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Abstract

In the Amazon, roads are closely intertwined with various social livelihood activities but also cause irreversible environmental destruction. As such, roads engender different infrastructural imaginaries of how economic growth should be pursued, signified and contested in rainforest landscapes. This paper focuses on infrastructural imaginaries of Brazil's BR-319 Highway, an unfinished road that plunges through some of the best-preserved sections of the Amazon rainforest. Based on a multisited ethnography of the road, it explores the various meanings and functions of 'growth infrastructures' in globally vital ecosystems facing destruction. We identify three distinct infrastructural imaginaries: (1) the road as a path to economic development and freedom; (2) the road as unleashing a surge of destruction; and (3) the road as co-existing with sustainability aims. Our analysis reveals how these imaginaries reflect diverse and competing (counter-)articulations of 'growth', distinctively shaping human-nature interactions, infrastructural politics and economic futures in the world's largest rainforest.

Keywords: BR-319 Highway; Amazon rainforest; roads; infrastructural imaginary; growth infrastructure; Brazil.

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Introduction

The opening of roads has been one of the most consequential developments for the Amazon rainforest (Ferrante *et al.*, 2020). In the Brazilian Amazon, roads have been central to the pursuit of growth-led development and are intrinsically associated with imaginaries and aspirations of conquering, populating and establishing national sovereignty over vast swaths of 'empty' territory (Moran, 2016). Throughout the 1960s and 1970s, roads were built across the rainforest under government slogans such as 'land without men for men without land' and 'the Amazon is ours' (Chaves, 2007). But the opening of roads in the Amazon has also set in motion a range of impacts and harms that continued and intensified in successive decades (Becker, 2001). By facilitating the advent of motorized transport and mobility, migratory flows and population increases, and the implementation of other infrastructural projects, roads have acted as drivers for deforestation, forest fires, land grabs, disease outbreaks, and social conflicts and violence, posing threats to indigenous populations and biodiversity (Ferrante *et al.*, 2021; Otsuki, 2011).

This paper explores the simultaneously productive and disruptive powers of roads in globally vital ecosystems. It investigates how road infrastructures lead to distinct and divergent infrastructural imaginaries and reflect diverse (counter-)articulations of 'growth', engendering different moral judgements, visions and practices of development and human-nature relations. We unpack these dynamics in relation to Brazil's BR-319 Highway. With an extension of almost 900 kilometres, the highway cuts across the densest of the Amazon rainforest, connecting Manaus in the state of Amazonas, the largest city in the Amazon Basin with a population of 2.2 million, to Porto Velho, the state capital of Rondônia and an agribusiness hub located on the southern edge of the Brazilian Amazon. Since its construction and inauguration in the 1970s, the road has contrasted periods of abandonment and ruination with major pushes for improvement and completion, evidencing the ebb and flow of infrastructural development over time (cf. Neuman Stanivuković, 2023). The highway coalesces different infrastructural conditions and materialities that alternate sections of smooth pavement facilitating the advent of Brazil's arc of deforestation with muddy, decaying stretches functioning as a shield for some of the best-preserved blocks of rainforest.

The paper draws on a multisited ethnography of the BR-319 Highway, conducted by the lead author (Eric Cezne) between September 2022 and December 2022. Data collection was carried out in Manaus and Porto Velho, at different human settlements along the road such as the village of Igapó-Açú, the district of Realidade and the town of Humaitá (see Section 3), and in places like canteens, guesthouses and gas stations frequented by road users. This resulted in over 20 interviews, which allowed us to garner narratives and viewpoints from government officials, local residents, road users, lobby networks, activists and academics. All communications were carried out in Portuguese and quotations reproduced in this paper are the authors' own translation. The

observation data was captured in fieldnotes, documenting the road's changing characteristics (design, built-in properties, infrastructural condition, surrounding forest density) and how these determined the politics of circulation and connection between different areas served and affected by the road.

The fieldwork was undertaken during the 2022 Brazilian presidential elections, offering insights into the diverse ways in which politics is enacted through infrastructural formations in the Amazon region. Media outputs, public statements by local and national authorities, and policy and NGO documents on BR-319 and other roadbuilding projects in the Brazilian Amazon complement the primary data. Our data reflect a varied spectrum of favourable, opposing and mixed positions towards the road, which allowed us to identify, through iterative coding, the three sets of infrastructural imaginaries that we analyse. The paper also draws on extended research by the other author (Kei Otsuki) in and on the Brazilian Amazon since 2003, which enabled us to situate BR-319 within a long-term perspective of development in the region (cf. Otsuki, 2011, 2013a, 2013b).

The paper proceeds as follows. We start by presenting our conceptual approach, which links the literature on infrastructural imaginaries to this special issue's conceptual proposition of 'growth infrastructures'. We then describe our case study. Next, we analyse the distinct infrastructural imaginaries connected to the BR-319 Highway, namely (1) the road as an enabler of economic development and freedom of movement, (2) the road as unleashing a surge of destruction, and (3) the road as co-existing with sustainability aims. In so doing, we discuss how growth is (re)defined by actors who hold distinct views of infrastructural development in Amazonian landscapes. The paper concludes by reiterating key findings and proposing directions for future research.

Infrastructural imaginaries and growth infrastructures

This paper builds on a tradition of research on 'social imaginaries', defined as the symbolic matrices within which people and groups understand their identity, place in the world, and social and technical surroundings (Taylor, 2004). We consider how infrastructures – understood as 'built networks that facilitate the flow of goods, people, or ideas and allow for their exchange over space' (Larkin, 2013, p. 328) – are connected to socio-symbolic orders and meanings, thus configuring 'infrastructural imaginaries'. As put by Parks (2014, para. 1), infrastructural imaginaries refer to the 'different ways of thinking about what infrastructures are, where they are located, who controls them, and what they do'. They can be conveyed through 'diverse narratives, imaginations, and technologies' and 'co-shape wider socio-political dynamics' (Dalakoglou & Kallianos, 2018, p. 77). Infrastructural imaginaries thus attest to Larkin's (2013) apt qualification of how infrastructures are never neutral or solely technical things. They operate on multiple levels concurrently, executing technical

functions while binding people, things and ideas into complex socio-material arrangements.

In this regard, roads – as surface constructions for enhanced ground mobility and circulation – have been empirically useful for unpacking and making sense of infrastructural imaginaries. Scholars have studied roads to understand imaginations and practices of state-making and sovereignty (Schouten, 2022), ideological possibilities such as modernity and progress (Wolfe, 2010), geopolitical and security calculations (Blanchard & Flint, 2017) and temporalities confronting visions of desired futures with ruins of forgotten pasts (Neuman Stanivuković, 2023). In this paper, we further ask how infrastructural imaginaries of roads connect to the broader logics, strategies and (counter-)politics of 'economic growth'.

