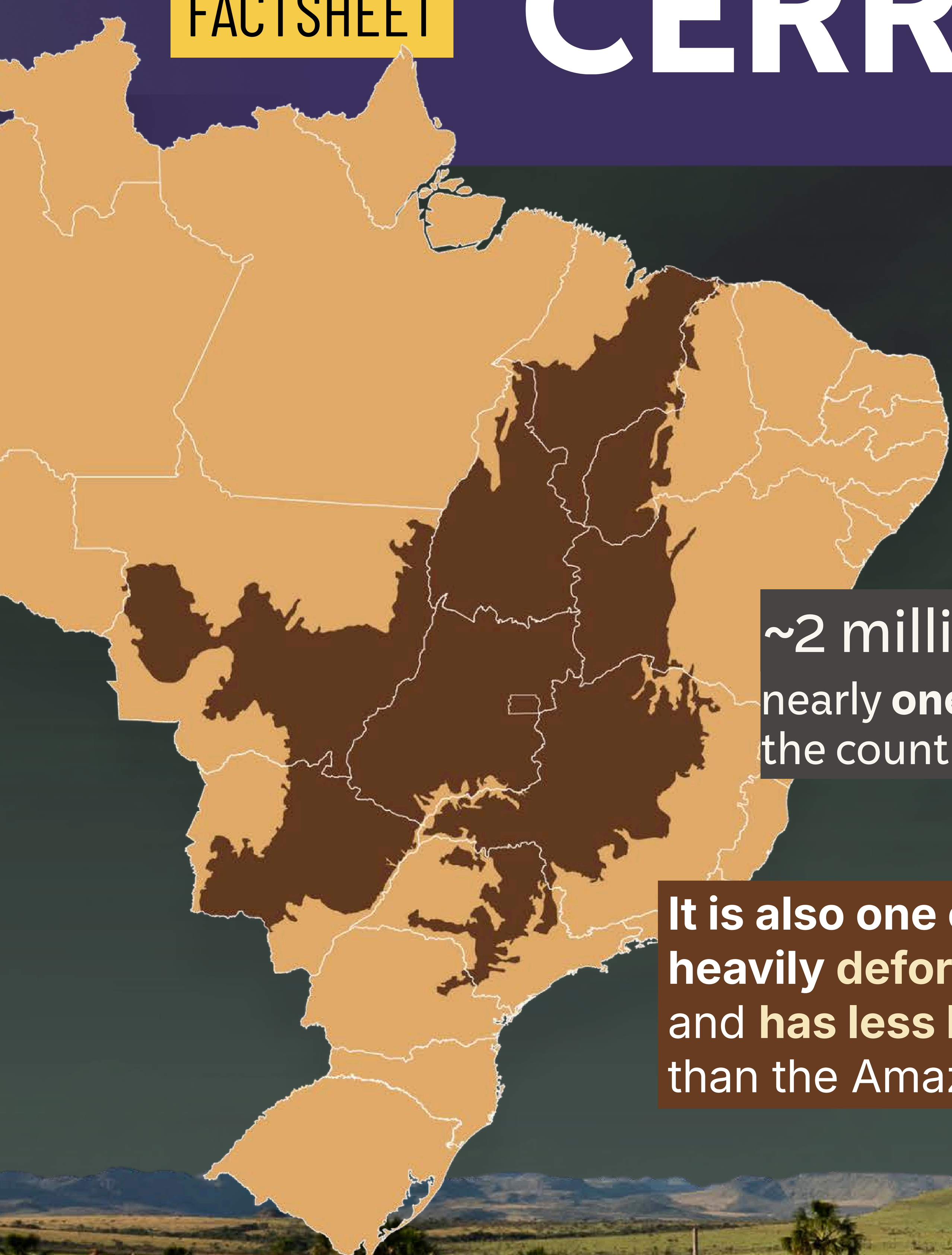
FACTSHEET

CERRADO

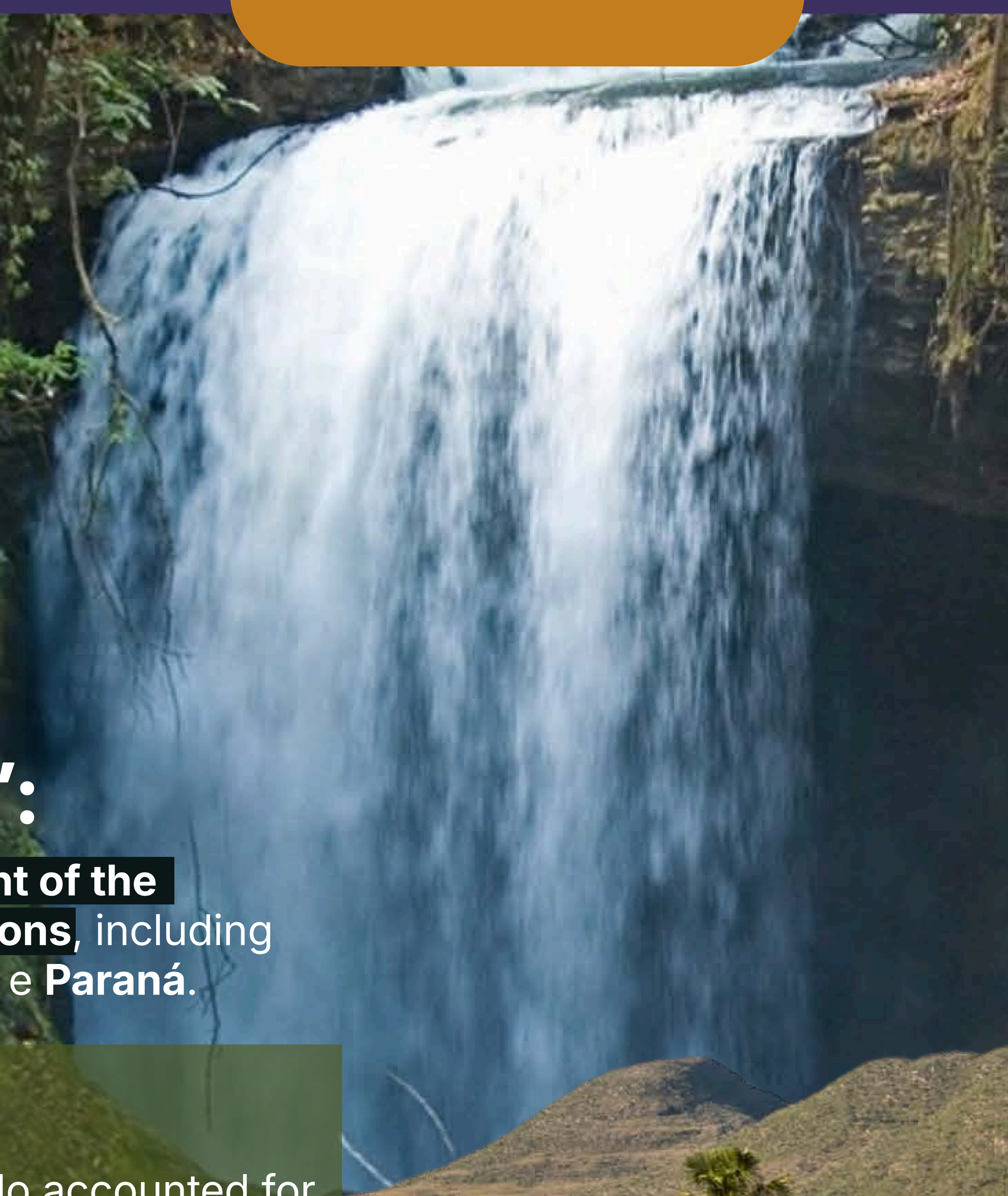
Mining Observatory



CERRADO IS BRAZIL'S 2nd LARGEST BIOME

~2 million de km², nearly **one-quarter** of the country's territory

It is also one of the most heavily deforested biomes and **has less legal protection** than the Amazon.



A "CRADLE OF WATERS":

it contains headwaters that feed **eight of the country's twelve hydrographic regions**, including **Tocantins-Araguaia, São Francisco** e **Paraná**.

MINING FOOTPRINT:

According to MapBiomas, the Cerrado accounted for **~9,9%** **of the country's mined area, predominantly industrial mining.**

WHAT IS MINED

The **Cerrado regions of Goiás** and **Minas Gerais** contain the **country's only operating rare earth mine** (Serra Verde, Minaçu-GO).

Projects under development (Carina/Aclara in Nova Roma; PCH/Appia in Iporá-Diorama), **niobium and phosphate operations in Catalão** (CMOC, China) and **Araxá-MG** (CBMM), and **nickel operations in Barro Alto and Niquelândia** (sold by Anglo American to China's MMG in 2025 for up to US$500 million), **as well as gold, manganese and copper.**

NEW FRONTIER IN GOIÁS

Northern, northwestern and western Goiás account for the expansion of applications for critical minerals — led by rare earths. Researchers point to "a new predatory extractive frontier" that threatens populations connected to the land and water.

OVERLAP WITH PROTECTED AREAS

Settlements under mineral applications

Goiás has

53 rare earth **applications**

overlapping rural settlements

37 filed by **Serra Verde** itself

in Minaçu and Montividiu do Norte. The company says it has no "current plans," but the titles perpetuate legal uncertainty.

Conservation units under indirect pressure

MapBiomas recorded a

between 2010 and 2020 **301%** **increase in the area of artisanal mining within conservation**

In the Cerrado, pressure from critical minerals is concentrated mainly around conservation units and protected territories — such as the Veadeiros/Kalunga mosaic — and is underestimated by direct-overlap data.

Encircled Quilombola territories

Goiás accounts for about one-fifth of the ~700 critical mineral applications that overlap 186 Quilombola territories in the country.

KALUNGA

3.850 families

BRAZIL'S LARGEST

Neighboring Chapada dos Veadeiros and the first Brazilian ICCA recognized by the UN) — has accumulated applications for rare earths, gold, manganese, iron and copper.

