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FORUM | REVIEW

Economic, environmental and social threats of a mining exploration proposal on indigenous lands of Brazil

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ABSTRACT

Deforestation, mining, pollution and the construction of hydroelectric plants are among the main risks for biological communities, ecosystems and indigenous peoples. In the Brazilian Amazon, historically there has been political pressure to reduce the constitutional rights of indigenous peoples, especially regarding mining activities and the construction of hydroelectric plants. This culminated in a law proposal allowing mining in indigenous lands (PL 191/2020), proposed during the last presidential term in Brazil (2018-2022), which sparked a heated debate in both the legal and ethical spheres. In this article we present objective arguments for the negative effects of mining on indigenous lands, using PL 191/2020 as a model to debate the consequences of such policies for biodiversity, ecosystem services, increased risks for humans due to pollutants and epidemics, and how this law violates the main objectives of the Agenda 2030 for sustainable development. Particularly in the Brazilian Amazon, the negative effects of this law on human life quality, economy and the ecosystems are greater than the supposed positive effects projected into the future. We suggest rethinking the feasibility of mining on indigenous lands and reiterate the importance of conserving these lands and other protected areas in the Amazon intact as a heritage of all Brazilians and the wider human kind.

KEYWORDS: Amazon, biodiversity loss, disease, deforestation, ecosystem services, life quality

Ameaças econômicas, ambientais e sociais de uma proposta de exploração mineira em terras indígenas do Brasil

RESUMO

O desmatamento, a mineração, a poluição e a construção de usinas hidrelétricas estão entre os principais riscos para as comunidades biológicas, os ecossistemas e os povos indígenas. Na Amazônia brasileira, historicamente tem havido pressão política para reduzir os direitos constitucionais dos povos indígenas, especialmente no que diz respeito às atividades de mineração e à construção de usinas hidrelétricas. Isso culminou em uma proposta de lei que permite a mineração em terras indígenas (PL 191/2020), proposta durante o último mandato presidencial no Brasil (2018-2022), que gerou um acalorado debate tanto na esfera jurídica quanto na esfera ética. Neste artigo apresentamos argumentos objetivos para os efeitos negativos da mineração em terras indígenas, usando o PL 191/2020 como modelo para debater as consequências de tais políticas para a biodiversidade, os serviços ecossistêmicos, o aumento dos riscos para os seres humanos devido a poluentes e epidemias, e como esta lei viola os principais objetivos da Agenda 2030 para o desenvolvimento sustentável. Particularmente na Amazônia brasileira, os efeitos negativos desta lei sobre a qualidade de vida humana, a economia e os ecossistemas são maiores do que os supostos efeitos positivos projetados para o futuro. Sugerimos repensar a viabilidade da mineração em terras indígenas e reiterar a importância de conservar intactas essas terras e outras áreas protegidas na Amazônia como patrimônio de todos os brasileiros e da humanidade em geral.

PALAVRAS-CHAVE: Amazônia, desmatamento, doenças, perda de biodiversidade, qualidade de vida, serviços ecossistêmicos

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INTRODUCTION

The exponential growth of the human population in the last 300 years and the consequent demand for resources have led to an extensive reduction and modification of the original vegetation cover worldwide (Gerland et al. 2014; Crist et al. 2017; Johnson and Munshi-South 2017; McDonald et al. 2019). Habitat loss is one of the main processes responsible for the global biodiversity crisis (Sala et al. 2000; Hanski 2005; Cardinale et al. 2012; Dirzo et al. 2014; Chase et al. 2020). In Brazil, external and internal political pressures contribute to the increase of deforestation, mainly linked to the export of soy and other commodities, to the detriment of the development of other industries (Kim and Tromp 2021). Internally, the approval of the current Brazilian forest code (see Ruaro et al. 2021) and the recent approval of a restrictive timeframe for the demarcation of indigenous lands (IL) (Law 14.701, Brasil 2023a) are main potential drivers of deforestation. The newly approved legislation determines that the demarcation of IL is only warranted to indigenous peoples who were occupying the reclaimed ancestral lands by the date of the promulgation of the Federal Constitution of Brazil, on October 5, 1988. Today, IL correspond to 14% of the Brazilian territory, most of them in the Brazilian Amazon, of which 443 IL had their demarcation process already approved, and 237 are still in the process of determining the limits of the reclaimed areas (FUNAI 2021). The demarcation of IL does not aim at ecosystem and biodiversity conservation (Law No. 6001, Brasil 1973), yet the delimited ancestral areas and their biodiversity are of high cultural importance for indigenous communities (Magnusson et al. 2018), and IL also act as reservoirs of native fauna and flora, preserving ecosystem services such as high rates of carbon fixation (Nolte et al. 2013), and inhibiting deforestation and fires (Nepstad et al. 2006). Therefore, IL are considered important and effective areas for landscape, ecosystem and biodiversity conservation worldwide (Garnett et al. 2018; Schuster et al. 2019; Resende et al. 2021).

