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LOCAL PRODUCTIVE ARRANGEMENT (LPA) AND LOCAL DEVELOPMENT: THE CASE OF BAHIA BEIGE MARBLE IN OUROLÂNDIA-BA

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Abstract

The Local Productive Arrangement (LPA) and public policies have been widely used as instruments to promote regional development, especially with strong productive specialization and socioeconomic limitations. In this context, the mining sector stands out for its economic relevance, but also for the challenges related to value addition, governance, and socio-environmental sustainability. The present study aims to analyze the Bahia Beige Marble LPA, considering its productive organization and its implications for local development. The methodology adopted was qualitative research, with a descriptive and exploratory approach, based on bibliographic survey, documentary analysis and consultation of institutional databases. The results indicate that, although Bahia holds a prominent position in the national production of beige marble, the APL has structural weaknesses, especially with regard to the internalization of the higher value-added stages of the production chain, the limitation of governance and the dependence on external centers for final processing. It is concluded that the APL Mármore Bege Bahia has relevant potential as an instrument of sustainable territorial development, as long as it is strengthened by integrated public policies, expansion of innovation and greater articulation between local actors, in order to transform mineral wealth into lasting socioeconomic and environmental benefits.

Keywords: *Cluster. Business networks. Chapada Diamantina. Ornamental stones. Mineral exploration.*

1. INTRODUCTION

Public Policies (PP) are actions aimed at promoting the well-being of population, which may arise from pressure groups or from public or private demand. SP are oriented towards specific social purpose [1], [2].

The Brazilian Federal Constitution of 1988 establishes that mineral resources, including those located in the subsoil, as well as natural underground cavities, are assets belonging to the Union [3].

The State of Bahia has the largest coastal region in Brazil in the North-South direction, with 1,183 km of extension, and a total territorial area of 564,692.67 km². In administrative terms, it is divided into 417 municipalities, organized into 27 Identity Territories [4], [5].

The municipality of Ourolândia was created in 1989, after being dismembered from Jacobina, through State Law No. 5,017/1989. Its former name, White Gold, derives from the large amount of marble found in its territory [6], [7], [8].

Ourolândia has a semi-arid climate, with an average temperature of 30.1 ºC and annual rainfall between 400 and 600 mm, concentrated mainly between November and December. The municiálity is located within the Drought Polygon region. Its subsoil is predominantly made up of sedimentary rocks [6], [7], [8].

In Brazil, mineral exploration began during Portuguese colonization, with the discovery of gold - a treasure that served to supply the Portuguese Crown and pay off debts, especially those related to the financing of the Great Navigations, whose objective was the expansion and exploration of new territories [9].

The mineral sector is characterized as an extractive traditional activity and is essential for the development of the country, as it constitutes a significant component of the export agenda, generating wealth and foreign exchange. In some municipalities, it represents the main - if not the only - economic activity, becoming the major employer of local and regional labor [10], [11].

However, mineral exploration generates negative impacts on the natural environment, mainly through the production of tailings, which can silt up water bodies and contaminate the soil. There are also problems related to air and noise pollution. Explosions and vibrations may cause structural damage, including cracks and even the collapses in homes. In addition, other problems, although not directly linked to the extraction process itself, are part of this universe, such as land conflicts and the need to remove communities from their homes [12].

Although the sector is dominated by large corporations, a significant portion of the production comes from small companies, and part of them operate informally and clandestinely, especially in the exploration of gems, gold, diamonds, quartz, among others minerals [11].

Around the mineral sector, clusters of companies specialized in production are formed, with mutual links with each other and with public and private development institutions (financial institutions and development agencies), the scientific and technological community (Higher Education Institutions (HEIs and research institutions) and other actors [11], [13].

These agglomerations also involve the three spheres of government (federal, state and municipal), civil society, and the productive sector (companies, cooperatives, unions, and associations) and other agents, such as self-employed workers, miners, artisans, goldsmiths, among others. Such agglomerations are called Local Productive Arrangement (LPA) [11], [13].

These arrangements are fundamental for regional development and for the settlement of the population, especially in poorer municipalities and far from large urban centers, which is why their implementation is often associated with developing economies [11], [13].

An LPA is usually composed of enterprises operating within the same productive segment, with relationships based on cooperation, articulation, interaction, and learning and, in some cases, supported by governance mechanisms. In the mineral sector, the LPA mainly brings together organizations dedicated to mineral exploration, processing, production, and transformation [11], [13].

The LPA of Beige Marble, or Ornamental Stones, has as its main product the Beige Bahia Marble, which has great acceptance in the domestic market, being one of the most consumed stones in the country. This preference is mainly due to its yellow-beige color, in addition to its brightness and texture characteristics [7], [14].

The main producer of this beige marble is the municipality of Ourolândia, Bahia, which holds about 90% of the reserves. There is also production in the municipality Jacobina. In these municipalities, extraction (mining) and pre-processing take place, while the final processing – involving marble, granite, quartzite, slate, and others ornamental stones – is carried out in centers such as Salvador, Lauro de Freitas, and Feira de Santana [7], [14], [15].

