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TRANSFORMAÇÕES REGIONAIS CONTEMPORÂNEAS NO SUL DO AMAZONAS: EIXO TRANSAMAZÔNICO HUMAITÁ-APUÍ

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ABSTRACT

This article analyses contemporary regional transformations in southern Amazonas, focusing on the municipalities of Humaitá and Apuí, based on fieldwork carried out between 2022 and 2025. The research draws on conceptual discussions of 'pioneering fronts' and processes of innovation as drivers of territorial transformation. The results reveal the dynamics of expansion and subsequent reconfiguration of the pioneer front in Humaitá, associated with the intensification of commercial activities and the expansion of soybean and coffee cultivation. In Apuí, there is continuity and deepening of the pioneer front, highlighted by the expansion of coffee production and the advance of agro-industrial activities. In the district of Santo Antônio do Matupi, there is a predominance of agricultural and livestock production, accompanied by the establishment of new agro-industries and productive innovations. It can be concluded that the territorial transformations along the Trans-Amazonian corridor in Amazonas are driven by the transformation of the frontier regions, with their revitalisation and the increasingly widespread introduction of technical innovations in the agricultural sector (seeds and livestock) and in infrastructure (agribusiness and ports), reflecting a context of greater territorial complexity.

Keywords: agribusiness; modernization; public policies; agriculture.

RESUMO

O presente artigo analisa as transformações regionais contemporâneas no sul do Amazonas, com foco nos municípios de Humaitá e Apuí, a partir de trabalhos de campo realizados entre 2022 e 2025. A investigação fundamenta-se nas discussões conceituais de frentes pioneiras e nos processos de inovação como vetores de transformação territorial. Os resultados evidenciam a dinâmica de expansão e posterior reconfiguração da frente pioneira em Humaitá, associada à intensificação das atividades comerciais e à expansão dos cultivos de soja e café. Em Apuí, observam-se a continuidade e o aprofundamento da frente pioneira, com destaque para a ampliação da cafeicultura e o avanço de atividades agroindustriais. No distrito de Santo Antônio do Matupi, verifica-se a predominância da produção agropecuária, acompanhada da instalação de novas agroindústrias e de inovações produtivas. Conclui-se que as transformações territoriais no eixo transamazônico amazonense estão pautadas na transformação das frentes pioneiras com seu revigoramento e com a inserção cada vez mais presente de inovações técnicas no campo produtivo (sementes e nos rebanhos) e nas infraestruturas (agroindústrias e porto) evidenciando um contexto de maior complexidade territorial.

Palavras-chave: frente pioneira; reestruturação territorial; rede urbana; sul do Amazonas; agroindústria.

INTRODUCTION

One of the most dynamic territorial segments in the state of Amazonas in recent times is Southern Amazonas, encompassing municipalities such as Humaitá, Lábrea, Apuí, Canutama, Manicoré, Boca do Acre, and Borba. Within this group, Humaitá, Apuí, and the southern portion of Manicoré stand out for intense territorial transformations associated with the expansion, retraction, and reconfiguration of pioneer fronts. These dynamics manifest primarily along the highway axes of the BR-230 (Lábrea–Apuí), the BR-319 (southern section between Toca da Onça, Humaitá, and Porto Velho), and the AM-174 (Apuí–Novo Aripuanã), highlighting distinct vectors of territorial transformation linked to both circulation and production.

This article analyzes contemporary regional transformations in Southern Amazonas, focusing on the municipalities of Humaitá, southern Manicoré, and Apuí, based on two fieldwork expeditions conducted between September 17–23, 2022, and December 19–27, 2025. The analysis seeks to understand recent pioneer-front dynamics by linking changes in production systems to territorial innovation processes.

Theoretically, the study rests on the classical discussion of pioneer fronts, first articulated by Bowman (1945), Monbeig (1945; 1984), and Bernardes (1953), and later revisited and updated by Théry (1980; 2005), Poccard-Chapuis (2004), Castro de Jesus et al. (2022), and Oliveira Neto (2024). It also incorporates the debate on territorial innovation proposed by Tunes (2016; 2020) and Silva and Egler (2004). This theoretical framework allows for interpreting pioneer fronts not merely as spaces of expansion but as territories undergoing restructuring, marked by the introduction of innovations and the growing complexity of their economic and spatial dynamics.

The connection between the framework and fieldwork revealed two phases. The first, along routes such as Manaus–Lábrea and Lábrea–Humaitá–Apuí, documented changes in urban networks and pioneer fronts linked to expanding productive activity. The second, along routes such as Manaus–Humaitá, Humaitá–Apuí, and Apuí–Santo Antônio do Matupi–Humaitá, showed recent pioneer front shifts. These include new agro-industries (dairies and slaughterhouses), reduced logging, increased coffee production, and land-use changes such as replacing pasture with crops. These trends suggest productive diversification, still rooted in cattle ranching but increasingly involving technical and organizational innovations.

