

MINERAL RESOURCES

Sergipe has great mineral potential, with several resources currently being exploited and others with potential for future exploration.

Potential and Dynamism of Sergipe's Mineral Sector

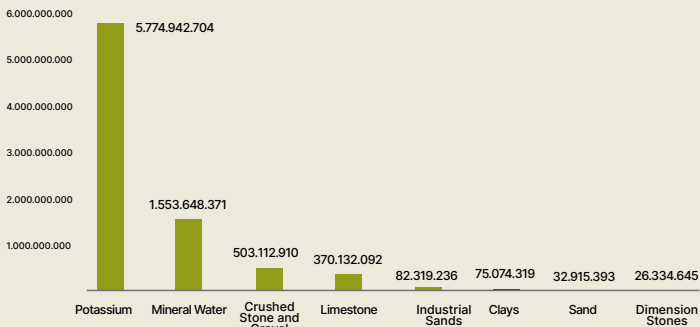
Sergipe has a diversified mineral sector, with strong growth indicators and significant opportunities. Between 2020 and 2023, mineral production in Sergipe experienced a significant increase, with highlights including:

Potassium: Production rose from R\$ 3.54 billion in 2020 to R\$ 5.77 billion in 2023, establishing it as the state's leading mineral resource. Sergipe is a national reference in potassium production, an essential input for the agricultural sector. Local deposits are strategic for meeting the growing demand for fertilizers, especially in a country like Brazil, which plays a major role in global grain production.

Mineral Water: This segment saw remarkable growth, rising from R\$ 379 million in 2020 to R\$ 1.55 billion in 2023.

Crushed Stone and Gravel: Production also increased, reaching R\$ 503 million in 2023, compared to R\$ 198 million in 2020.

Sergipe: value of mineral production by substance



Source: ANM. Brazilian Mineral Yearbook. Accessed on 01/15/2025.
Prepared by: Desenvolve-SE.

Mining Investments

Investments in Sergipe's mining sector have seen a considerable increase.

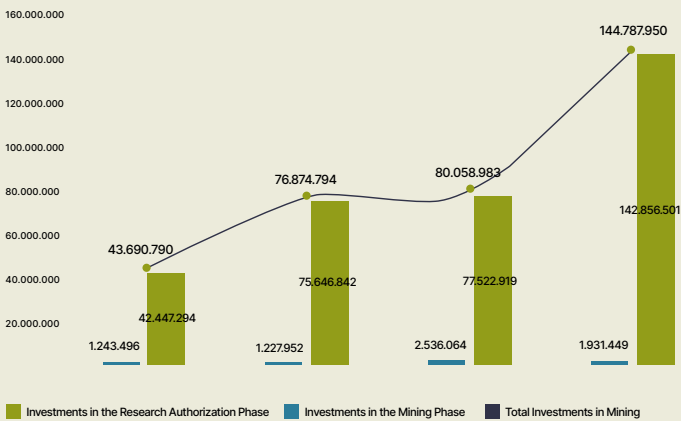
Mining Phase: Investments rose from R\$ 42 million in 2020 to R\$ 142 million in 2023,

highlighting the expansion of the sector's production capacity.

Total Investments: Total mining investments increased from R\$ 43 million in 2020 to R\$ 144 million in 2023.

These figures indicate a favorable environment for new investments in the mineral sector.

Sergipe: Evolution of Mining Investments (R\$)



Source: ANM. Brazilian Mineral Yearbook. Accessed on 01/15/2025.
Prepared by: Desenvolve-SE.

Structure of the Mining Market in Sergipe

Sergipe's mineral market has a dynamic and competitive structure, with companies at different stages of operation.

Companies in the licensing and research authorization phases reflect strong initial interest in the sector.