The aggregation of value in the production process of Bege Bahia marble follows the following logic: the sale of the raw product, in block form, is equivalent to approximately three times the cost of production. The sale of polished sheets abroad generates a revenue of three to four times higher than that of the raw product in block form, considering the gain per cubic meter. Finally, the sale of the finished product, such as furniture and countertops, among others, can yield a gain of six to ten times the value of the product in the form of a block [16], [17], [18], [19], [20].

The demands of the market and consumers tend to modify the productive structure, forcing it to adapt to new standards to access more restricted and competitive markets, overcoming barriers and imposing others, in the form of requirements for products. This dynamic creates the need to innovate in production processes and organizational arrangements, which enhances LPAs. As a consequence, the generation of jobs, the increase of local income, and the strengthening of the union between producers are promoted [13], [21].

Bahia Beige marble is widely used in residential buildings, especially in facades and columns. Its presence is also observed in public buildings of great institutional relevance, such as the Planalto Palace and the headquarters of the Federal Superior Court, both located in Brasília; the Banco do Brasil Cultural Center, in Rio de Janeiro; and the Legislative Assembly of Minas Gerais [22].

The present study aims to analyze the Bahia Beige Marble LPA from the perspective of territorial development and productive organization, as well as to examine the possibilities of articulation between the actors involved in the production chain.

2. THEORETICAL FRAMEWORK

2.1 PUBLIC GOOD

A public good is one that belongs to a legal entity governed by internal public law (the Union, States, Municipalities, autarchies, and public associations). A public good can also be considered to belong to a private entity, but which is intended for the provision of public service [23]. Public assets have the following characteristics: conditional alienability, unseizability, imprescriptibility, and impossibility of encumbrance [3].

Public goods are classified as follows:

Regarding the ownership:

- Federal – belong to the Union (Article 20 of the Federal Constitution);
- State – belong to the States (Article 26 of the Federal Constitution);
- District – belong to the Federal District, according to Article 26 of the Federal Constitution, by analogy with state competence); and
- Municipal – belong to the Municipalities, as provided for in their respective Organic Laws.

Regarding use: public assets can be used by the Public Administration itself or by whoever holds their ownership. They can also be destined to private individuals, as long as there is a purpose to be achieved and previously specified [23], [24], [25].

There are two modalities of use of public goods: the first is common **use**, intended for the collectivity, without distinction between specific groups. The second modality is called **special use**, which is subject to specific rules, requires state authorization, and in general, obligation to pay for use [23], [24], [25].

The forms of concession special use are: **authorization of use**, which allows the private use of public property; **permission of use**, which allows private use by a private individual, serving public and private interests in an equitable manner; **concession of use,** which grants a private party the right to use the public asset; **concession of real right of use**, which attributes to the private party a resolvable real right to use public land or airspace for justifiable purposes; and **assignment of use**, a free modality in which the use of public property by bodies or persons is consented, aiming at the development of activities that generate benefits for the community [24], [25].

As for the physical nature, public goods are classified as follows:

- **Water assets:** such as running waters (seas, rivers and streams); dormant waters (lakes, ponds and dams); and hydraulic energy potentials;
- **Terrestrial domain assets:** they cover the soil and the subsoil [3], [23], [24], [25], [26].

Mineral resources are assets of the Union, but subject to exploitation by private entities through a federal grant. These resources are representative for local economic development and, in some cases, constitute the only source of income and employment in certain regions. This contexto requires public authorities to formulate and implement specific sectoral policies [3].

As provided for in the Civil Code:

> Article 1,230. Soil ownership does not include deposits, mines and other mineral resources, hydraulic energy potentials, archaeological monuments and other assets referred to by special laws.
>
> Sole Paragraph. The owner of the land has the right to exploit mineral resources for immediate use in civil construction, provided that they are not subjected to industrial transformation, in compliance with the provisions of a special law [23].

The Federal Constitution establishes the following in relation to mineral exploration

> Article 176. The deposits, whether under mining or not, and other mineral resources and the potential for hydraulic energy constitute property distinct from that of the soil, for the purpose of exploration or use, and belong to the Federal Government, with the concessionaire being guaranteed ownership of the mining product.
>
> Paragraph 1 - The research and mining of mineral resources and the use of the potentials referred to in the "caput" of this article may only be carried out upon authorization or concession of the Federal Government, in the national interest, by Brazilians or a company incorporated under Brazilian laws and having its headquarters and administration in the country, in accordance with the law, which will establish the specific conditions when these activities are carried out in the border strip or indigenous lands.
>
> Paragraph 2 - The participation of the owner of the soil in the results of the mining is assured, in the manner and in the amount provided for by law.
>
> Paragraph 3 - The research authorization shall always be for a fixed period, and the authorizations and concessions provided for in this article may not be assigned or transferred, in whole or in part, without the prior consent of the granting authority.