To address these transformations and their main vectors, the article is structured around a discussion of pioneering fronts in territorial innovation. To address these transformations and their primary vectors, the article links the discussion of pioneer fronts to territorial innovation processes. It is organized into three sections: the first analyzes contemporary pioneer-front dynamics in Humaitá, emphasizing its expansion and reconfiguration from 2022 to 2025; the second examines the recent formation and transformations in the municipality of Apuí; and the third addresses changes observed in the district of Santo Antônio do Matupi, highlighting its role in consolidating new regional productive dynamics.

HUMAITÁ – RECENT CHANGES IN A PIONEER FRONT

One of the territorial fractions that most vividly expresses the spatial transformations associated with contemporary pioneer-front dynamics in Southern Amazonas is the axis linking Humaitá and its immediate surroundings (Castro de Jesus *et al.,* 2022). These transformations manifest as expanding economic activities within a broader context of productive restructuring and the diffusion of territorial innovations. These innovations occur in production—using soybean seeds (MSOY 8644 IPRO and 3850 IPRO) (Freitas, 2020) and coffee (BRS Ouro Preto and Robustas Amazônicos) (Embrapa, 2020)—and circulation, through engineering systems like grain ports (Oliveira Neto, 2020; Castro de Jesus et al., 2022) and agro-industrial units (Oliveira Neto et al., 2024).

Regarding pioneer fronts, this movement involves territorial incorporation and transformation marked by the expansion of productive activities—such as agriculture, grain production, and logging—historically linked to the occupation of the Amazon via highway axes and colonization projects (Théry; Poccard-Chapuis, 2014; Oliveira Neto; Théry, 2025; Castro de Jesus, 2026). In this context, the municipality of Humaitá exhibits cycles of dynamism, stagnation, and revitalization, reflecting the processual nature of these fronts.

Recent studies (Lima, 2005; 2008; Castro de Jesus *et al*., 2023; Castro de Jesus, 2024; 2026; Oliveira Neto, 2024; Araújo Filho *et al*., 2025) indicate an expansion of activities tied to cattle ranching, logging, grain production (soy and corn), and coffee farming, primarily along the southern portion of the BR-319. More recently, however, these dynamics have shifted; activities such as wildcat

mining (garimpo) and deforestation have declined due to strengthened environmental oversight and intensified land commercialization processes.

Concurrently, new territorial dynamics have emerged, including the establishment of agro-industries over the last decade (Oliveira Neto et al., 2024) and the consolidation of transport networks that move production toward centers such as Porto Velho and, especially, Manaus. Three distinct productive circuits are articulated with the pioneer front in this context.

The first is short circuit, mainly linked to family farming and local markets like the PNAE, involving flows between rural areas, cities, and schools. The second is the regional circuit, connecting family and corporate production across urban centers in the pioneer strip, such as Apuí, Santo Antônio do Matupi, and Lábrea, supplying Humaitá. The expanded spatial circuit links production to larger markets and agro-industrial chains, directing flows toward Manaus and other centers, especially for meat, dairy, coffee, soy, and corn.

Circles of cooperation sustain these circuits across different production and circulation stages. These include financial system agents such as the Bank of the Amazon (BASA), Sicredi, and Sicoob; public credit and subsidy policies; and non-governmental organizations such as the Institute for Conservation and Sustainable Development of the Amazon (IDESAM), which promotes coffee farming in agroforestry systems. Cooperatives, associations, and processing and transportation companies also play vital roles.

The productive activities of the pioneer front integrate into spatial circuits that link local and global scales and connect to agro-food, timber, and mineral chains. Three major complexes stand out: the agro-food complex (soy, corn, meat, and dairy), the timber complex, and the mineral complex (including gold, cassiterite, and, more recently, rare earths) (Castro de Jesus, 2026).

One must also mention the circles of cooperation[1] (Figure 1), which act directly and indirectly across the phases of production, processing, exchange, transport, and consumption. These involve market actors from the financial sector (Bank of the Amazon, Sicredi, Sicoob)[2], agricultural credit

1 On productive spatial circuits and circles of cooperation, see Moraes (1985).

2 Regarding studies indicate that the volume of formal rural credit contracted by rural producers in the municipality of Apuí/AM is managed by financial institutions such as AFEAM, Banco do Brasil, BASA, and SICOOB. According to the Rural Credit Matrix of the Central Bank of Brazil, between 2014 and 2020, the volume of rural credit contracted by producers in the municipality of Apuí averaged R$ 5.4M/year (with 99.5% allocated to cattle ranching). In 2020, due to changes in environmental licensing in the State of Amazonas, rural credit in Apuí was made available

lines, state subsidies[3], and support from NGOs like IDESAM[4] (promoting organic coffee in Agroforestry Systems – SAF[5]).

Pioneer fronts integrate their productive activities into various spatial circuits—both short and, primarily, long—directly linked to global economic dynamics. These circuits are linked predominantly to the timber, meat and livestock, soybean, corn, and mineral chains. They are organized into at least three major complexes: the agro-food complex (soy, corn, meat, and dairy), the timber complex, and the mineral complex, which encompasses cassiterite, gold, and, more recently, rare earths.