The Brazilian Constitution prohibits any economic activity to be carried out by non-indigenous people in IL, such as mining. However, historically Brazilian IL suffer from illegal mining exploitation and this has generated a series of social conflicts such as the death of indigenous people and illegal miners (Rorato et al. 2020; Machado and Garnelo 2021), and environmental problems such as river pollution and deforestation (Sonter et al. 2017). In recent years, due to increasingly omissive and permissive policies by the Brazilian federal government, there has been an invasion of illegal gold miners in IL, leading to a humanitarian disaster among the indigenous inhabitants due to malaria outbreaks, famine and water pollution by mining waste (Rorato et al. 2017; Watts 2023). Unfortunately, illegal mining is also prevalent among Amazonian indigenous tribes (Silva et al. 2023), and there is growing pressure for its legalization (Mataveli et al. 2022; Villén-Perez et al. 2022).

The mining sector wields significant political influence globally, potentially swaying decision-makers (Coelho et al. 2021). This influence is evident in the Brazilian National Congress, which has a history of imposing restrictions on indigenous peoples' rights (Machado and Garnelo 2021), with significant environmental consequences. A recent example is a law proposal from 2020 (PL 191/2020, https://bit.ly/3dyURv0), which aims to legalize mining within IL as a pseudo-partnership between indigenous tenants and mining enterprises, lacking proper legal backing and consultation with local tribes and entrepreneurs (Alkmin 2022). Recently, a grassroots organization of indigenous peoples (*Articulação dos Povos Indígenas do Brasil*, APIB) submitted a plea (https://rb.gy/r7nvp) to the Ministry of Indigenous Peoples arguing the unconstitutionality of PL 191/2020, which is still under consideration in the Chamber of Deputies. The recently elected President, Lula da Silva, requested the repeal of the controversial PL 191/2020, which was ultimately removed by its author. However, the recently approved equally controversial time frame for IL demarcation (Law 14.701, Brasil 2023a) has the potential to bolster the return of PL 191/2020 or the proposal of a similar law. In fact, throughout history, there has been a continuous tendency to undermine the rights of indigenous peoples, posing threats to their health and way of life (Machado and Garnelo 2021; Alkmin 2022), especially among those groups that have had minimal contact with outsiders, such as some uncontacted Amazonian ethnic groups.

PL 191/2020 examplifies the level of pressure of the mining industry indigenous communities and the potential threat to IL as vital biodiversity strongholds (Alkmin 2022). PL 191/2020 aims to regulate § 3 of Article 231 of the Brazilian Federal Constitution, which allows the effective use of water resources, including their energy potential, and the prospection and mining of mineral resources on IL after authorization by the National Congress, and hearing the affected communities and ensuring their participation in the mining profits, which must be established by law. It also aims to regulate § 1 of Article 176, which establishes that all mineral resources and hydraulic energy potential belong to the Federal Government, guaranteeing its concessionaire ownership of the resources, and that specific conditions for developing these activities on IL must be defined by law. Therefore, PL 121/2020 would regulate the above-mentioned paragraphs to establish the specific conditions for mining, hydrocarbon prospection, and the use of water resources for hydroelectric power on IL, including a compensation mechanism of profit sharing for the indigenous communities.