> Paragraph 4 - The use of the potential of renewable energy of reduced capacity shall not depend on authorization or concession [3].

It can be seen that, both in the Federal Constitution and in the Civil Code, the deposits and mineral resources are the property of the Union, and their exploration by private individuals is allowed only through concession or authorization of use.

2.2 PUBLIC POLICIES (PP)

Public Policies (PP) are actions undertaken by public entities at all levels of government - or by organizations that deal with public issues - with the primary objective of promoting improvements and well-being for the population as a whole or for a specific segment of society. These actions aim to allow access to a set of goods and services made available to citizens and, to achieve them, use legislation as a tool, through laws and regulations [1], [2], [27], [28].

The main areas of activity of the PP are education, health, environment, citizenship, transportation, social assistance, housing, public security, basic sanitation, justice, food supply, job creation, infrastructure, local development policy, among others [1], [2], [27], [28].

There is no single consensus on the definition of PP, which is why several conceptions coexist, according to their scope and analytical focus. Some scholars situate them as instruments that generate well-being for the population. Another current understands them as answers to specific questions of certain social groups. There are also scholars who define them as instruments aimed at solving and facing public problems [27], [28].

2.3 LOCAL PRODUCTIVE ARRANGEMENT (LPA)

The cluster consists of a large group of small and medium-sized enterprises that operate cooperatively, through the sharing of physical infrastructure and knowledge [16].

In turn, the Local Productive Arrangement (LPA) is a term derived from the English *cluster* and designates the concentration of economic activities in a given sector. These activities form a production chain characterized by synergy between its actors, who are not necessarily and exclusively business, resulting from the integration between multiple organizations and distinct spheres (public/private; business/research).

The term was introduced in Brazil at the end of the 1960s and later developed by Cassiolato and Lastres, who define the LPA and the Local Productive and Innovative Systems (LPIS) as follows:

> [...] They are territorial agglomerations of economic, political and social agents (focusing on a specific set of economic activities) that have links, even if incipient. Generally, they involve the participation and interaction of companies (which can range from producers of final goods and services to suppliers of inputs and equipment, consulting and service providers, traders, customers, among others) and their various forms of representation and association. They also include several other public and private organizations focused on: training and training of human resources (such as technical schools and universities), research, development and engineering, policy, promotion and financing.
>
> Local productive and innovative systems are those productive arrangements in which interdependence, articulation and consistent links result in interaction, cooperation and learning, with the potential to lead to the increase of endogenous innovative capacity, competitiveness and local development [29].

LPAs and LPIS have some differences. The first tends to be **less developed**, with a predominance of informality, and its emergence occurs in an improvised or informality way among the actors involved. In addition, it is characterized by incremental innovation, low-skilled labor and the predominance of micro and small companies [30].

The performance of these companies in an LPA is preferable to isolated and individualized action, as it makes them more competitive in the market, generates economies of scale and allows them to overcome difficulties common associated with the production process [30].

In the region where it is installed, an LPA is an important instrument for generating regional development, in addition to mobilizing actors with the objective of enhancing the competitiveness and sustainability of organizations [21], [29], [31], [32], [33].

Each LPA has **distinct characteristics**, influenced by the sector, the region context, the type of arrangement, the agents involved, the internal dynamics, and the organizational strategy [21], [29], [31], [32], [33].

The success of an LPA depends mainly on the following factors: social capital, collective strategies for the organization of production, collective market strategy, and political-institutional articulation. These elements do not operate in isolation; rather, they form a systemic framework that supports competitiveness and territorial development [21], [29], [33], [34].

Social capital (Foundational Dimension) constitutes yhe structural base of the model. Refers to a public good that allows the prevalence of cooperation and trust between

actors, requiring organizations to strengthen relationships to achieve effectiveness and efficiency in booth internal and external transactions. High levels of social capital reduce transaction costs, mitigate opportunistic behavior, and facilitate collective decision-making [21], [35].

In yhe absence of social capital, coordination mechanism tend to weaken, and collective strategies become fragile or unsustainable [21], [35].

The **collective strategy of organizing production (Internal Coordination Dimension)**, supported by social capital, concerns coordinated decisions among producers about who produces, what to produce and how to produce, with the aim of enhancing competitiveness, economies of scale, and greater productivity [21], [35].

The **collective market strategy (External Competitive Dimension)** refers to the coordination and convergence between productive actors, aiming to obtain the capacity to compete with large conglomerates and overcome obstacles inherent to the market, especially those that demand a large volume of products [30], [32], [36].

Political-institutional articulation (Governance and Policy Dimension) is also a result of social capital, to the extent that the productive sector is articulated with public and private entities responsible for implementing public policies, as well as with support organizations. This articulation requires the existence of effective governance mechanisms [30], [32], [36].

The main advantages of LPA include: economic development; reduction of social and regional inequalities; technological innovation; expansion and modernization of the production base; growth in employment and income levels; reduction of the mortality rate of micro and small companies; increased schooling and training; increased productivity and competitiveness; and expansion of exports [37], [38], [39]. All these advantages are also observed in the recognition of a Geographical Indication (GI).