In line with Raisová and Ďurčová (2014, p. 184), we interpret 'economic growth' as 'an increase in the capacity of an economy to produce goods and services', a concept that is widely recognized today as the main marker of societal progress and wellbeing in the world economy (Campbell-Verduyn & Kranke, 2025a). In this sense, we attend to a growing body of critical social science scholarship – particularly in fields like human geography, political ecology, anthropology, and science and technology studies – adopting relational conceptualizations of economic action and interactions in infrastructure arrangements (Anand *et al.*, 2018; Cezne & Otsuki, 2025; Dalakoglou & Kallianos, 2018; Harvey & Knox, 2015; Hönke *et al.*, 2024). This literature does more than simply question whether infrastructures and their associated institutional frameworks spur growth. Rather, it sheds light on the diverse meanings and functions that growth (counter-)agendas acquire in and through infrastructural socio-materialities, while also signalling the contingencies and (uneven) political and economic effects of these processes. In this vein, researchers have shown how infrastructures frequently embody grand narratives of economic growth that are tied to the 'fate of the nation', justifying power centralization measures, exceptional legal-political regimes and securitization practices (Bridge *et al.*, 2018). Others have challenged conventional growth paradigms by showcasing how infrastructures can support 'degrowth' solutions by reorganizing spaces based on material and energy downscaling and principles of care, justice and solidarity (Mazarro *et al.*, 2023). Others yet have voiced concerns about infrastructural developments that seek to make growth 'green' (e.g. the mining of critical minerals, renewable energy systems), criticized for their accumulative and extractivist structures (Dunlap *et al.*, 2024).

Heeding these perspectives and this special issue's guiding conceptual premise, we posit that roads provide enticing empirical windows to ground the concept of 'growth' in actual socio-material realities and to apprehend 'how moving [or not] beyond growth might be *thought of* and *acted on*' (Campbell-Verduyn & Kranke, 2025a). In this spirit, we approach the BR-319 Highway – a core infrastructure to ambitions of growth-led development in the Amazon – in terms of this special issue's conceptual proposition of 'growth infrastructures', defined as 'socio-material arrangements oriented

towards or facilitating the pursuit of economic growth' (Campbell-Verduyn & Kranke, 2025a). By combining this conceptualization of growth infrastructures with the lens of infrastructural imaginaries, we examine how BR-319 is thought of and acted on to generate and sustain diverse (counter-)articulations of 'growth' and, relatedly, how these dynamics shape the ways in which infrastructural politics are imagined and realized in the Amazon.

We enrich discussions of the infrastructure-growth nexus by considering the specific circumstances of globally vital yet vulnerable Amazonian rainforest landscapes. Here, the pursuit of infrastructural development and economic growth holds far-reaching global consequences such as to climate cycles, ecological balances, food security and water regimes (Nobre & Borma, 2009). Implications are thus not only locally manifested through increased ecological degradation and livelihood impacts but also threaten the very enabling conditions (climatic, geophysical) for sustained economic growth more globally.

Brazil's BR-319 Highway

Infrastructure interventions in the Amazon have long been divisive, contentious and problematic (Atkins, 2018). Roads in particular have been approached to capture the complexities, ambivalences and wider consequences surrounding infrastructural interactions (political, environmental, economic, racial) in Amazonian geographies, and how such dynamics possess an important ideational nature. Harvey and Knox (2015), for example, have reflected on the Iquitos-Nauta Highway in the Peruvian Amazon to assert how, despite evidencing instances of state absence and failure, the road has remained a persistent conveyor of future imaginaries of development and progress. Uribe (2017) has approached the Pasto-Mocoa 'frontier road' in the Colombian Amazon to describe the violent ways through which the Amazon region is incorporated into hegemonic imaginaries and spatial order of the Colombian nation-state. In the Bolivian Amazon, Hope (2022) has examined the Villa Tunari-San Ignacio de Moxos road to explore how citizens distinctively (re-)imagine and claim their relationship to the state.

Similarly to these roads, Brazil's BR-319 Highway evidences the multifaceted, contested meanings and functions of infrastructural development in the Amazon. Situated in the biodiversity-rich interfluve between the Purus and Madeira rivers, BR-319 stretches over 877 kilometres (km) and links Brazil's largest Amazonian metropolis, Manaus (the road's starting point, marked as km 0), to Porto Velho (the road's endpoint at km 877) (see Figure 1). The highway was built in 1972–1973 and officially inaugurated in 1976 by the Brazilian military regime. Its construction was motivated by developmentalist visions for the Amazon region, ambitions to connect Manaus to the southern regions, and aspirations of forming an Inter-Oceanic Highway linking South America's Pacific and Atlantic coasts (Andrade *et al.*, 2021;

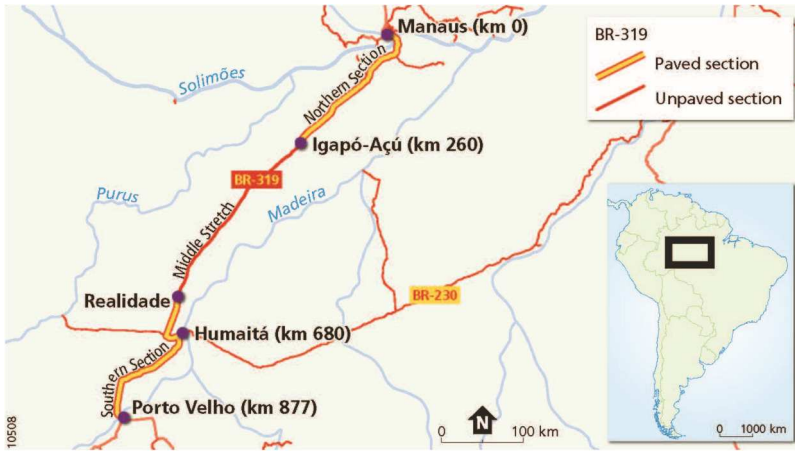

Figure 1. Location and the different segments of BR-319.
Source: Produced by Ton Markus, Utrecht University.

Ferrante *et al.*, 2020). Yet, the road soon deteriorated and, as of the mid-1980s, large parts became impassable and were subsequently abandoned due to harsh tropical conditions, poor construction and maintenance practices, and lack of economic viability (Fearnside & Graça, 2006).

Today, the BR-319 Highway roughly consists of three main sections (see Figure 1):

(1) a northern section from Manaus (km 0) to Igapó-Açú (km 260);
(2) a middle section from Igapó-Açú to Humaitá (km 680), conventionally known as the 'Middle Stretch';
(3) a southern section between Humaitá and Porto Velho (km 877), which also intersects with the Trans-Amazon Highway (BR-230).