However, PL 191/2020 focuses on development without taking into account that the proposed economic activities

can directly cause a drastic change in land cover and several environmental characteristics. Indirectly, deforestation in IL results in the loss of ecosystem services and, consequently, loss of productivity and life quality for local communities, indigenous or not (Keesing et al. 2006; Siqueira-Gay et al. 2020). Profit-sharing payments will probably not cover the social, environmental and economic damage caused. Both legal and illegal mining on IL, along with the creation of PL 191/2020, have sparked numerous social and legal debates within the scientific community (Cunha 2018; Alkmin 2022). Here we focus on the negative biological and environmental consequences of mining on IL by using the PL 191/2020 in its aim to regulate § 3 of Article 231 of the Brazilian Federal Constitution as a case study, considering four critical points (Figure 1): (i) loss of vegetation cover and biodiversity; (ii) loss of ecosystem services; (iii) loss of human health and life quality; and (iv) how the PL approval will entail negative consequences for the goals of the Agenda 2030 for sustainable development (UNO 2015).

BIODIVERSITY LOSS

The exploitation of mineral resources represents a serious threat to biodiversity, as the increasing demand for metal ores and incentives for mining make it profitable for a high number of enterprises to operate in remote and preserved areas (Figure 1; Sonter et al. 2017). The mining activity promotes drastic losses of native vegetation cover both inside and outside the limits of the leased mining areas (Sonter et al. 2014a, b). Over the last 20 years, there was a significant increase in deforestation rates of primary forest in the Brazilian Amazon (Silva-Junior et al. 2020) due to two main causes: (i) establishment of mining infrastructure and associated

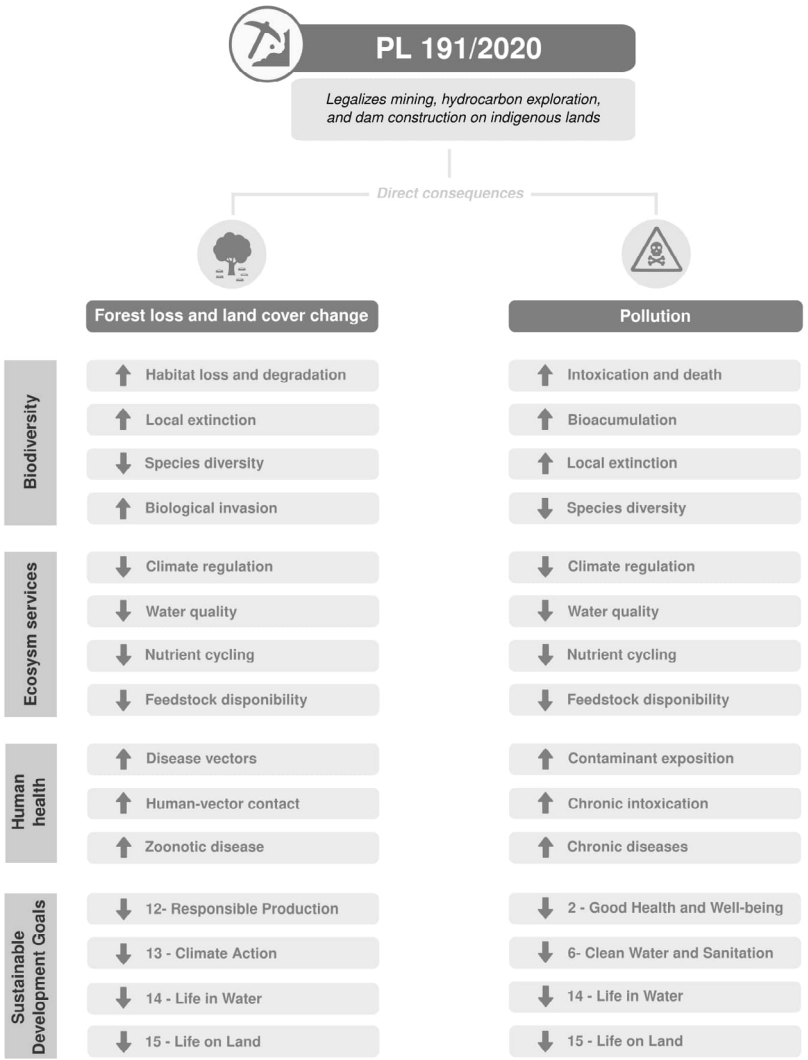

Figure 1. Flow chart summarizing the four points discussed. Arrows up or down indicate an increase or a decrease of components in relation to impacts of mining according to PL191/2020.

secondary deforestation (such as that associated with the opening of new roads and highways), urban spread (to support a growing workforce) and indirect economic activities stimulated by mining; and (ii) development of commodity supply chains (e.g. carbon for iron and steel manufacturing) (Sonter et al. 2017). The exploitation of water resources, such as the construction of hydroelectric plants, has similar consequences, due to direct deforestation of the reservoir area (Jiang et al. 2018), and possible indirect impacts involving infrastructure, labor support and structural changes in forest edges (Sanchez-Ribas et al 2012; Jiang et al. 2018).