Social Capital → Enables → Collective Organization → Strengthens → Market Strategy → Requires → Political-Institucional Articulation → Reinforces → Social Capital

Regarding the mineral-based LPA's definition is as follows:

> they are significant territorial agglomerations of economic, political, and social agents acting around a production chain that is based on extractive activity and mineral transformation and that share perceived forms of cooperation and some governance mechanism, and may include small, medium, and large companies [40].

2.4 LOCAL DEVELOPMENT

Local Development (LD) is a concept of relative complexity that undergoes modifications over time. It concerns

> implementation of actions in a given place with the objective of allowing citizens to have a dignified life, access to their civil rights, quality education and the opportunity to work and generate income, all of which is achieved and planned to occur in the long term, through a process of continuous improvement of the quality of life of residents in a given territory [41].

LD occurs in small clusters that boost the economy and promote improvements in people's quality of life, with the potential to generate changes in the economic and social bases, covering cultural, economic and socio-environmental dimensions [32], [42], [43].

The **cultural dimension** concerns the preservation of know-how, which is fundamental for the continuity of knowledge and its perpetuation over time. The **economic dimension** refers to the increase in the income of the actors involved, promoting a better distribution of wealth, which positively impacts the community. It also contributes to the dignification of work, fostering a sense of belonging among individuals and pride in their activities.

The **socio-environmental dimension** refers to the preservation of the environment for the enjoyment of future generations, without compromising its sustainability, interfering in the environment responsibly and without degrading it [43].

It also includes actions that involve all actors and spheres of power in an articulated manner, aiming at strengthening society, empowering marginalized groups, combating poverty and social inequalities, as well as promoting the integration and inclusion of citizens, with a view to collective well-being [43].

For the implementation of the LD, structuring conditions are necessary that involve the active participation of local public authorities and civil society, access to sources of financing – especially through exogenous resources -, the existence of articulated public and institutional policies, as well as the continuous training of the agents involved. It is a strategy based on social capital that, in the process of constituting and consolidating an LPA, seeks to promote not only the strengthening of economic activities, but also the improvement of the socioeconomic conditions and quality of life of the population inserted in the territory [16].

2.5 BAHIA BEIGE MARBLE

The segment of ornamental stones in Bahia began with the extraction of Bege Bahia marble in the 1950s, in the region of Juazeiro. At that time, there were only four marble

factories, all installed in Salvador, which worked with marbles from Espírito Santo and imported, mainly from Italy [22], [44], [45], [46], [47].

The mines were exploited in an artisanal way, and the mechanization process began in the 1980s. In 2000, the municipality of Ourolândia started to use diamond looms, which contributed to changing the type of stone commercialization, which was no longer sold exclusively in raw blocks and started to be sold already processed [22], [44], [45], [46], [47].

Currently, Bahia has about 19 thousand Mining Rights, and ornamental stones represent approximately 23% of this total. In 2017, there were about 93 mining concessions, of which only 21% were related to limestone, belonging to 17 different companies. Of this universe, 71% of the companies were based in Bahia [46].

The Brazilian Association of Technical Standards (ABNT, 1995) defines ornamental stone as "a natural rock substance that, subjected to different degrees of modeling or processing, can be used with any aesthetic function" [48].

Marketable natural stone is divided into two main categories: granite (60%) and marble (20%). Granites are silicate rocks characterized by lower porosity, greater resistance and hardness, resulting in more expensive and laborious sawdust. In turn, marbles are carbonate rocks [17], [46].

The use of these materials occurs mainly in civil construction, especially for wall and floor coverings, due to their high resistance to chemical attack and abrasive wear, in addition to durability, ease of cleaning, among other characteristics [17], [46].