The northern and southern sections of BR-319 are mainly paved and have seen regular traffic throughout the years. But the roughly 400 kilometres-long Middle Stretch, which passes through the densest of rainforest, has turned into a dirt, irregular road featuring sections of broken pavement, gravel and sand with large potholes, mud and collapsed wooden bridges (see Figures 2 and 3). As a temporary fix to improve trafficability, the Middle Stretch has been subjected to rudimentary maintenance works since 2014, allowing for it to be crossed during the dry months (May–November).

During the administrations of radical right President Jair Bolsonaro (2019–2022), plans to restore and pave the entire road have gained renewed impetus. This was reflected by the development of a controversial environmental impact assessment study for the Middle Stretch and the beginning of works for the reconstruction of a 52 kilometres-long section on the road's northern portion

Figure 2. Aerial view of BR-319's Middle Stretch.
Source: National Department of Transport Infrastructure (DNIT). CC BY-NC-ND.

(km 198–km 250) (Modelli, 2022). Yet, despite the re-election of leftist leader Lula da Silva for a third term in office (2023–ongoing) amid greater environmental commitments to the Amazon, such trends have not been reversed. Plans for reconstructing the BR-319 Highway have remained on the table with the establishment of a working group designed to take measures for renovating the road (Fearnside, 2024). In July 2025, eyeing oil drilling in the Amazon and the renewal of BR-319, the Brazilian Congress has passed a

Figure 3. Stuck in the mud during crossing of the Middle Stretch, November 2022.
Source: Eric Cezne.

controversial bill to loosen and fast-track environmental licensing procedures for infrastructural projects deemed 'strategic' for the nation (Wenzel, 2025). Opponents, encompassing environmental groups, academics and indigenous communities, have alerted that the road's upgrading and completion would mark the beginning of the end for the Brazilian Amazon, giving deforesters and land grabbers access to what remains of the country's rainforest (Ferrante *et al.*, 2021).

Against this backdrop, mirroring other major roads in the Amazon, BR-319 is often discursively touted as a means to expand development frontiers and associated with ideologies of economic growth, progress and mobility (Moran, 2016; Otsuki, 2011). Thus, the highway tends to be vested with an affective dimension, framed as something tangible that contributes to nation-building, economic sovereignty, and makes practical sense for Amazonian populations (Oliveira & Nogueira, 2024). BR-319 links, however, the relatively undisturbed central and western sections of the rainforest to Brazil's notorious 'arc of deforestation': an area stretching along the southern and eastern portions of the Brazilian Amazon experiencing intense illegal deforestation rates, active land conflicts, and the encroachment of indigenous reserves (see Figure 4). At the same time, the road also co-exists with sustainability agendas, as its

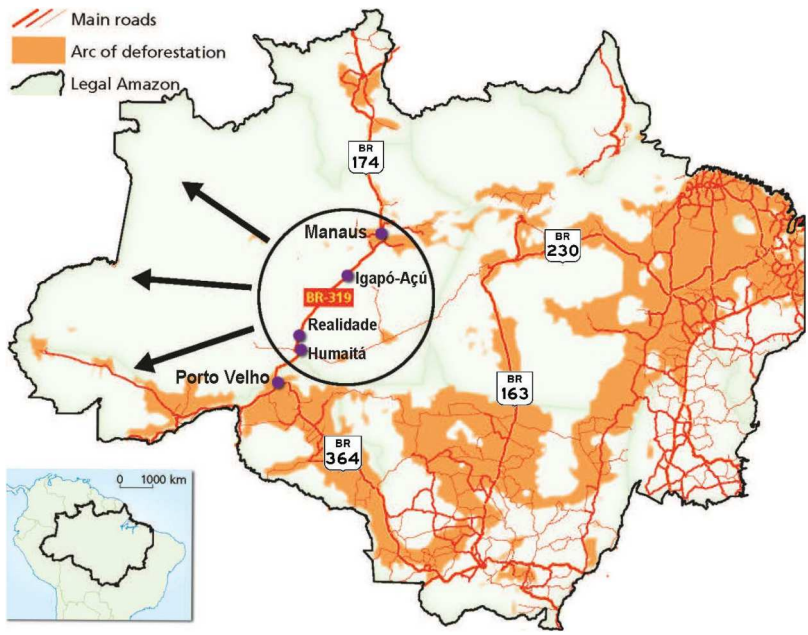

Figure 4. Major roads and the arc of deforestation in the Brazilian Amazon.
Source: Produced by Ton Markus, Utrecht University, based on data from the Brazilian National Institute for Space Research (Brazilian National Institute for Space Research (INPE), 2024): https://terrabrasilis.dpi.inpe.br/app/map/deforestation?hl=en.

surroundings consist of large stretches of conservation units and indigenous reserves devised to promote preservation, forest management, ecotourism and sustainable natural resource extraction (Ferrante *et al.*, 2020).

Therefore, BR-319 has ambivalent characteristics, simultaneously serving competing functions and interests. To build on Otsuki (2013b) and Atkins (2018), this ambivalence evidences the multi-dimensional framings and imaginaries that underlie infrastructural development in the Amazon, revealing distinct visions and practices of development, economic storylines and (de)legitimation struggles. Our analysis, focusing on three competing infrastructural imaginaries, contributes to existing scholarship on the relational and ideational geographies of infrastructures and roads in the Amazon (cf. Atkins, 2018; Harvey & Knox, 2015; Hope, 2022; Moran, 2016; Uribe, 2017) by centring on how the pursuit of economic growth mediates infrastructural framings and interactions. But it does so without losing sight of how such processes build on and intersect with well-studied trends of uneven distributions, environmental costs, socio-spatial violence, extractivism and contestations that have long characterized infrastructure interventions in the Amazon and beyond.

'Our right to come and go and to develop a region with surpluses of forest': The road as a path to economic development and freedom

A common infrastructural imaginary connected to the reconstruction of the BR-319 Highway sees the road as an indispensable condition for economic development and freedom in the Amazon. In this sense, BR-319 is essential for exerting rights, freedoms and choices linked to economic well-being, progress, mobility and citizenship. This infrastructural imaginary is also imbricated with long-entrenched national ideals of populating, integrating and modernizing the Amazon (Chaves, 2007). Today, the attribution of 'economic development' and 'freedom' symbolisms and purposes for BR-319 is championed by the local political establishment, the bulk of urban populations, roadside communities, road-users and actors engaged in extractivist activities such as large-scale farmers, cattle ranchers, miners and loggers – groups who now make up the majority of Amazonian populations (Richards & VanWey, 2015). Not surprisingly, their arrival and settlement in the Amazon is intimately connected with, precisely, the development of roads and the consequent proliferation of mining, dam building and agribusiness initiatives across the region, particularly since the 1970s (Becker, 2001). These groups largely perform economic activities and have socio-spatial existences constructed around the centrality of cities, automobility, consumption and extractive modes of accumulation and growth (Richards & VanWey, 2015).