Deforestation has long been proposed as a major cause of declining biodiversity worldwide (Daskalova et al. 2020). Although mining is not mentioned as a threat to many species by IUCN (Maxwell et al. 2016), vegetation suppression is unavoidable to carry out a mining enterprise. In fact, 153 large and medium-sized mammal species have already been impacted by mining, and 20% of these are threatened with extinction (Martins-Oliveira et al. 2021). In addition to the physical changes generated by mining, there are other indirect effects on the ecosystem, such as impairing hydrology, microclimate and nutrient flow (Sonter et al. 2014a; Jiang et al. 2018), negative impacts on biodiversity due to increased parasitism (Fecchio et al. 2021), hunting, fauna trampling, and decrease of surrounding habitat quality (Merovich et al. 2021). The incentive for mining within IL is potentially highly damaging because, despite IL are not classified as officially designated conservation units (CU), they act as important havens for environmental protection. Even if the protection measures currently applied are insufficient to prevent deforestation, indigenous-managed lands currently play a key role in the conservation of biodiversity (Jonas et al. 2014; Schuster et al. 2019), as IL show lower deforestation rates compared to CU and unprotected areas (Nolte et al. 2013; Schuster et al. 2019). This higher effectiveness is owed to the interaction between environmental law enforcement agencies and the monitoring and control activities of local indigenous inhabitants (FUNAI 2021). Therefore, ensuring the access to and permanence of indigenous people in their ancestral lands ensures the conservation of natural landscapes and biodiversity (Garnett et al. 2018).

ECOSYSTEM SERVICE LOSS

Ecosystem services are benefits that natural ecosystems provide to humans, such as resource supply, regulation of hydrological and nutrient cycle, regulation of climate, and support for cultural values (Tallis and Kareiva 2005) (Figure 1). The loss of natural vegetation cover leads to a loss of ecosystem services (see Strand et al. 2018 for the Amazon). The extinction or partial loss of species can impair the decomposition, cycling and quality of soil nutrients (Hobbie 2015), decrease or extinguish the microbiota, increase erosive processes and decrease soil fertility (Seitz et al. 2015), and reduce carbon capture and storage (Le Quéré et al. 2018).

Climate regulation is a basal ecosystem service of increasing importance worldwide, due to global warming caused by greenhouse gas emissions. Investing in the persistence of protected areas ensures the maintenance of "protected carbon", including billions of tons of carbon stored in forests (Campbell et al. 2008). Deforestation and forest degradation contribute approximately 15% of the global greenhouse gas emissions (van der Werf et al. 2009). In contrast, government actions to protect IL contribute directly to carbon sequestration, biodiversity conservation and the reduction of greenhouse gas emissions (Nolte et al. 2013).

In 2021, the 26th United Nations Climate Change Conference (COP26) established the Declaration of Leaders on Forests and Land Use, signed by 141 countries, to meet zero deforestation by 2030 and contain the increase of global temperature below 2°C (Lennan and Megera 2022). The Brazilian government, a signatory country, presented a set of guidelines for a strategic agenda focused on climate neutrality, with measures to eliminate illegal deforestation by 2028, restore and reforest 18 million ha of forests and reach rates of 45-50% of renewable energy in the energy matrix by 2030 (Resolution nr. 3, Brasil 2021). However, the increase in deforestation, little effective reforestation, and scarce government incentives for reforestation recorded at the time of writing this manuscript, do not indicate a tendency to neutralize deforestation or reach restoration targets by 2030. Any initiative or omission that results in an increase in deforestation infringes upon Brazil's role as a signatory of the COP26 declaration. Beyond the effects on regional climate, missing the COP26 targets may have a strong effect on the international credibility of Brazil, removing large areas of forest from the world carbon market. As part of a recent amendment effort, the Brazilian government has issued Decree #11550, outlining procedures for the development of sectoral plans aimed at mitigating climate change through the National System for Reducing Greenhouse Gas Emissions (Brasil 2023b).