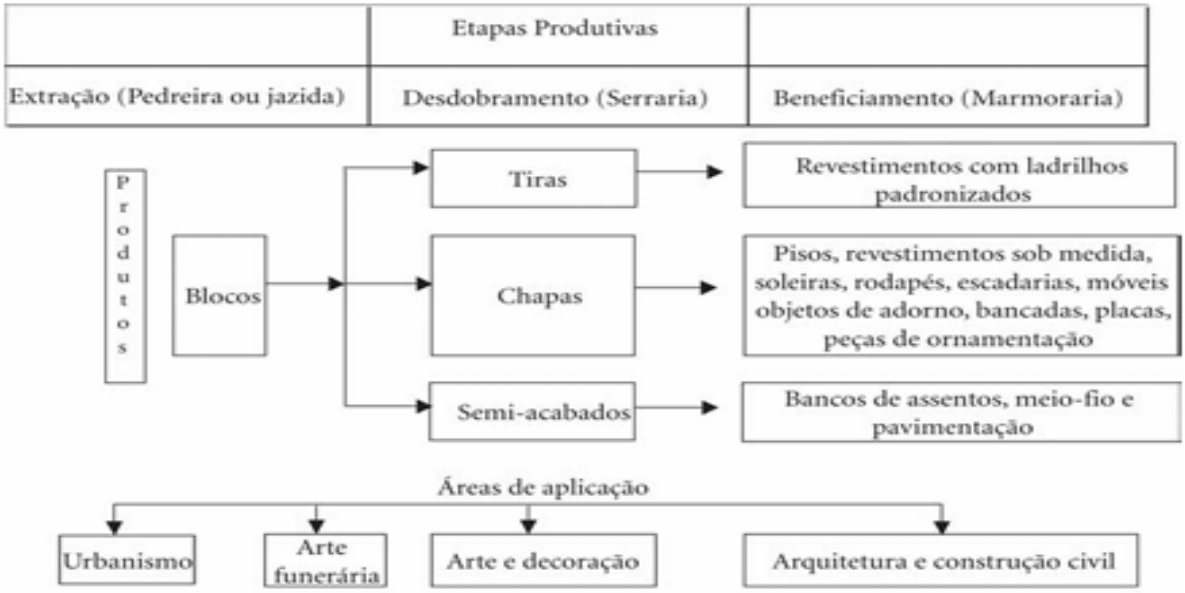
Limestone is a product formed naturally in an environment where there are running watercourses over rocks, especially in places with waterfalls and cascades [49].

The extraction of ornamental rocks is carried out in the form of blocks by the extracting companies, with the material being removed from rock masses or thickets, with varying dimensions [8], [46], [49].

Then, the primary unfolding or processing, also called sawdust, takes place This is the first stage of industrialization, generating products in strip, sheet and/or semi-finished format [8], [46], [49].

The last production process is the final processing, carried out by marble factories, responsible for checking the dimensions and polishing according to the technical specifications and the requirements of the final consumer [8], [46], [49]. Figure 1 shows the production chain of ornamental stones.

Figure 1 *– Ornamental stone production chain*



Source: Spínola (2003)

Beige marble is originally from Brazil and corresponds to a secondary limestone of the "calcrete" type, whose formation occurs in the Caatinga biome, resulting from chemical, physical and biogenic changes of marine limestones of the Salitre Formation [8], [49], [50].

It is a material characterized found in nature with varied color patterns, veins and shades, which makes it unique in its beauty, presenting its own characteristics, variations in finish and a wide range of applications [8], [49], [50]. Figure 2 shows the marble in the form of a block.

Figure 2 *– Raw block of Bahia Beige marble*

Source: Google (2026)

Bahia is the largest producer of beige marble, due to its climatic and geological diversity. Extraction takes place in the municipalities of Juazeiro, which began exploration in the 1950s, as well as in Itaguaçu da Bahia; Campo Formoso; Mirangaba; and Ourolândia, the latter being responsible for approximately 90% of the production [45], [51], [52].

Bahia Beige marble is the most consumed and popular among the existing ornamental stones in Brazil, being widely appreciated by architects, decorators, and builders [46].

The Bahia Beige Marble has also been called "Marta Rocha Marble", in honor of the Bahian woman who was the first winner of the Miss Brazil contest, in 1954, standing out for her exuberant beauty [22], [52].

The material is also known as "National Travertine" and, outside Brazil, as "Brazilian Travertine". The term "Travertine" refers to the Italian city of Tivoli, one of the first regions to extract this type of marble. The name derives from Latin and means "pencil tiburtinus" or "Tibur's stone" [22], [42], [50].

Beige marble has great prominence in civil construction, with a widely consolidated market, being used as flooring, coating, table top, countertop, among other applications. Figure 3 shows the use of Bahia Beige marble.