A second dimension concerns economic transformations that transcend the local scale and are heavily conditioned by exogenous factors. In this context, land appreciation associated with the expansion of pioneer fringes stands out, as it involves converting public lands into private property[6]. This movement relates directly to rising prices for land, minerals, timber, meat, and grains, driving the incorporation of new areas into the logic of accumulation and speculation.

In the classic pioneer fronts of the twentieth century, it was already observed that "the great jump in the price of land [was] caused by the arrival of coffee" (Machado, 1992, p. 31). In the current period, this process takes on new configurations associated with the valuation of agricultural and mineral commodities, the intensification of the land market, and the displacement of capital from consolidated pioneer fronts, alongside economic agents' search for new expansion areas.

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almost exclusively by SICOOB: R$ 8,455,894, according to data collected from the institution's rural credit management in Apuí/AM." (Soares, 2022, p. 33).

3 Becker previously noted that "ranchers and cattlemen [are] heavily dependent on incentives and credit; they either expand their investments with tax incentives (the large-scale ones) or direct them toward export products, following the shift in credit" (1988, p. 71).

4 "(...) since 2012, IDESAM has coordinated the Apuí Agroforestry Coffee project, which promotes coffee production in agroforestry systems as an alternative to deforestation and extensive cattle ranching in the region. These systems have contributed to forest regeneration, increased productivity, and improved coffee quality, generating higher economic returns for local families. The Apuí Agroforestry Coffee initiative (by the company Amazônia Agroflorestal) represents the Amazon's pioneering agro-sustainable coffee, originating from certified agroforestry systems". (Maciel, 2025, p. 24).

5 This type of production represents an effort by institutional and non-institutional actors to strengthen agroforestry activities and alternative uses as part of a policy to contain the displacement of pioneer fronts in the municipality of Apuí and the pioneer strip.

6 A pioneer front of capitalist dynamics, featuring capitalist property formations (Becker, 1988), in which land ownership and its uses, in this case, correspond to "a capital investment from the initial moment of deforestation and soil preparation" (Machado, 1992, p. 31).

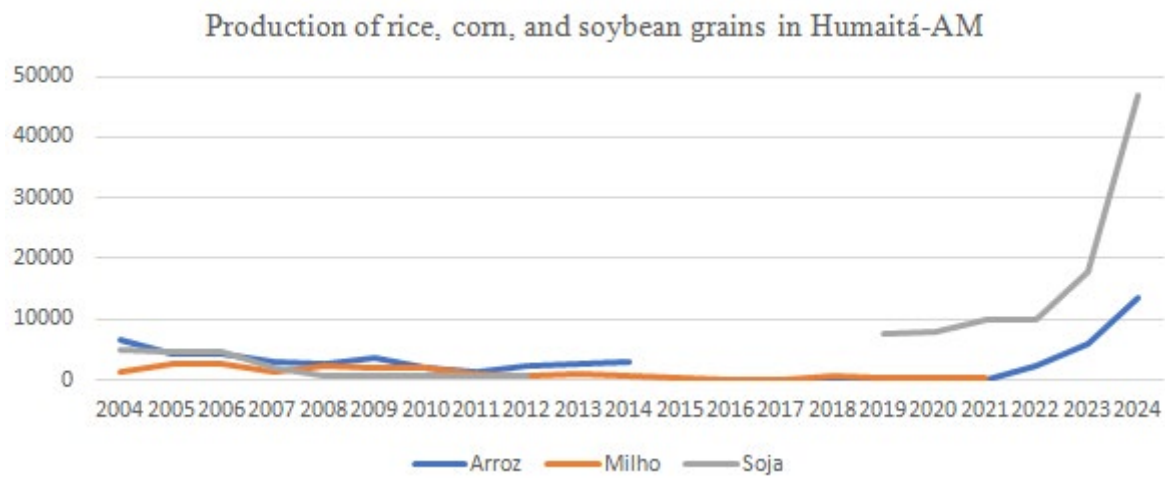
The third dimension involves institutional changes within the Brazilian State that directly affect the normative and operational architecture. These changes produce varying levels of support for the productive forces through financing, incentives, and public policies, as well as distinct degrees of control over illegal activities associated with pioneer-front expansion (Figure 1). These tensions and contradictions constitute a structural element of these dynamics, manifesting in cycles of expansion, retraction, and revitalization, heavily conditioned by the economic variables previously highlighted.

Figure 1 | Activities in Humaitá: a) and b) Santa Rita Farm (soybean production); c) farm with Bank of the Amazon financing; d) bypass road; e) Amazonas slaughterhouse; f) grain port.

Source: The Author. 2025.

Fieldwork conducted in 2022 and 2025 highlights these reconfigurations. Spatially, one observes the continuous expansion of soybean and corn cultivation in the municipality of Humaitá, as shown in Graphic 1, revealing the persistence of productive vectors associated with agribusiness despite institutional and environmental inflections.