Among the most perceptible impacts of climate change in Brazil is water shortage, which has been recently compromising both water and hydroelectricity supply (Jardim 2015). One of the most important ecosystem services provided by the forests of protected areas is the provision, maintenance and purification of water available for human use (Larsen et al. 2012). For example, many aquatic plants can remove pollutants and toxic substances from water reservoirs, also avoiding contamination of freshwater and groundwater (Pang et al. 2023). Ecosystem services are not only qualitative and ethereal concepts, as they can be quantified financially. For example, the impact on an area within a 70-km radius around mining projects in the Amazon was estimated to amount to

a loss of USD 5 billion per year (ca. BRL 25 billion per year; exchange rate as of December 2023) in ecosystem services for food production, raw material supply, mitigation of greenhouse gasses and climate regulation (Siqueira-Gay et al. 2020). Therefore, the notion that mining in the Brazilian Amazon boosts local economic growth, stimulated by the increase in employment and wage values, as well as greater agricultural production is contradictory (Sonter et al. 2017).

Following the loss of ecosystem services, local communities need to forgo several resources and cultural traits associated with the acquisition of food and drinking water. Therefore, the benefit of mining for local communities, indigenous or not, in the vicinity of mines is unreliable and, at least, context-dependent. The several dimensions of the potential impact across several ecosystem services should be factored into the calculation of financial compensation schemes for the implementation of mining projects in IL instead of simply considering a net percentage of profits.

INDIGENOUS HEALTH AND LIFE QUALITY

Contamination risk

There are prevalent examples of contamination of soil and water by mercury and other pollutants in mining regions in Brazil (Uryu et al. 2001; Hylander et al. 2006; Costa 2011; Ferreira Portela et al. 2019) and other countries such as the United States (Stamenkovic et al. 2004), Indonesia (Castilhos et al. 2006) and China (Feng et al. 2006). River contamination by mercury from gold extraction has directly and indirectly caused deaths among the indigenous Yanomami people, which has recently gained international media attention (Barbosa et al. 1995; Vasconcellos et al. 2018; Vega et al. 2018). The current gold mining activity in the middle Tapajós River region results in the consumption of fish contaminated with mercury 25-fold in excess of the acceptable rates, threatening the survival of the Mundukuru indigenous population (Vasconcellos et al. 2021). Besides mercury, evidence suggests that the extraction of hydrocarbons can also have potential impacts on the health of people directly exposed to oil spills, or living close to contaminated extraction sites (Aguilera et al. 2010; Johnston et al. 2019). Such impacts are associated with acute physical, psychological, genotoxic and endocrine effects (Aguilera et al. 2010), as well as cancer, liver damage, immunodeficiency and neurological symptoms (Johnston et al. 2019).

Another predicted detrimental impact of mining legalization in IL is the increased pressure to build hydroelectric dams (as proposed by PL191/2020), since forest clear-cutting and flooding of lands associated with reservoir formation promote the mobilization of inorganic mercury present in relatively high concentrations in Amazonian soils, and its transformation in methylmercury (MeHg) (Bisinoti and Jardim 2004; Hylander et al. 2006; Adler Miserendino et al. 2018; Gomes et al. 2019). Similarly to mercury from mining, MeHg has high toxicity that can be transferred across trophic webs, bioaccumulating in different organisms such as fish (Uryu et al. 2001; Hylander et al. 2006), that is the main vector of MeHg contamination in humans (Bisinoti and Jardim 2004;Vasconcellos et al. 2021). MeHg intoxication causes serious health problems and, in cases of severe contamination, can cause blindness and death (Cano 2014; Gomes et al. 2019).