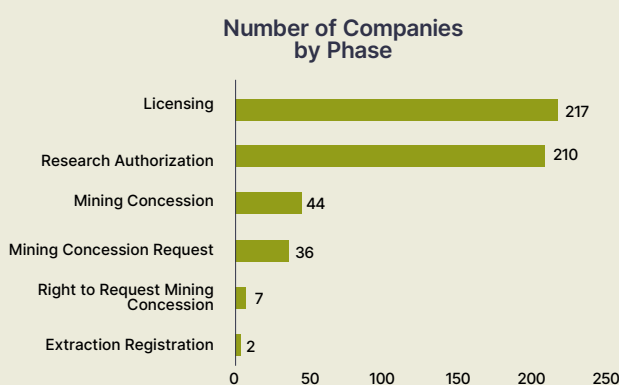
Operating Companies: 44 companies already hold mining concessions, forming a solid base of established operations, which is crucial for the state's production chain.

Projects in Development: 36 companies have submitted mining concession requests and 7 hold the right to request concessions, indicating a pipeline of new projects under development.



Sergipe Wins, Investors Win:

- A large number of companies in early stages points to growth potential
- A significant number of established operations demonstrates the sector's viability
- The quantity of concession requests suggests sector expansion in the medium term
- A competitive environment with multiple players at different stages



Source: ANM, Brazilian Mineral Yearbook. Accessed on 01/15/2025.
Prepared by: Desenvolve-SE

Potential and Dynamism of Sergipe's Mineral Sector

The current landscape presents favorable conditions for new investments, supported by:

- Consistent growth in sector investments
- A diversified base of mineral resources
- Established infrastructure for extraction and processing
- A competitive environment with multiple players
- A robust pipeline of new projects under development
- A proven track record of successful operations

Sergipe thus offers a conducive environment for investment in the mineral sector, combining abundant natural resources, established infrastructure, and a rapidly expanding market, with opportunities both for new entrants and for the expansion of existing operations

Main Mineral Resources Found in Sergipe

① Hydrocarbons

Oil and Natural Gas: The exploration of oil and natural gas is one of the most important economic activities in Sergipe. The state has significant reserves in its sedimentary basin,

both onshore and offshore, and production has been increasing in recent years.

② Industrial Minerals:

Limestone: Limestone is used in the production of cement, lime, gypsum, and other construction materials. Sergipe has large reserves of high-quality limestone distributed across various regions of the state.

Potassium: Potassium is an essential nutrient for agriculture, and Sergipe is the only national producer of potassium salts. Production is carried out by Mosaic Fertilizantes, which announced an investment of around R\$ 800 million to extend the lifespan of the Taquari-Vassouras mine complex, located in the municipality of Rosário do Catete, about 40 kilometers from Aracaju. These investments help consolidate Sergipe as a major national producer of fertilizers.

Other Minerals: Sergipe also has deposits of other industrial minerals such as clay, sand, quartz, granite, and marble. These minerals are used in various sectors of the economy, including civil construction, ceramics, the glass industry, and the chemical industry.

③ Metallic Minerals

Although on a smaller scale, Sergipe also has reserves of metallic minerals such as copper, iron, and niobium. These resources are not yet exploited on a large scale in the state.

④ Sand, Crushed Stone, and Clay Deposits

Sand: Sand is one of the main materials used in civil construction, and Sergipe has large reserves of high-quality sand. Sergipe's sand is used in the production of concrete, concrete blocks, mortar, and other construction materials.

Crushed Stone: Crushed stone is another key material for civil construction and is produced on a large scale in Sergipe. It has wide applications in construction, such as in concrete production, road paving, wall building, and land drainage.

Clay: Clay is used in the production of bricks, ceramics, and other construction materials. Sergipe has several deposits of high-quality clay.

⑤ Other Resources:

Titanium and Zirconium



Mineral Fertilizers in Sergipe

They are composed of essential nutrients in mineral forms such as nitrogen (N), phosphorus (P), potassium (K), among others. Sergipe has reserves of all the primary macronutrients (nitrogen, phosphorus, and potassium).

Sergipe hosts the only operating potassium mine in Brazil, the Taquari-Vassouras Mine/Plant Complex, located in the city of Rosário do Catete. It features conventional underground mining through mechanical extraction in silvinitic ore caves. The production supplies about 4% of the national market (approximately 1.3 million tons per year).

The cities of Capela and Japarutuba contain deposits of the mineral carnallite, with reserves estimated at 12 billion tons of ore, including 2.5 billion tons of potassium chloride (8.3% grade), which corresponds to 1.5 billion tons of potassium oxide on site.