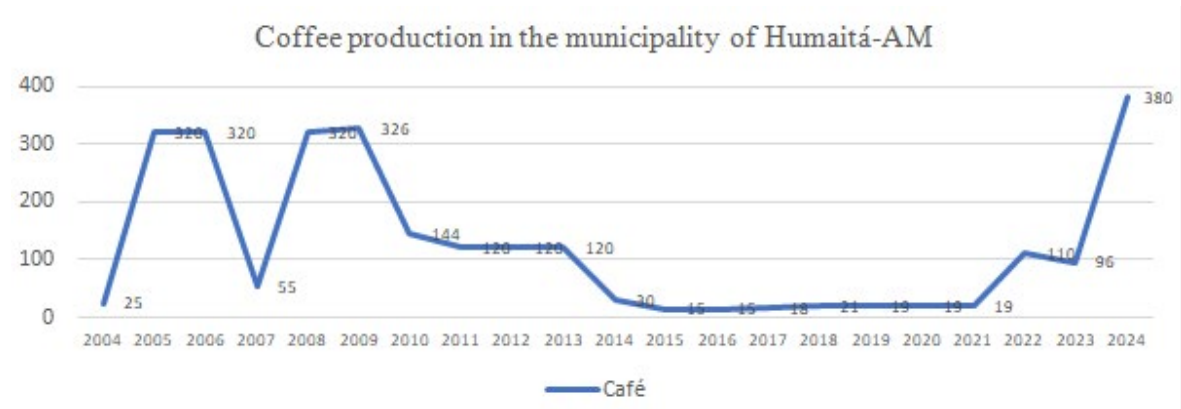
Graphic 1 | Production in tons of rice, corn, and soybeans in the municipality of Humaitá.



Source: Municipal Agricultural Production. Sidra-IBGE, 2025.

Another identified dynamic is the expansion of coffee production in Humaitá, which rose from 19 tons in 2021 to 380 tons in 2024 (Graphic 2). This represents a significant increase, driven by both rising international commodity prices and the Government of Amazonas's institutional actions to incentivize coffee cultivation in the state.

Graphic 2 | Coffee production in the municipality of Humaitá.



Source: Municipal Agricultural Production. Sidra-IBGE, 2025.

Institutional changes resulting from government transitions extend beyond the central political-administrative structure, manifesting spatially in the dynamics of pioneer fronts. Regarding the pioneer front along the Amazonian Trans-Amazonian axis, I identified two primary movements.

First, one observes the non-realization of several government and private projects aimed at expanding grain cultivation, agro-industries, and logistics infrastructure—such as the Zagaia Agro project[7]. Conversely, cargo transshipment operations continue at the Masutti grain port, the Humaitá bypass remains functional, and soybean production persists within the influence zones of the BR-230 and BR-319 highways, covering the municipalities of Humaitá, Lábrea, and Canutama. Furthermore, the presence of recently cleared properties without consolidated productive activities highlights a context of land valuation characterized by low or nonexistent effective production.

Regional policy, as a stimulus for development, manifests through actions aimed at improving transport networks, establishing industries, and expanding technical and productive innovation. In this regard, "the development of transport can boost a region by reducing costs. The participation of state or federal governments is of great importance in this process (...)" [as] different government incentives and investments allow for the "optimization of regional costs, making production and circuits within the pioneer strip more competitive" (Madureira, 2015, p. 17). These interventions manifest concretely through improvements in highway trafficability, which directly enhance territorial fluidity.

Second, environmental enforcement actions have intensified, resulting in the partial dismantling of illegal activities and the imposition of sanctions for deforestation on undesignated public lands, conservation units, and Indigenous territories, as well as in private areas in violation of the Forest Code. Additionally, gold and cassiterite mining, along with logging operations along the Trans-Amazonian axis, have been partially halted.

The spatial advances and retreats of economic activities (Sawyer, 1984) relate directly to economic, institutional, and normative shifts—including environmental moratoria[8]—that impact commercialization levels and production incentives. This dynamic was previously observed in Humaitá during the contraction of soybean production in the first decade of the twenty-first century (Lima, 2008).

7 Formation of the Humaitá Port and Logistical Agro-industrial Hub (SEDECTI, 11/01/2022).

8 "Around the year 2006, due to the contraction of international prices, the inability to access financing, producer indebtedness, the creation of protected territories, and the absence of buyers, soybean production in Humaitá declined (...). In 2017, through private initiative, soybean planting resumed, and currently, we observe five new areas linked to this activity in the municipality along the Trans-Amazonian Highway and the BR-319" (Silva et al., 2021, p. 7).

Nevertheless, previous studies (Oliveira Neto *et al.*, 2024) point to new developments for pioneer fronts along the Trans-Amazonian axis associated with the installation of productive technical objects, specifically agro-industries[9]. In the case of Agroindústria Matupi[10], the Government of Amazonas's granting of tax incentives highlights the State's role in selectively inducing specific economic activities.

Poccard et al. (2004) suggest that stimulating the dairy production chain is a fundamental mechanism for expanding production on pioneer fronts and for consolidating family farming in coordination with agro-industries. In this context, the absence of agro-industries—coupled with inadequate road access and precarious secondary roads (ramais)—acts as a factor of exclusion for producers, limiting income generation through milk commercialization. This reality reflects multi-scalar regional inequalities in transport, infrastructure, and production.