For our interlocutors here, the abandonment and precarious state of the BR-319 Highway is imagined as one of the main drivers of underdevelopment in the Amazon. The region, they often underscored, exhibits one of Brazil's lowest

economic and human development indicators (IBGE, n.d.). Accordingly, the lack of good roads, as exemplified by BR-319's deterioration, leads to the isolation of the Amazonian populations from the rest of the country, deprives people from basic citizenship rights (healthcare, education, mobility, prosperity), and hinders the exploitation of the region's wealth and resources. In the words of Eduardo Braga, an Amazonas state Senator, the recovery of BR-319 is a 'humanitarian, social, and economic necessity' (Portal da Floresta, 2023). For former President Bolsonaro, paving BR-319 would fulfil 'a wish of the Amazonian people' (McCoy, 2022). Yet, to draw on scholarship on shifting demographic trends in the Brazilian Amazon (Richards & VanWey, 2015; Schor *et al.*, 2018), such concerns and demands are specifically bolstered by increasing processes of urbanization, shifts to urban lifestyles in the region, and the wishes of Amazonian urbanities, principally those in or close to Manaus.

Known as the 'jungle metropolis', Manaus is a sprawling city in the heart of the Amazon Basin, home to about 2.2 million people and the largest urban centre in the entire Amazon (IBGE, n.d.). It also boasts one of Brazil's main industrial parks at the Free Economic Zone of Manaus, hosting major manufacturers in the automotive, electronics, pharmaceuticals, chemicals and food processing industries. Yet, Manaus is virtually cut-off from Brazil's main road networks. Two major federal highways serve the city: the north-bound BR-174, which provides a route to Venezuela (see Figure 4); and the south-bound BR-319. As such, BR-319 is Manaus' main and only road connection to Brazil's comparatively wealthier and most populous southern regions. While BR-319 formally starts in Manaus, access to the remainder of the highway requires a 40-minute ferry crossing over the wide Amazon River. Coupled with BR-319's unfinished state, which makes it passable only in the dry months (May–November), Manaus' road link with the rest of Brazil is, therefore, tenuous and unreliable. Thus, the interests, wishes and life-worlds of inhabitants, economic actors and political elites in or linked to Manaus have long been central to infrastructural imaginaries about BR-319 and decisively shape main pro-road stances and lobbying efforts (Fearnside & Graça, 2006).

For these actors, 'economic development' justifications for the reconstruction of BR-319 essentially revolve around two benefits. Purportedly, the first is by leading to cheaper consumer goods. Shipping costs to Manaus, which also acts as a regional distribution centre, can be over five times more expensive than the Brazilian average (Guia do TRC, 2015), given the longer distances and reliance on river and air freight. Lower freight costs enabled by the road could significantly reduce prices for essentials such as food and medicine and result in better social security and more disposable income, particularly for Manaus' urban poor. Relatedly, a good and reliable road link to Manaus could allegedly bring more economic dynamism and growth to the region and empower roadside communities, enabling them to commercialize their produce, acquire much needed supplies, and seek healthcare in the city. Today, many of these

populations have hindered access to Manaus due to the impassable mud in the rainy season, the frequent collapse of bridges, and long travel times. Such narratives are frequently featured in the local media, with Manaus' largest newspaper *A Crítica* depicting the plight of local communities to reach the city through headlines such as 'Precarious crossings and a feeling of abandonment' (*A Crítica,* 2025a) and 'BR-319: the agony continues' (*A Crítica*, 2025b).

The second anticipated benefit is that BR-319 would offer a better, faster and more reliable logistical option for supply chains and the manufactured goods assembled in the Free Economic Zone of Manaus, nowadays almost totally reliant on slow river cargo ships. In this regard, according to the leader of Friends of BR-319, a pro-road lobbying group based in Manaus, a fully restored BR-319 could have a positive knock-on effect, favouring the development of associated infrastructures, such as a railway that could run parallel to the road and support the industrial park. Moreover, noting that Manaus and Georgetown in Guyana are 'only' about 1,000 kilometres apart, he proposed that the railway could even be extended to the Caribbean Sea. 'The products of the Free Economic Zone would directly go to the Caribbean Sea, with a much lower cost and privileged access to the US market',[1] he said, touting the road as a true growth infrastructure: one that can stimulate economic growth while literally making other infrastructures grow out of it.

Alongside economic benefits, 'freedom' repertoires are also preponderant in shaping favourable infrastructural imaginaries of BR-319, extending significations of 'growth' to the individual level. For many in large cities like Manaus and Porto Velho, this strongly revolves around 'freedom of movement' aspirations. For them, the road would enable citizens to exert their constitutional right to come and go. 'We want to have the freedom to hop on a car with our family and drive to Rio or São Paulo', declared an Uber app driver in Manaus.[2] 'The paving of this highway would connect us to the whole of Brazil. We are isolated here', said a former road maintenance worker turned into a BR-319 vlogger for YouTube.[3] For the leader of Friends of BR-319, what is at stake with the highway is 'our right to come and go and to develop a region with surpluses of forest'.[4] He then concluded: 'BR-319 is a path to freedom'.[5] Tellingly, these constructions reveal how 'freedom of movement' referents are fundamentally tied to the achievement of broader individual liberties, rights and choices attached to modern living, sovereignty, healthcare and citizenship that should be enjoyed by the local people (cf. Hope, 2022).

The COVID-19 crisis was recurrently brought up as an example to justify these assertions. In the beginning of 2021, Manaus was the global epicentre of the pandemic due to the emergence of a new, more infectious coronavirus variant, which resulted in the deadly collapse of the city's health system due to severe oxygen shortages (Ferrante *et al.*, 2022). Local politicians and media quickly attributed the collapse to BR-319's poor state, which allegedly slowed down the delivery of oxygen into Manaus (Marques, 2021). 'That's why we need to urgently restore BR-319. It leads to death. It leads to misery', summarized the above-quoted vlogger.[6]

In pro-road circles, one particular character was rendered responsible for BR-319's paralysis, the COVID-19 tragedy, and other malaises in the region: the so-called 'environmentalist', constructed as a catch-all category to describe critics and opponents of BR-319, including ecologists, academics, social movements, NGOs and foreign entities. The 'environmentalist' was accused of promoting through 'environmental terrorism' (BNC-Amazonas, 2025) anti-road agendas that are also anti-growth, anti-development and anti-freedom, and of co-opting indigenous populations to impede roadbuilding progress and national development. For the leader of Friends of BR-319: 'We see the [Bolsonaro] government's good will in wanting to repave the highway. But we see the environmentalists blocking it all the time'.[7] Such depictions not only delegitimize opposition to the road as working against the 'fate of the nation' (Bridge *et al.*, 2018), but through the construction of the 'environmentalist' monolith, they also obfuscate the complexities of struggles and activisms around BR-319 and negate the agency of Amazonian minorities, perceived as co-opted subjects.