Figure 3 *– Bahia Beige Marble*

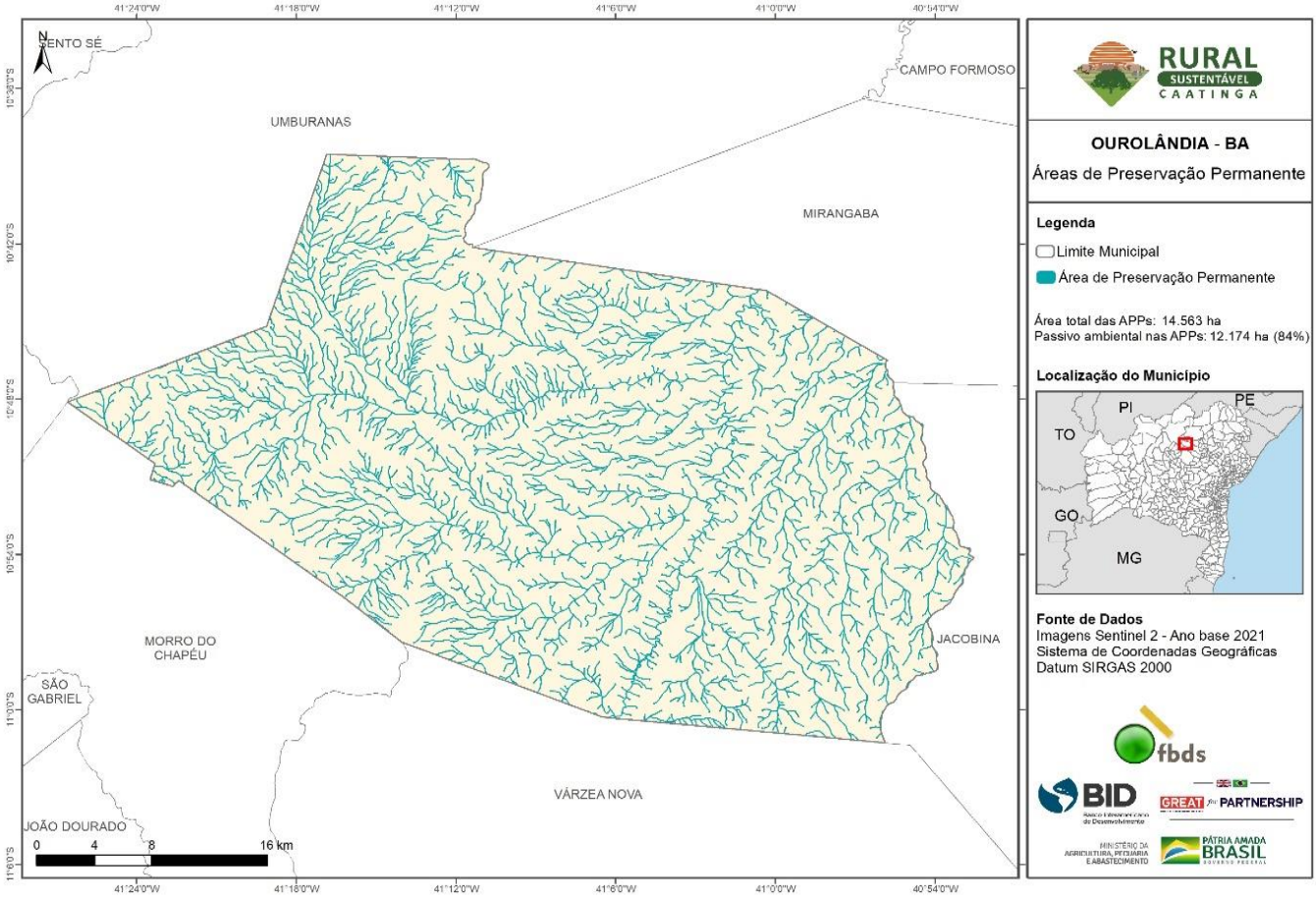
Source: Google (2026)

2.6 MUNICIPALITY OF OUROLÂNDIA

The formation of the municipality of Ourolândia began in the seventeenth century, with the arrival of pioneers in search of gold mines. The first occupation centers were dedicated to the cultivation of sugarcane and, due to the milling carried out in mills, the place became known as Engenho Velho. With the advancement of the settlement process and diversification of productive activities, cotton cultivation and the opening of quarries for marble exploration were introduced, an activity that began to assume increasing economic relevance and motivated the denomination of the locality as Ouro Branco, then belonging to the municipality of Jacobina [6].

From a territorial point of view, Ourolândia is located in the Mesoregion of the Center-North of Bahia, in the Microregion of Jacobina and is part of the planning region of the Piedmont Identity Territory of Diamantina. The municipality is approximately 363 km from the capital Salvador, has a climate that varies from subhumid to dry and an average altitude of 560 meters above sea level. Its territorial limits include the municipalities of Jacobina, to the east; Várzea Nova and Morro do Chapéu, to the south; Sento Sé and Umburanas, to the west; and Mirangaba, to the north, configuring a strategic position in a region with significant mineral and productive potential [6], [7], [8]. Figure 4 shows the Permanent Preservation Areas.

Figure 4 *– Map of Ourolândia's Permanent Preservation Areas*



Source: https://www.geo.fbds.org.br/BA/OUROLANDIA/MAPAS/

From a socioeconomic perspective, Ourolândia has typical characteristics of a small municipality in the semi-arid region of Bahia, with a strong dependence on primary activities. In 2025, the estimated population was 20,141 inhabitants, with a Municipal Human Development Index (MHDI) of 0.560, classified as medium-low, according to 2010 data. The Gross Domestic Product (GDP) per capita was R$ 15,927.39, and the average monthly income of formal workers corresponded to 2 minimum wages, indicators that reflect structural limitations and historical challenges related to the generation of employment, income and economic diversification [6], [7], [8].

3. METHODOLOGY

To meet the objectives of the present study, a descriptive and exploratory research was adopted, with a qualitative approach. Descriptive research allows the characterization of the phenomenon studied and its main variables to be identified, without interference from the researcher, while the exploratory approach allows for greater familiarization

with the topic, contributing to the construction of deeper interpretations and analyses [53], [54].