Within this spatial framework, innovation agents fall into two groups: Producers of Innovation, concentrated in high-technical-density regions, influence local pioneer production areas. This includes public and private companies in seed development, agro-processing, and transport systems linked to global circuits. Local Agents: This group includes service sectors, agro-industries, and producers responsible for incorporating and operationalizing innovative processes across the production, transformation, and circulation stages.

Table 03 | Agro-industries identified during fieldwork.

Municipality	Agro-industry	Social Capital	Year of Installation
Humaitá	Frigorífico Amazonas*	R$ 20,000000.00	01/20/2020
Apuí	Apuí Laticínios (Laticínios Jamari Ltda)**	BRL 2,200,000.00	06/30/2023
	Leite do Vale	-	-
Matupi (Manicoré)	Matupi Fabricação de Laticínios Ltda***	1,200,000.00	01/03/2013
Maravilha/Matupi Community (Manicoré)	Frigorífico Manaós Comércio de Carnes e Cereais Ltda****	2,500,000.00	09/19/2020

*Part of the Frigoraca group; partner: Pedro Roque do Nascimento;
**Part of the Laticínios Jamari Ltda group; partners: Leandro Fiori and Lindomar Fiori;
***Part of the Matupi Laticínios group; partners: Cleidemar dos Santos Gomes and Renato Gomes Pereira.
****Part of the Manaós group; partners: Joao Guilherme Yoshimatsu, Felix Pereira, and Vilson Antonio Borelli.
*****Date of CNPJ registration.

Source: Fieldwork, 2025.

9 Poccard et al. (2004, p. 116) points out that "the regional evolution of pioneer fronts in recent years has clearly favored the establishment of agro-industries, providing new momentum to the strengthening of productive chains."

10 See: https://sistemas.sefaz.am.gov.br/get/Normas.do? method=viewDoc&uuidDoc=6d956ead-9403-48ed-87a9-53db4165734f

Southern Amazonas exhibits dynamics that we can interpret as a transformation of the pioneer strip, marked by the incorporation of technical-productive innovations—specifically in seed development and the establishment of new agro-industrial structures. This process characterizes a new stage for the pioneer front, defined by a revitalization driven by the introduction of innovations with high technical density.

Regarding the diffusion of innovation, the study identifies mechanisms to reduce and combat the slaughter of cattle from illegally deforested areas. A prominent example is the creation of legal-institutional instruments, such as the Conduct Adjustment Agreement (TAC), signed between the Federal Public Prosecutor's Office (MPF) and the slaughterhouse in Humaitá. This agreement ensures that cattle acquisitions follow the Electronic Animal Transit Guide (e-GTA) tracking (Amazonas Atual, Feb. 12, 2021; Boi na Linha, 2024). This process is further refined by the Amazon Cattle Supplier Monitoring Protocol, which now includes indirect suppliers, defined as "any rural establishment that moved cattle or buffalo to the direct supplier in the 24 months preceding the acquisition of the lot by the slaughterhouse" (MPF, March 11, 2026).

This context highlights that innovations involve not only production techniques but also tracking actions and environmental oversight. They are unevenly distributed, concentrated in regions like agro-industries, ports, tracking systems, and seeds, which have the necessary infrastructure, transportation networks, and economic flows.

Along the Humaitá–Apuí Trans-Amazonian axis, I identify at least three spatial manifestations of innovation articulated across multiple scales: the expansion of coffee cultivation in the municipalities of Humaitá and Apuí; the consolidation of agro-industries in Humaitá, Apuí, and the district of Santo Antônio do Matupi; and soybean production linked to a logistical complex in Humaitá, with expansion vectors toward the municipalities of Canutama, Lábrea, and southern Manicoré.

These territorial innovations express an articulated movement across the stages of production—highlighting the use of improved seeds and agro-industrial technologies—circulation (through ports and logistics), and consumption in both local and national markets. Such overlap, as Tunes (2020, p. 57) points out, constitutes one of the primary vectors accelerating the (re)production of capital.

Innovations, therefore, do not emerge in a territorial vacuum. They rely on previously established arrangements, whether through an infrastructural base such as urban networks, ports, and highways, or through a normative base that ensures the institutional conditions for expansion—often expressed as legal certainty.

From this perspective, Silva and Egler (2004) emphasize that technical innovations constitute a set of devices that drive territorial reorganization. Their diffusion occurs across two main spatial dimensions: a dispersed one, related to implementing innovations such as planting seeds on rural properties along the pioneer strip, and a concentrated one, linked to stages such as agro-industrial processing and logistics, including transshipment ports. This innovative dynamic was identified in Apuí.

APUÍ – PIONEER FRONT AND MINING AS TERRITORIAL TRANSFORMATION?

Beginning in the 1980s, the Brazilian State intensified efforts to encourage settlement along the Trans-Amazonian axis in southern Amazonas. This culminated in 1982 with the implementation of the Rio Juma Settlement Project (PARJ)[11], recognized as one of the largest colonization projects in Brazil and Latin America[12]. The project spanned approximately 689,000 hectares and had the capacity to settle roughly 7,500 families (Galuch; Menezes, 2020). As the authors point out, between July and August 1983, approximately 2,000 families migrated from southwestern Paraná — especially from the municipalities of Francisco Beltrão and Cascavel — to the region (Galuch; Menezes, 2020). This flow intensified during the 1990s; records show about 500 families arriving per month in 1997, and in 1996 alone, approximately 2,000 families were settled, many originating from Rondônia (Muggiati, 1997).