Epidemic disease risk

Beyond environmental contaminants, new epidemics of zoonotic origin have emerged due to rapid and uncontrolled changes in land use (Figure 1), particularly in rainforests in developing countries (Lambin and Meyfroidt 2011; Nava et al. 2017). In the Amazon region, a direct relationship has been established between ecosystem degradation and the increase in cases of several diseases, such as malaria (Barros and Honório 2015; Baeza et al. 2017; McDonald et al. 2019), dengue (Cheong et al. 2014; de Sousa et al. 2021), paracoccidioidomycosis (do Valle et al. 2017), cutaneous leishmaniasis (Chagas et al. 2006), and emergence-reemergence of diseases of arboviral origin (Favoretto et al. 2019). Malaria cases have significantly increased in areas subject to illegal mining on Yanomami lands, causing deaths particularly among children (Barros et al. 2021). In addition to the aforementioned diseases, the Amazon is considered a potential source of upcoming pandemics, with particular concern at deforestation edges (Ferrante et al. 2021), emphasizing the need for policies to control changes in land use.

Thus, the installation of a mine in an IL, or in its vicinity, imposes health risks to the indigenous populations due to increased abundance of infected human hosts, vectors (e.g., mosquitoes), and points of contact between humans, vectors and pathogens (bacteria, viruses and parasites). Vectors are favored by intermediate environments suitable for reproduction (Barros and Honório 2015), vector behavior changes (e.g., increased synchronicity of mosquitoes feeding times with human activity peaks) and genetic and phenotypic changes in pathogenic organisms (Shibeshi et al. 2020). Changes in phenotypic frequencies of vectors and pathogens can occur due to increased resistance to pesticides (Hemingway et al. 2016) and drugs (Shibeshi et al. 2020). Among the many ecosystem services lost through human actions, the regulation and mitigation of diseases is paramount. Preserved forest areas not only act as reserves of potential epidemic agents, but also as disease buffers (Keesing et al. 2006). Several mechanisms by which biodiversity can regulate the emergence of infectious diseases have been identified. A high host diversity may act as ecological traps buffering the spread of Lyme disease (Keesing

et al. 2006). A high bird diversity has been associated with low incidence of the West Nile virus (Swaddle and Calos 2008). A high diversity of aquatic organisms has been associated with low rates of schistosomiasis (Johnston et al. 2019), and a high diversity of warm-blooded animals was directly associated with a decrease in the probability of contracting malaria (Laporta et al. 2013). In this context, the activities that would be authorized by PL191/2020 implicate a high risk to local communities considering that i) mining activities are associated with an increased exposure to mosquitoes and frequency of cases of hantavirus and malaria (Bauch et al. 2015; Terças-Trettel et al. 2019; Ellwanger et al. 2020); ii) the change in river dynamics to lentic environments due to dam construction is a major source of mosquito proliferation (Sanchez-Ribas et al. 2012; Brito et al. 2018), particularly the vectors of zika, dengue, chikungunya, yellow fever and malaria (Midega et al. 2012; Endo and Eltahir 2018a,b).

Studies on malaria, diarrhea and acute respiratory infections in the Amazon derived from mining exploitations and road construction in IL suggest that the profits produced will be far less than the health investment to alleviate these diseases (Bauch et al. 2015). Similarly, 0.7% of the benefits of produced energy for local communities, as proposed by PL191/2020, and the potential economic benefits obtained through the construction of hydroelectric plants and implementation of mining exploitation in IL do not contemplate the long-term governmental expenses with medical treatments, sanitation, and investment in health plans. In Slovakia, malaria-associated direct costs were estimated to amount to an average USD 970.75 per 30-year-old patient requiring hospital admission (Svihrova et al. 2009). In the USA, the total costs of antimalarial treatments between 2000 and 2014 amounted to USD 555 million (USD 25,200 per patient under medical treatment) (Khuu et al. 2017). In Brazilian real (BRL, exchange rate as of December 2023) these values would be of BRL 5,500 and BRL 135,000 per patient, respectively. The economic burden of malaria is not only related to the eradication, but also to the costs of treatment, research and prevention plans (Andrade et al. 2022). In addition, in countries with high incidence of malaria, the gross domestic product (GDP) grew 1.3% less per person and year, which is directly related to the number of days lost from work due to infection or recrudescence (Gallup and Sachs 2001). In Brazil, estimates of expenses with malaria do not take into account massive invasions by illegal miners, such as the recent one observed in Yanomami territory (Martins-Filho et al. 2023; Watts 2023). Being a disabling disease, malaria had a synergistic effect on the individual ability to obtain food, causing starvation.