The enactment of economic development- and freedom-based infrastructural imaginaries for BR-319 reveals, moreover, how roads in the Amazon interweave with populist radical right (anti)environmentalism. While the 2022 Brazilian elections saw leftist leader Lula defeating radical right incumbent Jair Bolsonaro on a tight race for the presidency, Bolsonaro led the vote count in the two main cities connected by BR-319, Manaus and Porto Velho (Uol, 2022). In 2022, candidates allied with Bolsonaro also won elections for governor in six out of nine Amazonian states, including the states of Amazonas and Rondônia (Turtelli & Casado, 2022). This demonstrates the strong inroads made by (radical) right political forces, agendas and ideologies across the Amazon region (Menezes & Barbosa Jr., 2021). Roads have been central to such developments by enabling and accelerating demographic, cultural and economic shifts associated with the advent of agribusiness, cattle ranching and mining in Amazonian landscapes (Richards & VanWey, 2015). (Radical) right-wing actors, parties, and movements in Brazil have tangibly and aptly built on such trends, signifying the appeal of roads like BR-319 in relation to the immediate practical needs, economic wishes and daily concerns of the 'Amazonian people', who tend to be homogenized as patriotic, orderly, religious and freedom-loving but neglected by a 'corrupt elite' (cf. Barbosa Jr & Casarões, 2022). With the 'people' central to such constructions, BR-319 acquires religious, biblical overtones linked to man's conquest and mastery over nature, mirroring earlier human-settlement trends of the 1960s–1970s when religious beliefs provided ecological and governance rationalities for occupying the Amazon (Otsuki, 2013a). In justifying the need for BR-319, the head of the Conservative Movement of Amazonas explained:

> We need to prioritize the 'man'. Always. We cannot be subservient to nature. You cannot pre-judge people here to the detriment of a bunch of trees. We

> must understand that the Amazon is not only forest. It has its people. And the priority for us is the people.[8]

Vesting BR-319 with a civilizational mission, he went on to assert how the road can provide indigenous populations with individual liberties and possibilities linked to automobility, material consumption and economic growth:

> Do you think an indigenous person wants to live in the middle of the forest hunting animals? Or, let's say, he could have a car, a phone, a school of quality for his child, a good quality hospital inside [the reserve]. I have spoken with many indigenous people: most of them are in favour of mineral exploitation within their lands.[9]

In tandem with broader practices of the populist radical right globally (Abrahamsen *et al.*, 2020), conservative stances about BR-319 and infrastructure development in the Amazon rest, furthermore, upon a fierce dualistic imagination and rhetoric of 'us versus them', 'nationalism versus globalism', 'growth versus anti-growth', 'people versus elite', and 'human versus nature'. Capturing it all, another representative of the Conservative Movement of Amazonas highlighted:

> There is a war waged against us by those who do not want the economic development of our state. This is not only a thing from local environmentalists. This also involves environmentalists from abroad, who tell us that we cannot touch our forest. This is a punishment for our people. Well, Americans, Europeans and Japanese come here and tell us not to touch our forests. But which of them has untouched forests like ours? [10]

While BR-319, along with associated imaginaries of economic development and freedom, has been fervently cherished by the Brazilian radical right, the road receives broad support across the entire political spectrum – though attached symbolisms and meanings may differ, as we discuss below. For an Amazonas state legislator affiliated with a leftist political party and formerly the mayor of Manaus: 'It is hard for someone who is outright contrary to roads and BR-319 to be elected here'.[11] As explained, today almost 80 per cent of the population in the state of Amazonas lives in cities, most of whom in Manaus and adjacent metropolitan areas (SEDECTI-AM, 2021). These populations are already habituated to an urban economy premised on the rapid exchange of goods and services that are typically concentrated in cities, and have grown accustomed to urban materialities, lifestyles and temporalities in which roads and rapid mobility are paramount (Richards & VanWey, 2015; Schor *et al.*, 2018). Such conditions and experiences largely dictate perceptions of what is (and what can be desired) from 'economic

development' and 'freedom' and explain why roads such as BR-319 are imagined by the majority of Amazonian populations today as indispensable 'growth infrastructures'.

'BR-319's deterioration as a shield for the Amazon': The road as unleashing a surge of destruction

The second infrastructural imaginary of the BR-319 highway revolves around positions seeing the road as one of the greatest threats to the Amazon rainforest. This view is mainly shared by ecologists, climate scientists, public prosecutors, organizations like the Observatory of Climate (which gathers 120 Brazilian NGOs), indigenous communities and other traditional forest populations – groups that are pejoratively lumped together under the 'environmentalist' label by the BR-319 proponents (see above). Here, BR-319's deteriorated state is imagined as a shield against the forest's destruction. Specifically, it is argued that improving and paving the roughly 400 kilometres-long Middle Stretch (see Figure 1) will be a premeditated tragedy and the beginning of the end for what remains of the rainforest. For actors and groups supporting this perspective, BR-319 must not be restored and should not have been built in the first place. A key concern is that a fully restored BR-319 would expand Brazil's 'arc of deforestation' and associated dynamics of conflict, violence and land-grabbing into rainforest areas that have been mostly spared to date, precisely due to the lack of good roads.

As shown in Figure 4, the progression of the arc of deforestation has a clear correlation with roadbuilding processes, as major road projects in the Brazilian Amazon such as the Trans-Amazonian (BR-230), Cuiabá–Santarém (BR-163) and Cuiabá–Porto Velho (BR-364) highways opened formerly closed forest areas to initial degradation and exploitation. The three roads function today as main arteries of the arc of deforestation, where the landscape is a mosaic contrasting heavily degraded areas, farms, and towns with sparse forest fragments. The occupation and deforestation of these spaces have followed familiar land-grabbing patterns throughout the Amazon (Ferrante *et al.*, 2021). First, the construction of a road exposes public protected forest areas (e.g. indigenous reserves, conservation units) for illegal logging and mining. Once the vegetation is cleared, the land is prepared for initial human occupation and small-scale farming. Landholders then act to request, obtain, or forge land titles, eventually selling the land for great profit margins (Ferrante *et al.*, 2020). Ultimately, the land is absorbed by large-scale agribusiness or developed into towns. Across the Amazon, these dynamics have been marked by acute violence and conflict, with serious impacts on traditional populations such as indigenous peoples and riverside communities (Fearnside & Graça, 2006; Ferrante *et al.*, 2021).