Regarding the approach, the qualitative research was chosen because it enables the understanding of the social, institutional and productive processes that involve the APL Mármore Bege Bahia, considering economic, territorial, institutional and socio-environmental aspects. This approach allows capturing perceptions, relationships, and dynamics that cannot be fully apprehended by quantitative methods, and is suitable for local development studies and public policies [53], [54].

The study was developed through bibliographic and documentary research, consisting of a bibliographic survey, where a systematic review of the national and international literature on local development, public policies, public goods, APL and the ornamental stone sector was carried out, through consultation in books, scientific articles, course completion works (theses, dissertations and monographs) and technical reports, with the objective of building the theoretical framework and grounding the analysis.

In the documentary research, official documents, legislation, institutional reports and secondary data produced by public agencies and sectoral entities were analyzed, aiming to characterize the mineral sector, the Bege Bahia marble LPA and the socioeconomic context of the municipality of Ourolândia.

The contextual and interpretative analysis was carried out from the articulation between the theoretical framework and the documentary data, proceeding to the analysis of the productive, institutional and territorial conditions of the APL, as well as the public policies related to the mineral sector, focusing on potentialities, limitations and impacts on local development [53], [54].

Data collection was based exclusively on secondary sources, using the techniques of document analysis, applied to legislation, standards, institutional reports and official statistics; bibliographic analysis, with critical and systematic reading of specialized literature; and, content analysis, aiming to organize, categorize and interpret the information, based on previously defined analytical axes such as local development, public policies, productive organization and socio-environmental impacts [53], [54].

The work is also characterized as exploratory, as it allows a deepening of the studied theme through a pertinent survey and articulated to the APL Mármore Bege Bahia. In addition, the objective is to familiarize with the problem, making it more explicit and generating possibilities for analysis [53], [54].

The spatial cut of the research was concentrated in the municipality of Ourolândia, with emphasis on the APL. From a temporal point of view, data and documents available until February 2, 2026 were considered.

4. RESULTS AND DISCUSSION

The activity of extraction and processing of Bahia Beige marble plays a central role in the local economic dynamics, constituting one of the main sources of income, employment and productive identity of the municipality. The presence of relevant deposits, associated with the historical trajectory of mineral exploration, gives Ourolândia prominence in the ornamental stone sector in Bahia, especially with regard to beige marble, widely recognized in the national and international market.

In addition to its economic role, mining activity in the municipality has direct interfaces with social, cultural and institutional aspects, especially with regard to the productive organization, the generation of social capital and the possibilities of structuring an APL. Such characteristics reinforce the relevance of public policies aimed at the qualification of the workforce, the addition of value to the product, environmental sustainability and territorial governance in order to enhance the positive impacts of the mining activity and reduce its vulnerabilities.

In this way, Ourolândia is configured as a strategic territory for the analysis of the relationships between natural resources, productive organization, public policies and local development, especially in the context of the Bahia Beige marble production chain, whose valorization can contribute to the promotion of sustainable socioeconomic development and to the strengthening of territorial identity.

The development of municipalities or regions depends on the combination of instruments, methodologies and strategies that consider, in an integrated way, the local productive specificities and the economic vocation of the territory. The literature on regional development emphasizes that sustainable competitive advantages do not result only from the availability of natural resources, but from the capacity of productive, institutional and social factors around a collective development strategy [29], [42].

In this sense, aspects such as the availability of raw materials, the qualification of qualified labor, the logistical and productive infrastructure, marketing channels, access to inputs, tax incentives, economies of scale, and the capacity for cooperation between companies and local institutions are central elements for the consolidation of territorial productive arrangements. The absence or fragility of any of these factors tends to compromise the systemic competitiveness of the territory.

The mining sector generates direct and indirect Jobs, contributing to the development of local infrastructure,

such as Transportation systems and support services. It is responsible for 4% of the Brazilian Gross Domestic Product (GDP), generating approximately 205 thousand direct jobs and more than 2 million indirect Jobs, with Investments expected to exceed US$ 50 billion by 2027 [55], [56].

In the mining sector, these challenges are even more complex due to strong state regulation and the socio-environmental impacts associated with extractive activity. The bodies responsible for analyzing and granting mining authorizations simultaneously perform regulatory and inspection functions. However, the limitation of technical and institutional staff results in slowness in administrative processes, creating an environment conducive to informality and the proliferation of clandestine mining. Such a scenario reinforces negative externalities, such as environmental degradation, pollution of water sources and inadequate disposal of waste, in addition to weakening public revenue and territorial governance [57].

Public policies therefore assume a strategic role in mitigating these asymmetries, either through regulation or by stimulating local productive organization. In Brazil, LPAs are one of the main instruments of industrial and regional policy, being used as a strategy to promote competitiveness, innovation and productive inclusion. Currently, there are 839 APLs registered in the national territory, distributed among various economic sectors, which highlights the centrality of this model in the development agenda.