The pioneer front associated with the PARJ and the municipality of Apuí is characterized by occupation dynamics tied to successive waves of migration. In the 1980s, migrants from Santa Catarina, Paraná, and Bahia predominated. This was followed by an intensification of flows from

11 The "objective defined in the [PARJ] implementation project was to constitute an alternative for absorbing the migratory flow from Rondônia and Acre via the BR-319, which connects Porto Velho (RO) to Humaitá (AM), where it joins the Trans-Amazonian Highway. This Project would serve as an 'instrument for ordering land occupation in Amazonas, avoiding disorderly intrusions and squatting.' It presupposed 'the expansion of the agricultural frontier, the creation of new jobs, and a contribution to regional self-sufficiency in basic food staples'" (Soares, 1999, p. 98).

12 "Created via Decree No. 238/82 to settle 7,500 families, INCRA spokespersons advocated for the Rio Juma Directed Settlement Project (PAD) to hold the status of the largest settlement in Latin America" (Leal, 2009, p. 160).

Rondônia in the early years of the twenty-first century (Soares, 2022). More recently, migrants and productive capital from Rondônia and Mato Grosso have emerged, signaling a reconfiguration of the pioneer front toward more capitalized forms of territorial use (Castro de Jesus *et al.,* 2023).

Regarding land use and land cover, data reveal the spatial materialization of these dynamics. In 1985, forest cover accounted for approximately 97.63% of the municipality's total area. By 2020, this figure had reduced by 30.52%, while pasture areas expanded by 30.85% during the same period (Santos *et al.,* 2024). This process confirms deforestation as a primary indicator of advancing pioneer fronts, associated with timber and mineral extraction, pasture formation, and the consolidation of agro-pastoral establishments and urban centers (Thalês; Poccard-Chapuis, 2014).

While the pioneer front in Apuí has evolved, its structural trait remains the conversion of forest cover into productive areas, primarily for cattle ranching. However, a qualitative inflection has occurred: the logic of occupation is shifting from small productive units typical of agrovilas toward a broader integration into globalized agribusiness dynamics (Galuch; Menezes, 2020).

Along the Trans-Amazonian axis, particularly in access areas such as the district of Santo Antônio do Matupi and the AM-174 stretch, this pioneer front faces multiple drivers. These include fluctuations in commodity prices that drive the expansion or contraction of agro-pastoral activities (Soares, 2022); political-institutional actions (Rodrigues-Filho et al., 2015); land conflicts and rural real estate speculation (Merry et al., 2008); settlement policies (Carrero; Fearnside, 2011); and changes in environmental regulations, including shifts in the Forest Code and licensing mechanisms (Soares-Filho et al., 2014), as well as the general weakening of environmental policies (Mello-Théry, 2021).

Fieldwork identified a movement characterized as concentrated productive diversification. At first, the local production base was structured around the extraction of wood, with multiple sawmills, mining activities (gold and cassiterite), extensive livestock, and coffee crops, already observed in 2022.

Beginning in 2023, these activities underwent a reconfiguration. Significant portions of logging and mining operations were halted due to intensified environmental inspections, particularly targeting illegal activities. Economic factors exacerbated this shift, such as falling meat prices in national and international markets and the rising value of coffee (Figure 2), contributing to a partial reorganization of the local productive base.

The expansion of coffee cultivation (Graphic 3) is linked to multiple agents promoting the crop, especially through Agroforestry Systems (SAFs) with institutional support from IDESAM, alongside local producers and agents from other states. Notably, producers from Rondônia—specifically from the municipality of Nova Brasilândia D'Oeste—have transferred technical *know-how* to Apuí, fostering new productive cycles.

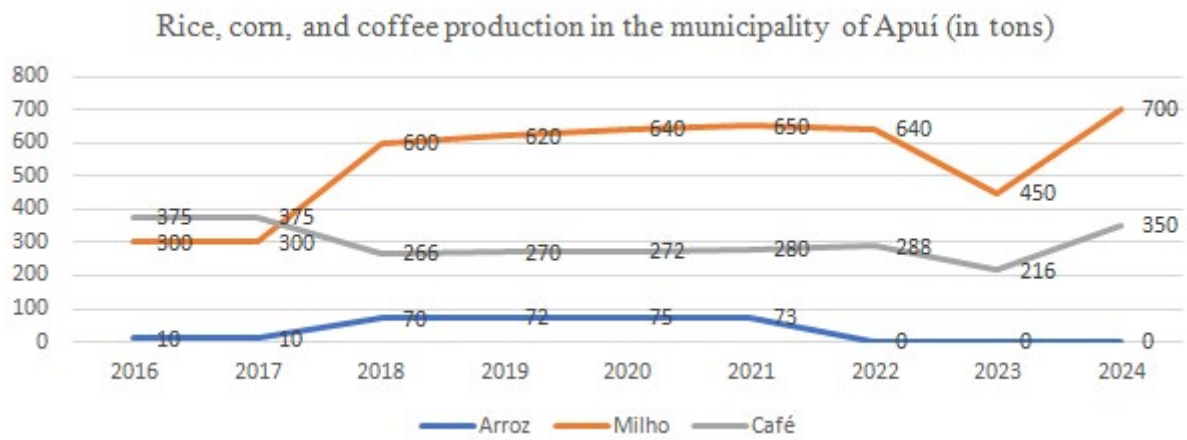
Figure 2 | Coffee Plantation: a) and b) coffee cultivation on one of the properties in the municipality of Apuí.