The opponents of BR-319 thus fear that the completion of BR-319 will expand the arc of deforestation and conflicts along the road. They warn, moreover, that the resulting destruction will not be limited to the immediate

roadsides of BR-319 but will extend well beyond the highway's route due to the so-called 'fishbone effect' (Sansolo, 2022). This occurs when the development of a road leads to other (legal or illegal) side roads emerging from the main line. Such dynamics can compound the spread of deforestation, justifying fears that BR-319 will lead to destruction of what remains of the rainforest, offering land-grabbers access to vast untouched tracts of land. This would draw the Amazon closer to what ecologists describe as a 'tipping point', beyond which the rainforest would enter a self-sustained cycle of 'dieback' as it turns into a savannah, with irreversible consequences to global warming, ecosystem services and water cycles (Nobre & Borma, 2009).

Such an imaginary can be justified through the observation of the district of Realidade, a booming town at the southern end of BR-319's Middle Stretch (km 570) (see Figure 1). Realidade was established in 1972 as a camping site for roadbuilders and in 2007 turned into a settlement for landless farmers. During the 2010s, political promises to pave BR-319 attracted an influx of small-scale farmers, cattle ranchers and illegal loggers, significantly changing the profile of the residents (Oliveira & Nogueira, 2024). In Realidade, it was common to spot billboards advertising land for sale, logging trucks, lumber mills, agribusiness shops and roadside businesses such as auto repair shops, guest houses and snack bars.[12] This influx of people and new businesses led to a 122 per cent increase of deforestation in the area between 2020 and 2022, a period which coincided with the Bolsonaro's government announcement of repaving the Middle Stretch (Observatório do Clima, 2024). Extensive illegal road offshoots (i.e. the fishbone effect) followed such dynamics, compounding environmental degradation and land conflicts. 'If you imagine BR-319 as a spearhead for Amazonian deforestation, Realidade is the tip of it', summed up a senior researcher from the Federal University of Amazonas.[13]

Interviewees objecting to BR-319 also contested and debunked imaginaries of the road as essential for economic development and growth. As explained by a researcher of the National Institute of Amazonian Research (INPA): 'the road is not economically viable, not even for Manaus'.[14] He argued that freight costs from Manaus to São Paulo via BR-319 are three times greater than using the Madeira River, which flows parallel to the road (cf. Ferrante *et al.*, 2021; see Figure 1). 'The river is the main and most efficient logistical link between Manaus and Porto Velho, on top of being already there and not so disruptive', he added.[15] Furthermore, he observed how Manaus's own industrial park has long produced studies asserting that the current logistical option to and from the southern regions, consisting of a combination of river shipping, cabotage and road transport via other highways, is in fact cheaper – and more reliable – than using BR-319 (CIEAM, 2023). 'The knock-on effect argument [that BR-319 favours the development of associated infrastructures and compounds economic growth]', according to the INPA researcher, 'is not only fallacious but also dangerous: the only concrete knock-on effect that we see is the fishbone effect'.[16] BR-319 has resulted in more than 4,000 kilometres of illegal secondary roads that have massively expanded deforestation,

contributing to organized crime and the illicit economy (Observatório BR-319, 2021).

For the opponents of BR-319, the fact that the road decayed and was abandoned in the 1980s due to a lack of demand and traffic already evidences its inadequacy for economic development. Academic interviewees added that BR-319 is in fact counter-productive for both regional and national economic development interests.[17] Regionally, the fishbone effect set to occur with the restoration of BR-319 will lead to massive soil erosion, with sediments washed off into streams and rivers. This can cause siltation and undermine navigability on the rivers, the region's main economic lifelines. Moreover, the consequences of deforestation and a warming climate already expose the Amazon to less rainfall and unprecedented droughts, causing rivers to shrink, hampering shipping operations, and increasing costs of food, medicine and other essentials (Marengo & Espinoza, 2016). The Amazonas State Industry Federation has warned about the grave economic consequences of soaring freight costs for the industrial park in Manaus, which can be up to US$5,000 more per dispatched container during periods of severe droughts (Zanatta, 2024). Nationally, the spread of deforestation can threaten Brazil's agribusiness belt in the central and southern regions, responsible for half of the country's total exports, as these areas are dependent on the Amazon for about 40 per cent of their rainfall (Ferrante *et al.*, 2023). In this sense, the precarious state of BR-319 ends up protecting Brazil's overall economic growth and status as a global agribusiness powerhouse, while preventing further deforestation.

Finally, the opponents challenge imaginaries of the road as a path to freedom for the 'Amazonian people'. According to an ecologist with the Wildlife Conservation Society Brazil (WCSB):

> The real, authentic Amazonian people, those who are historically linked to Amazonian territories, are indigenous populations, riverside dwellers, Brazil nut collectors, rubber-tappers. They are spread along rivers, not along roads, and do not have an interest in roads. Those along roads are usually outside migrants who got there, precisely, because of the road and in search of opportunities linked to the road.[18]

Questioning commonly deployed 'freedom of movement' repertoires by roadside communities and urban populations, the above-quoted INPA researcher added:

> People have their right to come and go. But what they don't have is a right to a construction project of billions to bring asphalt to their homes in the middle of the rainforest, especially if this project results in irreversible damages to the country.[19]

On this point, the WCSB ecologist added that it is naive for roadside families engaged in small-scale agriculture in the Middle Stretch to think that they can

sell their produce in Manaus with a better road. 'With a better road, they will most likely be violently encroached and removed from their land by larger agribusinesses', he justified (cf. Ferrante *et al.*, 2021).[20] Citizenship claims linked to better health, e.g. by expediting travel to Manaus for better healthcare, are also contradicted by the fact that the costs for upgrading and maintaining the road far exceed the costs of building adequate health facilities in roadside communities. A good road does not guarantee good healthcare either: municipalities in the Brazilian Amazon served by major, paved roads have long exhibited some of the country's worst public health indicators (Viegas *et al.*, 2024).

The opponents have also addressed the 2021 COVID-19 spurred oxygen crisis in Manaus, which is often used to legitimize BR-319. They argue that blaming the lack of good roads for the crisis is fallacious because the parallel Madeira River could have been used instead to take the oxygen from Porto Velho.[21] Fearnside *et al.* (2021) note that this was a politically convenient strategy, to spare authorities from their deadly mismanagement of a crisis whose imminence has been warned two months in advance by scientists.

