus that the responsibility for access to services in this sector does not belong to UC management, but rather to municipalities and their health departments. According to the managers of RDS do Rio Negro, it is only the management's responsibility to survey needs, demands and problems. The study by Medeiros et al.[22], on the competencies and responsibilities in health care for riverside populations in UC areas, points out that there

are difficulties in interinstitutional dialogue and political co-management, which seriously harms the development of a public policies agenda for the socio-environmental management of these territories.

This management should be ensured by the State, but, in practice, its actions and strategies are carried out by non-state public organizations,

> consisting of a rich portfolio of actions and products, ranging from research, inspections and interventions in infrastructure to payment for environmental services[22(7)].

There is no development of new skills and responsibilities, and existing initiatives barely change the social structure of the most vulnerable social groups in these areas. In fact, an environmentalist policy that does not include health care as a priority axis is nonsense, as health care problems cannot be separated from territorial management.

In the RDS of Rio Negro, residents highlight the need for intersectoral planning and action to meet demands in the area of health. They highlight the need for professionals to stay in the area, for the expansion of medical services, for greater availability of infrastructure for the movement of ACS and for the existence of specific actions to meet the demands of people residing in the reserve. For one of the interviewees, actions aimed at health need to be articulated with the UC's socio-environmental management model, which must be paradigmatic in the production of sustainable forms of use and occupation of the territory.

> *I thought, RDS is a possibility for an environmental strategy. If you have an RDS, it has to be a model for the state, so if you have a UC that has the conditions to be a model [...] because this here means agrarian reform. The conservation unit is the state's land policy today, elected par excellence, and the only way to guarantee that there is access to this area here, without it being a problem area, and people cannot enter a conservation area and do what they want, deforest, fish without permission.*

In the understanding of managers and residents of RDS do Rio Negro, the strategic location of the reserve, close to the city of Manaus, allows the development of projects and policies that would place it in a paradigmatic condition. However, what they observe is the abandonment of environmental policies and agendas in recent years, in addition to immense human pressure in potential areas for tourism and land speculation.

> *What is missing is the State. It is a matter of state policy. The State needs to understand that we want this conservation unit configuration. Because it's not just about spreading UC throughout the state, because expanding state and federal UC is spreading UC with everything. A conservation unit is a land package, because this is land that has been regularized in a certain way, which has been transformed into a conservation unit, and whoever is here has a concession to use this area and will live here their entire lives. Now what's missing? Public policy, social policy... because in a way, they are making this environmental policy happen, with sanctions, with regulations... If you have sanctions and a series of regulations to not deforest, to not have an impact and it is being guardian, as they wanted in the project, 'Guardian of the Forest', then you have to have public policy.*

The management of a UC is determined by the Management Plan, which must be re-elaborated every five years. It must establish rules for the sustainable use of natural resources and create programs for their maintenance. The Rio Negro RDS Management Plan was jointly prepared in 2016 by SEMA, the Institute for Conservation and Sustainable Development of the Amazon (IDESAM) and local communities. Among its programs, the Community Support Program and the Quality of Life Improvement subprogram stand out. There are three topics in the matrix of this subprogram: the first talks about the creation of a commission to deal with any issue related to the health area; the second, on the maintenance of ambulanchas (river ambulances);

and the third, on training health professionals. In this subprogram, there is emphasis on the need for institutional coordination between reserve managers and health and environment secretariats[3].

For one of the interviewees, the plan did not present any specific proposal to meet demands in the area of health, "*it only presented the physical state of health at the time the information was collected, that was really it*". In fact, in terms of strategic actions, the health sector is little discussed in management plans. In general, data is collected about the living and health conditions of families, main diseases, forms of care and treatment, in addition to the characterization of the health services offered in the area. Among the main criticisms is the difficulty in intersectoral coordination to strengthen actions aimed at health in a way associated with environmental issues, establishing strategic planning for all levels of health.

Machado et al.[23] highlight that understanding the interface between the territorial dimension and the health field is the first step towards proposing and implementing efficient and effective public policies in this sector. Disregarding territorial specificities is producing development policies that are incapable of generating any impact, since the territory produces transformations and is transformed by local and global dynamics. Experiences witnessed in these territories, such as the RDS, are representative objects of analysis of collective health, as they constitute the basis on which a set of social relations are projected and determine health-disease processes[23].

Final considerations

In recent years, Brazil has experienced a dismantling of its public policies aimed at the environment, registering the biggest setback in its historical trajectory of security and protection of natural resources. In the midst of this scenario, UCs have assumed and continue to assume strategic positions to reduce damage caused by capitalist irrationality, as they are based on environmental justice, the sustainability of natural resources and the socioeconomic development of families living in their territorial areas. Furthermore, the management organization responsible for the UC must work to meet local needs, from the perspective of social and human inclusion, promoting the participation of its residents in the construction of their political, social, environmental, cultural and legal demands.

This study constituted a possibility for dialogue between like-minded people: on the one hand, researchers who embark on the epistemological incursion of thinking about the field of knowledge of collective health in the Amazon, relativizing and expanding pre-established notions for new social spaces, full of ambivalences and ambiguities; on the other, subjects who add new dimensions of the 'world of life' to the 'systemic world' of health. Therefore, one of the biggest challenges for Amazon scholars in the 21st century is the deconstruction of ethnocentric and colonialist assumptions that underpin a large part of the economic and social development projects launched for its multiple territories. The region that is home to the greatest biological and sociocultural diversity in the country permanently demands that its singularities be read and respected, including in health.

Collaborators

Miguez SF (0000-0003-4781-3140)* contributed to the collection, analysis and interpretation of data, writing and critical analysis of the manuscript. Souza RCB (0000-0002-4281-6417)* contributed to data collection, analysis and interpretation, and writing of the manuscript. Pinheiro R (0000-0001-8745-9209)* contributed to data interpretation and critical review of the final version of the manuscript for important intellectual content. ■

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