Source: Author's images, December 2025.

This demonstrates a movement of displacement and reconfiguration of agricultural practices within the Amazonian pioneer front itself. It highlights the circulation of techniques, knowledge, and capital between consolidated and expanding pioneer fronts (Castro de Jesus *et al.*, 2023; Oliveira Neto, 2024). This process reinforces the understanding of the pioneer front as a dynamic space for the diffusion and adaptation of productive innovations linked to broader production and circulation networks.

The crop expansion in Apuí in 2025 is linked to rising global coffee prices. The increase in coffee prices, along with the decline in meat prices from 2023 to 2025, has altered productive dynamics in both small and large farms, showing a strategic shift by economic agents.

Graphic 3 | Production of rice, corn, and coffee grains between 2016 and 2024.



Source: Municipal Agricultural Production. Sidra-IBGE, 2025.

Regarding permanent crops, approximately half of Amazonas' coffee production is concentrated in the Madeira River basin, totaling 1,036 tons. Within this volume, 614.6 tons were produced in the municipality of Humaitá, 345.6 tons in Apuí, and 48 tons in the district of Santo Antônio do Matupi, according to 2024 data (IDAM, 2025). These figures underscore the centrality of this territorial fraction in the recent restructuring and expansion of coffee farming in the state.

Despite these transformations, the urban and peri-urban space reveals the persistence of technical objects and flows associated with an active pioneer front. This dynamic manifests through the circulation of timber transporters, the presence of heavy machinery (such as crawler tractors), and the transit of live herds, indicating the coexistence of traditional and emerging activities within the same territorial formation.

SANTO ANTÔNIO DO MATUPI – 180: CHANGES IN A PIONEER FRONT?

The district of Santo Antônio do Matupi—regionally known as "180" because it is located 180 kilometers from the municipality of Humaitá (Honorato; Wiggers, 2013)—sits in the southern portion of the municipality of Manicoré. Its territorial formation is directly linked to the Matupi Settlement Project (PA Matupi), established by Resolution No. 148 on June 20, 1992, within the context of the Programa Terra (1991). The genesis of this nucleus is associated with a directed colonization policy, strongly articulated with the Trans-Amazonian highway axis.

The occupation process intensified after 1995, establishing an active pioneer front by creating 538 rural lots ranging from 60 to 80 hectares. In this context, approximately 372 families were settled along secondary roads (vicinais) such as Nova Vida, Bela Vista, Matupi, Matupiri, Boa Esperança, Maravilha, Triunfo, Bom Futuro, and Santa Luzia (Souza *et al.,* 2015). This movement mirrored the migratory flows that structured the municipality of Apuí, involving population and capital shifts from other Amazonian pioneer fronts—especially Rondônia and Mato Grosso—as well as regions such as the Center-West (Goiás) and Southern Brazil (Santa Catarina, Paraná, and Rio Grande do Sul).

The district's occupation wasn't uniform across lots delimited by INCRA, creating a mosaic of occupied and unoccupied areas. This pattern gained new significance after 2010 with the revitalization of the pioneer front along the Trans-Amazonian axis, marked by demographic growth and economic intensification. Capital flows from established pioneer fronts fueled this process, targeting secondary roads and the highway's main route.

In this new context, a significant shift in the logic of occupation emerged: the primary driver shifted from family migration to capital migration, which is highly sensitive to market dynamics and public policy. This movement targets the expansion of pastures and the consolidation of agricultural production areas—specifically rice, coffee, corn, and soybeans—highlighting the district's increasing integration into agro-food value chains.

Currently, the district has approximately 10,000 inhabitants distributed across 23 communities (Amazonas, 2022). It exhibits an initial concentration of services supporting agro-pastoral activities, grain production, and timber extraction. This configuration reinforces the role of urban nuclei as structural elements of pioneer fronts.

The relationship between urban nuclei and pioneer fronts is deeply intertwined. According to Becker (1988), this involves the "expansion and consolidation of regional and local centers that constitute the base for productive operations." From this perspective, cities and urban nuclei serve as strategic spatial forms by concentrating services, infrastructure, and support functions that enable occupation, persistence, and the reproduction of economic activities within the pioneer fronts (Becker, 2013).