In the mineral sector, however, there is a limited distribution of LPAs, which reveals a structural contradiction: although mining has economic relevance, its territorial organization in cooperative and innovative ways is still restricted. The APLs registered in this sector – such as the APL Bege Bahia; APL Calcário do Cariri; APL Areia de Piranema; APL of Ceramic Mineral Base - Pottery of Iranduba; APL of Ornamental Stones of Northwest Fluminense (RJ); APL of Red Ceramics of Campos; APL Ornamental Stones of Espírito Santo– which demonstrates specific initiatives of productive organization, but still insufficient to change, in a structural way, the predominant pattern of primary specialization [58].

In the Bahian context, this contradiction becomes more evident. Although the state leads the national production of several minerals, it has only two APLs in the mineral sector: Gems and Jewelry and Bahia Beige marble. This limitation can be interpreted as a reflection of the low internalization of the higher value-added stages of the production chain, especially the final processing. The export or shipment of the product in its raw state to other Federation Units results in significant economic losses for the territory of origin, restricting the multiplier effects on employment, income and innovation [19], [58].

The Bege Bahia Marble LPA, located in the Ourolândia hub, emerges as an attempt to confront this logic, by seeking to integrate companies, support institutions and public entities around a development strategy. The performance of the Secretariat of Science, Technology and Innovation (SECTI) and the State Center for Support to the Development of Local Productive Arrangements of Bahia (NE-APLs/BA) shows the recognition of the APL as a public policy instrument capable of promoting productive articulation, training and territorial planning [47].

Institutional support actions, such as the training of the workforce by the Brazilian Service of Support to Small and Medium Enterprises (SEBRAE), the Social Service of Industry (SESI) and the National Service of Industrial Learning through SENAI-Cimatec, as well as initiatives aimed at environmental innovation, such as projects developed by the Center for Mineral Technology (Cetem) and the Forest Factory (nursery-school) in Ourolândia, reinforce the systemic dimension of the APL. Such initiatives dialogue with the literature that associates the success of APLs with the presence of intermediary institutions, capable of articulating knowledge, technology and public policies [19], [21], [47], [59].

Despite these advances, structural limitations persist. The absence of institutions directly linked to the APL in the areas of financing and higher education restricts the capacity for innovation and productive diversification. In addition, the fragmentation of the production chain, in which the final processing occurs mostly outside the municipality, highlights the difficulty of retaining the value generated locally.

The configuration of the production chain in Ourolândia, composed of extraction, primary processing (sawdust) and secondary processing (polishing and obtaining finished products) companies, reveals an arrangement that is still incomplete from the point of view of territorial development. Although 32 companies operate in the municipality, the scale of production and technological limitations prevent the internalization of all stages of the production process. This pattern reinforces the dependence on larger urban centers and limits the positive impacts of the LPA on local development [45].

Thus, the results indicate that the APL Mármore Bege Bahia has relevant potential as an instrument of regional development, but its effectiveness depends on the strengthening of governance, the expansion of public policies to support innovation and the internalization of the stages of greater added value of the production chain. The consolidation of this arrangement requires, therefore, coordinated action between the State, the productive sector and support institutions, capable of transforming mineral wealth into sustainable territorial development.

5. FINAL CONSIDERATIONS

The present study showed that the LPA is a relevant instrument for productive organization and promotion of regional development, especially in territories with strong specialization in extractive activities and socioeconomic limitations.

Bahia occupies a prominent position in the production of beige marble, however, the production structure still presents significant weaknesses, especially with regard to the aggregation of value, the internalization of the final stages of processing and the consolidation of governance mechanisms capable of articulating public and private actors more efficiently.

The Bahia Beige Marble LPA has the presence of technical support and labor training institutions, but it structurally depends on external urban centers for final processing, which impacts on the aggregation of value, job creation, income increase and innovation, despite the institutional performance of the state in regulating and stimulating the formation and strengthening of APLs, mainly due to the limitation of technical staff, slowness in licensing processes, which contributes to informality, clandestine exploitation and negative socio-environmental impacts, compromising the sustainability of the sector.

The limitation of the study lies in the predominantly qualitative nature of the research, although it is adequate for understanding institutional and territorial dynamics.

The future perspective in the context of Bahia is in the strengthening of the Bahia Beige Marble APL as an instrument of sustainable territorial development, which requires investments in productive infrastructure, expansion of final processing in Ourolândia, incentive to technological and environmental innovation, in addition to strengthening governance.

At the national level, there is a need for a more robust and integrated policy for LPAs, especially in the mineral sector, and to promote the internalization of value in productive regions.

Bege Bahia marble has potential for insertion in markets that value attributes such as sustainability, traceability and territorial identity. The strengthening of the APL can contribute to the construction of an image associated with quality, origin and socio-environmental responsibility, approaching successful experiences of mineral clusters and products with indication of origin.

It is concluded that the APL of BEGE Bahia marble represents a strategic opportunity to transform mineral wealth into socioeconomic and environmentally sustainable development. For this potential to materialize, coordinated action between the State, the productive sector and civil society is essential, guided by integrated public policies, effective governance and continuous innovation.

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