The extraction of carnallite requires a natural gas consumption of 760,000 m³/day for drying the brine produced in the potassium salt dissolution process, to achieve a higher fertilizer concentration. It is important to highlight that this gas supply could come from the gas to be produced by Petrobras' Sergipe Deep Waters Project, with investments totaling R\$ 109 billion.

In the nitrogen fertilizer segment, there is a prospect for the construction of at least one more Nitrogen Fertilizer Plant in Sergipe.

Clay in Sergipe

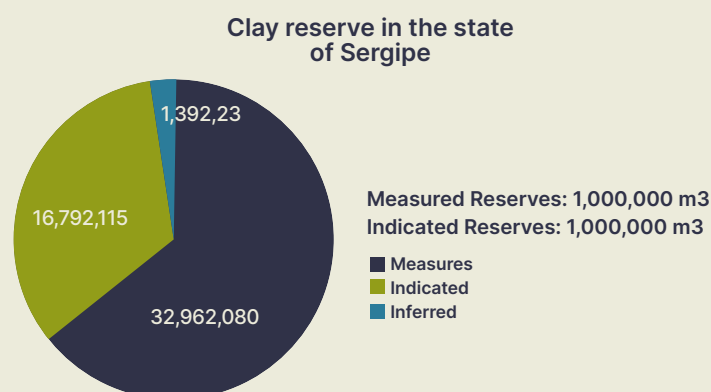
Clay is used in the production of bricks, ceramics, and other construction materials. Sergipe has several high-quality clay deposits, with almost all production destined for red ceramics (roof tiles, bricks, tiles) and cement production. There are also deposits in Sergipe that can be used for white ceramics, refractories, and lightweight aggregates (montmorillonitic clays).

Of the 29 registered deposits, nine are recorded as active (five) and intermittent (four) artisanal mines, and five as deposits/mines. Two mines, one active and one inactive, and thirteen occurrences/indications complete the total.

The reserves amount to approximately 34 million tons of measured reserves, 18 million

tons of indicated reserves, and 1.3 million tons of inferred reserves. The deposit with the largest reserve tonnage is Rio do Sal (25ag), with over 20 million tons (measured reserve), intended for the cement industry.

In addition to clay reserves, shale reserves were defined, totaling 1,506,600 tons as measured reserves and 693,750 tons as indicated reserves.



Limestone

Considering its multiple uses, strategic location, demonstrated (evaluated) and potential reserves, and wide compositional spectrum, limestone represents a significant mineral asset in the state's economy.

All deposits in the Sergipe Basin are typically sedimentary and classified as limestone, calcitic limestone, dolomitic limestone, and dolomite, totaling 34 deposits. The remaining deposits, all located in the Sergipe Fold Belt, comprise 24 records, including typical marbles and incipiently metamorphosed limestones.

The most important deposits, based on blocked reserves, are in the Sergipe Basin, which holds the largest evaluated reserves compared to the Fold Belt.

Regarding reserves, it is evident that the tonnage of calcitic limestone is dominated by indicated and inferred types.

As for production, only a few mines are regularly active considering the number of registered deposits. Most deposits are legally classified as deposits or reserves and have not yet entered exploitation. Besides dolomite, which is used as a soil corrector, these deposits can also produce filler. Total known reserves are



approximately 2 billion tons.

Titanium and Zirconium

In addition to the mineral resources mentioned above, Sergipe also has potential for the exploration of other resources such as titanium and zirconium.

Although Sergipe is not known as a major producer of titanium and zirconium in Brazil, there are some opportunities and potential for developing these minerals in the state.

Geological studies indicate the presence of occurrences of titanium and zirconium ores in Sergipe, mainly in the region of the São Francisco River mouth. However, further research and studies are needed to assess the economic feasibility of exploiting these mineral resources.

In this regard, titanium and zirconium deposits of marine placer-type minerals have been evaluated at the São Francisco River mouth, associated with sandy beach sediments. These consist of concentrations of ilmenite, rutile, zircon, and monazite.





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