Agro-pastoral expansion benefits from government incentives such as technical assistance, tax breaks, and access to credit, as well as private investment. This supports a herd of around 200,000 cattle managed by about 868 breeders (SEPROR, 7/17/2024). Nelore breeds dominate beef production, while Girolando and crossbreeds dominate dairy production. Crossbreeding for genetic improvement involves Sebrae, Matupi Laticínios, breeders, and Zoetis (ADAF, 6/30/2020). The latter provides "genomic tools for production cattle" to increase meat and milk yields by providing producers with data, contributing to "more productive and profitable herds" (Zoetis, March 21, 2026).

In the dairy segment (Figure 3), the region records daily milk production of approximately 12,000 liters, with an installed capacity to reach 100,000 liters per day and the creation of 68 direct jobs (IDAM, Dec. 19, 2017). Certified production began in 2013 (ADAF, March 8, 2023). Matupi Laticínios maintains its own farm, accounting for about 15% of the milk it processes. Two supplier groups provide the remainder: roughly 150 local farming families and a monthly supply of about 60 tons of dairy derivatives from Rondônia, São Paulo, Minas Gerais, and Paraná for butter and requeijão (cream cheese) production (ADAF, June 30, 2020). The industrial unit produces 32 other dairy derivatives.

These data indicate not only the economic relevance of the activity but also its potential for expansion, associated with the consolidation of regional production chains and the incorporation of higher technical density into the territory.

Figure 3 | Matupi Agro-industry: a) entrance; b) sign indicating state government support; c) entrance; d) truck transporting milk.

Source: The author, December 2025.

In 2020, the Frigorífico Manaós (Frigonosso) began operations with a daily slaughter capacity of 300 cattle and the initial creation of 80 direct jobs. The enterprise holds the State Inspection Service (SIE) seal, which authorizes the inter-municipal circulation of meat and derivatives within the state of Amazonas (ADAF, Nov. 10, 2020).

Recently, the dynamics of the pioneer fronts in the Santo Antônio do Matupi district reveal significant shifts: a) a partial reduction in the conversion of forest areas to pasture since 2023 due to increased environmental enforcement; b) a drop in meat prices and livestock trade since 2023, contributing to the slowdown of cattle expansion.

A primary spatial manifestation of pioneer fronts is the reduction of forest cover resulting from the incorporation of forest areas and their conversion into crops and pasture. This movement is linked to a set of actions and policies that drove the diffusion of pioneer fronts across the Amazon. As Silva (2012) argues, a significant portion of deforestation is directly linked to various land uses and to colonization projects implemented by INCRA.

One should not view the Humaitá–Apuí Trans-Amazonian axis merely as a stagnant "pioneer front," but as a region under construction, shaped by commodity flows, capital (Castro de Jesus et

al., 2023), and public policy. This process aligns with Silva et al.'s (2021) definition of revitalizing productive dynamics, resource extraction, and territorial transformation. In this context, the BR-230 (Trans-Amazonian Highway) serves as a structural element of this transformation, articulating with productive dynamics and territorial integration processes.

The southern region of Amazonas can therefore be understood as a socio-spatial construction in the process of consolidation, linked to multiscalar dynamics, as proposed by Scott and Storper (2003) in their emphasis on the relational character of regions in the contemporary context. From this perspective, there is a regional shift in Humaitá–Apuí, marked by expanding cattle ranching, growing agro-industry, and structured circuits. This underscores the territory's integration into larger economic flows, linking it to current production and circulation dynamics.

FINAL CONSIDERATIONS

Pioneer fronts, as expressions of territorial occupation and incorporation processes, articulate the expansion of rural areas for economic exploitation with the formation of urban nuclei, revealing socio-spatial dynamics marked by continuous transformations. Recently, commodity valuation—specifically meat (2019–2023)—shaped these dynamics amid regulatory flexibility and reduced environmental enforcement.

The political-institutional shift between 2022 and 2023, coupled with intensified enforcement and falling meat prices, led to a deceleration in expansion and highlighted the sensitivity of these areas to institutional and market oscillations. Concurrently, a new productive configuration is emerging, marked by the expansion of agro-industries and the internalization of stages within productive circuits.

Furthermore, a productive reconfiguration is underway, tied to the resumption of coffee cultivation expansion. International market appreciation and institutional support are driving this growth, particularly in the municipality of Apuí, where the activity has historical roots predating the municipality's founding. This process occurs alongside a relative retraction of logging and wildcat mining, while cattle ranching remains central and coffee cultivation expands. These developments incorporate innovations that enhance competitiveness and facilitate the entry of regional products into consumer markets.

Regarding regional development, this research identified various forms of innovation linked to production and the creation of new agro-industrial core locations. At the same time, public policies have led to the partial and unequal expansion of transport infrastructure. This reinforces the differentiated transformations within the pioneer strip of southern Amazonas, especially along the Trans-Amazonian Highway axis.

Finally, the evidence highlights the initial consolidation of these fronts, marked by greater technical and economic density, the diffusion of productive practices and innovations from consolidated areas (such as Rondônia), and the strengthening of urban centralities. Apuí and Humaitá, in particular, now play strategic roles in articulating flows, services, and productive activities throughout southern Amazonas.

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