RISK TO SUSTAINABLE DEVELOPMENT GOALS

In 2015, the United Nations proposed to its member countries, including Brazil, a new sustainable development agenda composed of 17 sustainable development goals (SDG), to be achieved in the next 15 years (UNO 2015). Meeting the goals of the agenda is a matter of citizenship, since it was built to meet the basic needs of people. However, it also entails issues related to international trade with countries concerned about the environment. The approval of mining in IL, as proposed by PL191/2020, contradicts the adherence to the goals of Agenda 2030 by Brazil, directly and negatively affecting at least seven out of the 17 SDG, i.e., SDG 2 – Health and well-being, SDG 6 – Drinking water and sanitation; SDG 11 – Sustainable cities and communities; SDG 12 – Responsible consumption and production; SDG 13 – Action against global climate change; SDG 14 – Life in water; and SDG 15 – Life on land. Considering only the potential deforestation caused by mining (Sonter et al. 2017) and hydroelectric dam construction (Jiang et al. 2018), would negatively affect SDG 13, once the key metric is forest cover, SDG 14, since forest cover directly influences the structure and biological diversity of freshwater ecosystems (Lo et al. 2020), and SDG 15, due to habitat loss and degradation of forest species.

Regarding the potential risk of environmental pollution, not only terrestrial (SDG 15) and aquatic (SDG 14) ecosystems will be affected (Uryu et al. 2001; Hylander et al. 2006; Costa 2011; Ferreira Portela et al. 2019; Gabriel et al. 2020), but also drinking water availability (SDG 6; Mhlongo et al. 2018) and health and well-being of local communities (SDG 2; Aguilera et al. 2010; Johnston et al. 2019). Considering such environmental and social consequences, some policy caveats need attention if the promises to achieve responsible consumption and production (SDG 12) and the establishment of sustainable cities and local communities (SDG 11) are to be attained.

CONCLUSION REMARKS

The proposal of mining, exploration of hydrocarbons and construction of hydroelectric plants in IL contradicts the compromise of the Brazilian government with the goals of Agenda 2030 to reduce and prevent environmental degradation to preserve natural resources, biodiversity and ecosystem services, which ultimately represents a great economic loss for the country. Given that indigenous reserves represent a significant percentage of preserved areas in the Brazilian Amazon, the changes caused by mining are expected to be catastrophic. Exploiting mineral, water and hydrocarbon resources within IL demonstrably causes immeasurable losses to the health of the indigenous inhabitants, especially by mercury-mediated contamination of water and soil and/or the spread of tropical diseases. By detailing compelling evidence, we suggest that any law similar to PL 191/2020, while entailing potential economic benefits to a few groups, will probably involve a great economic and life-quality loss for

the local native communities. Recent historical experience in the Brazilian Amazon, as exemplified by the Yanomami case in Roraima state, shows that a strict adherence to control mechanisms established by law by mining activities cannot be expected, due to weak governance and law enforcement capabilities. However, even if the legislation is strictly followed, the project implies expenses for the nation, since the indigenous people are Brazilian citizens. Article 255 of the Brazilian Federal Constitution states that "Everyone has the right to an ecologically balanced environment, a good for common use by the people and essential to a healthy quality of life, imposing to the Public Power and the community the duty to defend and preserve it for present and future generations". Indigenous peoples are Brazilian citizens, therefore they are equally entitled to the benefits constitutionally guaranteed by Article 255. This includes the provision by the Brazilian government of all medical and sanitary services required to support public policies for indigenous peoples to ensure their right to life and well-being. In the absence of state support, we may witness the repetition of genocidal processes of entire ethnic groups resulting from exploitative economic activities in IL, as was the case with the Yanomami (Watts 2023). After the controversial approval of the law that regulates the time frame for IL demarcation, it is likely that there is a favorable inclination of Brazilian legislators to support further initiatives against the rights of Brazilian indigenous peoples, including the approval of PL191/2020. In order to avoid existence-threatening impacts for Brazilian Amazonian indigenous peoples and the extensive forest areas conserved by IL in the region, decision-makers are strongly advised to repeal PL191/2020 and similar law proposals.

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