In light of the above, the INPA researcher, whose work and activism opposing the road has resulted in death threats, summarizes what is at stake: 'BR-319 is about exponential growth for deforestation, land-grabbing and zoonotic diseases – not economic growth'.[22] Or, to resonate with Livingston (2019), it is about a 'self-devouring growth' that eats up resources and leads to lower collective welfare and well-being in the long run.

'The best of both worlds': The road as co-existing with sustainability aims

The third and final infrastructural imaginary of BR-319 sits between the two previous positions. As described by an environmental consultant working in the road's influence area:

> The road is already there and cannot be undone. It will be built regardless. Thousands of people live on its route and depend on the road. So how we need to think the road is in terms of consolidating governance over the territory. Ensuring adequate co-existence with indigenous reserves and conservation units. Promoting sustainable development and green growth.[23]

In this regard, BR-319 is imagined as having functionalities that can reconcile road mobility with sustainability aims, to be achieved through robust environmental and territorial governance agendas. This view is favoured by environmental NGOs and consultancies like the Institute of Conservation and Sustainable Development of the Amazon (IDESAM), the Worldwide Fund for Nature (WWF) and the Getúlio Vargas Foundation (FGV); some academics and politicians identified with the progressive left; and Lula's current presidential administration.

BR-319 is surrounded by 63 officially recognized indigenous lands and 28 conservation units (Ferrante *et al.*, 2020). For actors favouring the road-sustainability imaginary, BR-319 can support community-based resource management, ecotourism and the bioeconomy (FGV, 2021; Observatório BR-319, 2023; WWF, 2019). Accordingly, the reconstruction of the road may be pursued, provided indigenous populations are adequately consulted and strong environmental licensing requirements are met. This should be facilitated by what FGV (2021) calls a 'Territorial Development Agenda', including capacity building mechanisms for local communities, participatory processes, inter-institutional dialogues and financial instruments. Such an approach, according to a civil servant at the Brazilian Institute of the Environment and Renewable Natural Resources (IBAMA), can allow for the 'best of both worlds, stopping this arc [of deforestation] and providing terrestrial access to 2 million people in Manaus, all while empowering local communities to control devastation and make money from biodiversity'.[24]

Field observations in localities such as Igapó-Açú (see Figure 1), a community on the northern edge of BR-319's Middle Stretch (km 260) exhibiting relatively low deforestation rates, highlighted many residents engaged in sustainable livelihood activities such as chelonian farming, the harvest of forest products (Brazil nuts, açaí berries), and artisanal fishing.[25] Consultancies, NGOs and scholars often cite the case of Igapó-Açú, which hosts a Sustainable Development Reserve, as a model that combines road access, forest preservation, community participation and the bioeconomy (FGV, 2021; Observatório BR-319, 2023; Sansolo, 2022), suggesting that it can inspire governance models for other sections of BR-319. In this sense, BR-319 is idealized as a 'green growth infrastructure' that can 'promote economic growth, with social inclusion and environmental sustainability' (FGV, 2021, p. 16).

However, while the road–sustainability imaginary represents their official or preferred view, some interviewees have admitted that enormous challenges complicate its implementation, conceding that such aspirations may be close to wishful thinking.[26] As conveyed by the IBAMA civil servant: 'We don't have capacity in terms of human, financial resources to handle this immense challenge'.[27] Accordingly, law enforcement in vast Amazonian territories remains elusive in face of Brazil's notoriously understaffed, underfunded security and environmental agencies, made worse in recent years under the Bolsonaro government (Menezes & Barbosa Jr., 2021). A recent study by Greenstein (2023) estimates that the Chico Mendes Institute for Biodiversity Conservation (ICMBio), the federal agency responsible for the management of Brazil's protected areas, has only 2.2 staff per 1,000 square kilometres. Ferrante *et al.* (2020) find that, by 2020, no consultations have ever been held with indigenous groups since the establishment of BR-319 and that the government only planned to consult five out the 63 indigenous territories impacted by the road. Adding to such challenges, scholars have cautioned about how the language of 'sustainability' has often functioned as a

smokescreen to green-wash and legitimize further ecological catastrophe and land occupation across the Amazon (cf. Atkins, 2018). This is seen, for example, in recent pushes to regularize and implement sugarcane – a crop currently prohibited in Amazonian biomes by Brazilian law – in the northern section of BR-319 based on pretexts of expanding biofuel production for the global energy transition (Ferrante & Fearnside, 2018).

Lastly, the aptitude through which radical right leaders have drawn on projects like BR-319 to appeal and relate to the immediate, tangible needs of what is today the sheer majority of Amazonian (urban) populations places the Brazilian political left – more programmatically supportive of sustainability agendas – in a tough spot. To remain politically relevant and competitive, progressive camps have embraced roadbuilding in the Amazon under beliefs that environmental ills can be controlled through adequate governance. But examples from the past offer useful guidance. In the 2000s, during Lula's first presidency (2003-2010), the reconstruction of the Cuiabá-Santarém Highway (BR-163) was conceived under the Sustainable BR-163 Plan, co-produced with NGOs, renowned environmentalists and academics. It was aimed at preventing deforestation, consolidating state presence and promoting sustainable growth (Government of Brazil, 2004). Then (and current) Minister of the Environment Marina Silva anticipated BR-163 as a 'corridor of sustainable development' (Fearnside, 2024). Today, BR-163 is one of the main arteries pulsing through the arc of deforestation (see Figure 4). This is what is feared for BR-319 under pretence sustainability and green growth imaginaries, indicating how 'best of both worlds' assumptions can turn into a 'worst world' reality.

Conclusion: The Amazon's road to growth?

Focusing on Brazil's BR-319 Highway in the Amazon, this paper has discussed how growth is articulated and contested through particular infrastructural imaginaries. We have uncovered three distinct infrastructural imaginaries of BR-319: (1) the road as a path to economic development and freedom; (2) the road as unleashing a surge of destruction; and (3) the road as co-existing with sustainability aims. In so doing, we have contributed to understandings of how 'growth infrastructures' are distinctively enacted and shaped in rainforest landscapes.

The first infrastructural imaginary underscored the role of urban life-worlds, extractive interests and mobility demands in legitimizing BR-319. Here, the restoration of the road was associated with more opportunities for resource extraction, commercial exchanges, industrial and agricultural production, consumption and other infrastructure-building. In this sense, BR-319 was deemed necessary to deliver development for supposedly remote and isolated Amazonian populations, a point nonetheless mainly echoed by comparatively better-connected urban citizenries. Relatedly, the road was also presented as an indispensable means for the 'Amazonian people' to pursue individual freedoms and

choices linked to modern and urban living, economic prosperity and mobility. Recent demographic, economic and political shifts in the Brazilian Amazon stemming from rapid urbanization, extractivist activities and right-wing populism make such visions the predominant imaginary for BR-319 today, projecting the wills and wishes of hegemonic groups as urgent and desirable economic futures for Amazonian populations more widely.

The second infrastructural imaginary revealed BR-319 as a different kind of 'growth infrastructure': one that leads to the exponential and uncontrolled growth of deforestation, the illicit economy and violence and conflicts in the Amazon. This perspective was defended by ecologists, scientists, NGOs and traditional forest populations, who hold that the road must not be restored. We have shown that BR-319's current, deteriorated state is imagined as a shield against the forest's destruction, holding off the advance of the arc of deforestation. BR-319 is also seen to threaten far more important regional and national economic activities such as agribusiness in the central and southern regions.

Finally, the third infrastructural imaginary established the road as a 'green growth infrastructure'. Environmental consultancies, some NGOs, progressive academic and political actors, and the Lula government defended that BR-319 can combine road mobility functionalities with sustainable development by securing access for communities to engage in forest preservation and the bioeconomy. Yet, accomplishing this on a broader scale is fraught with obstacles. We have discussed how the promotion of green growth has been formerly used to legitimize further land occupation and devastation and how past roadbuilding projects based on sustainability ideals turned into core vectors of deforestation.

In dialoguing with this special issue, our findings highlight how 'growth infrastructures' can be productively studied through ideational and relational frameworks (Campbell-Verduyn & Kranke, 2025a; Durrant, 2025). Along with Durrant (2025), Yürük and Karaman (2025) and Neuman Stanivuković (2025), we demonstrate how 'growth infrastructures' – whether in the form of roads, railways, ports, or tunnels – tend to be tied to the 'public benefit' and the 'fate of the nation', even if only serving dominant and selective interests. But we also join them in showing how such infrastructures are, nonetheless, sites of (geo)political contestation, prone to competing claims and (re-)significations at multiple scales. Still, contrary to other papers (Durrant, 2025; Campbell-Verduyn & Kranke, 2025b), our findings reveal that opposition to BR-319 does not necessarily warrant alternative approaches to economic growth such as those furthered in 'degrowth', 'post-growth', or similar projects. Rather, by leading to irreversible environmental and climate consequences, BR-319 is seen to undermine the very foundations of prevailing economic systems in the Amazon and beyond. At the same, we partake with Maechler and Boisvert (2025) and Hoffmann (2025) in problematizing 'greening growth' (cf. Hickel & Kallis, 2020) and contend that the attachment of 'green' labels to infrastructures often masks and perpetuates existing patterns of extractivism, violence and environmental destruction.

In terms of research gaps, due to field access limitations during the Brazilian electoral period, we have not fully explored imaginaries by indigenous peoples, historically vulnerable groups to roadbuilding in the Amazon. Future research could further advance our understandings and findings by looking into how indigenous cosmovisions calling for alternatives to development and economic growth (e.g. *Buen Vivir)* (cf. Gudynas, 2014) (re-)articulate and challenge 'growth infrastructures'.

The future of the BR-319 Highway is uncertain. The race to complete the road is re-gaining momentum, as Brazil has recently loosened its environmental licensing legislation and gears up for oil drilling off the Amazon River's delta – developments which coincided with the preparations for the first ever Conference of Parties (COP30) held in Amazonia, hosted at the Brazilian city of Belém in November 2025. Emblematically, the lead-up to the COP in Belém has been marked by the construction of a four-lane highway cutting through protected parts of rainforest to ease traffic to the city and climate summit (Wells, 2025). President Lula insists, however, that infrastructure-led growth and sustainability can co-exist, imagining 'the Amazon not as humanity's sanctuary … but as a means for Amazonian peoples to earn money from its preservation' (Agência Brasil, 2024). Yet, as we highlighted through the reality of Amazonian landscapes traversed by BR-319, the Amazon's road to growth can also potentially, and irreversibly, become the road to the rainforest's – and the world's – ecological collapse.

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Ethical approval statement

For the interviews and focus groups conducted in this study, research participants were asked to read and sign an informed consent form outlining the objectives of the study, the nature of their participation, and their rights (e.g. withdrawal). All communications, which lasted an average of one hour, were voice-recorded or accounted for through notetaking. Consent included permission to use anonymized excerpts for publication. The research project in which this study is embedded has been awarded and implemented in accordance with the Netherlands Code of Conduct for Research Integrity (NWO-Aspasia/015.013.054) and Utrecht University's Code of Conduct for Scrupulous Research Practice and Integrity.

Notes

1 Interview, leader of Friends of BR-319, Manaus, Amazonas, 27 October 2022.
2 Personal communication, ride with Uber app driver, Manaus, Amazonas, 13 October 2022.
3 Interview, BR-319 vlogger, Manaus, Amazonas, 18 October 2022.
4 Interview, leader of Friends of BR-319.
5 Interview, leader of Friends of BR-319.
6 Interview, BR-319 vlogger.
7 Interview, leader of Friends of BR-319.
8 Focus group with leader and members of the Conservative Movement of Amazonas. Manaus, Amazonas, 13 October 2022.
9 Focus group, leader and members of the Conservative Movement of Amazonas.
10 Focus group, leader and members of the Conservative Movement of Amazonas.
11 Interview, Amazonas state legislator with the Brazilian Socialist Party (PSB). Manaus, Amazonas, 27 October 2022.
12 Participant observations by the lead author while passing through the district of Realidade, Amazonas, 2–3 November 2022.
13 Interview, Professor at the Federal University of Amazonas (UFAM). Manaus, Amazonas, 22 October 2022.
14 Interview, researcher at the National Institute of Amazonian Research (INPA). Manaus, Amazonas, 24 October 2022.
15 Interview, INPA researcher.
16 Interview, INPA researcher.
17 Such views were mainly expressed in conversations at INPA and UFAM.
18 Interview, ecologist at Wildlife Conservation Society Brazil (WCSB) Brazil. Manaus, Amazonas, 13 October 2022. See also Schor *et al.* (2018).
19 Interview, INPA researcher.

20 Interview, WCSB ecologist.
21 Interview, INPA researcher; interview, WCSB ecologist.
22 Interview, INPA researcher. Attribution with participant's consent.
23 Interview, environmental consultant. Humaitá, Amazonas, 3 November 2022.
24 Online interview, civil servant at the Brazilian Institute of the Environment and Renewable Natural Resources (IBAMA), 27 October 2022.
25 Participant observations by the lead author in the Igapó-Açú community, Amazonas. 31 October–1 November 2022.
26 Such views were mainly expressed by academic and civil servant interviewees.
27 Online interview, IBAMA civil servant.

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