Headwaters deforested at the first rare earth mine

Serra Verde was fined by Semad-GO for clearing native vegetation at the headwaters of Lajes Creek.

WATER IMPACTS

Water as a contested resource

The extraction of rare earths from ion-adsorption clay uses large volumes of water and reagents (ammonium sulfate) in a biome that feeds the country's main river basins.

The Serra Verde case and the history of **"water enclosure"** indicate that water risk is the main liability of the new cycle. Recent literature from 2025 links ammonium sulfate leaching to soil acidification, heavy metals and radioactivity (uranium/thorium), and identifies magnesium sulfate as a lower-impact alternative.

Warning sign from Minas Gerais

In the same cycle, the MPF is challenging in court the absence of radiological risks declared by projects in southern Minas Gerais (Poços de Caldas, outside the Cerrado) and points to a threat to regional water resources — a precedent for the water and radiological conflict that ion-adsorption clay could replicate in Goiás, where uranium and thorium also occur.

Minaçu – an already saturated territory

The region has accumulated liabilities: **decades of asbestos mining** (SAMA's chrysotile mine), the Cana Brava Hydroelectric Power Plant reservoir and now rare earths.

Quilombola communities, riverine communities and farmers report a lack of information and territorial conflicts.

Environmental compensation stalled

Of the R$52.1 million in compensation agreed in Goiás (2019–2025), only R$5.1 million (9.93%) was disbursed, although these funds should finance conservation units in the Goiás Cerrado.

only 9,93%

QUILOMBOLA AND INDIGENOUS RIGHTS

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KALUNGA

The country's largest Quilombola territory is also one of the most affected: in addition to the multiple applications, it is affected by Aclara's Carina project in Nova Roma, with no record of a completed prior consultation process (Convention 169).

SPECIAL ZONES CREATED BY STATE LAW

Goiás State Law 23,597/2025, approved in two days, created the **State Critical Minerals Authority** (AMIC/GO), a fund and Special Zones with priority licensing. Legal experts consider the framework unconstitutional (federal jurisdiction; precedent ADI 4606/STF) and view it as reducing community participation.

INDIGENOUS LANDS ENCIRCLED

278 Indigenous lands ~44% of the total

are encircled by critical mineral applications. In the Cerrado, this pressure compounds that of agribusiness — the double encirclement by soy/cattle ranching and mining is a distinctive feature of the biome.

PRIOR CONSULTATION WEAKENED BY REGULATION

Loopholes in regulations and the new licensing law facilitate extraction without consultation with Indigenous and Quilombola communities — the procedure allows exploration and even licenses without recognizing nearby communities as affected.

COMPANIES AND FEATURED PROJECTS

COMPANY (origin)	MINERAL / PROJECT	LOCATION	STATUS
Serra Verde → USA Rare Earth (EUA)	**Rare earths (ion-adsorption clay)** — Pela Ema	Minaçu (GO)	Country's only operation in production; sale for ~US$2.8 billion announced in 04/2026; fined for deforestation at headwaters; 37 applications overlapping settlements
Aclara Resources (Canada; Hochschild and CAP among its shareholders)	**Heavy rare earths** — Carina Project	Nova Roma (GO), Kalunga region	Capital expenditure of US$780.9 million; development beginning in 2026, production expected in 2028; separation planned in the United States
Appia Rare Earths (Canada)	**Rare earths** — PCH Project	Iporá/Diorama/Israelândia (GO)	Exploration; R$550 million pledged
Alpha Minerals Brazil	**Rare earths** — exploration	Goiás and Pernambuco	28 applications, some overlapping settlements
CMOC (China)	**Niobium and phosphate**	Catalão/Ouvidor (GO)	Operating since the acquisition from Anglo American (US$1.5 billion, 2016)
MMG (China), formerly Anglo American	**Nickel (ferronickel)**	Barro Alto and Niquelândia (GO)	Sale for up to US$500 million announced in 02/2025; operating assets
CBMM (Moreira Salles group; Chinese and Japan-Korea consortia as minority shareholders)	**Niobium (world's largest producer)**	Araxá (MG)	Operating; the region is also targeted by rare earth projects

GOVERNANCE, UNCERTAINTIES AND MEDIUM-TERM OUTLOOK

Federal dispute over mineral resources

Quilombola communities, riverine communities and farmers report a lack of information and territorial conflicts.

The Goiás Cerrado has become the stage for a national dispute: the **Caiado–Trump memorandum** (March 2026), Lula's reaction accusing the opposition of "selling Brazil," and the state law facing questions over its constitutionality. BNDES and Finep plan more than R$45 billion, with projects in Goiás preselected despite unresolved environmental issues (Serra Verde).

PNMCE without specific safeguards

The National Policy on Critical and Strategic Minerals (PNMCE), approved by Congress, expands incentives and creates a guarantee fund without robust mitigation mechanisms for communities or specific provisions for biomes such as the Cerrado.

The **Mining Observatory**, the Climate Observatory, Inesc, and AMIG warn of the risk of repeating "historical mistakes."

Oversight in crisis

The PF indicted senior ANM officials for criminal organization offenses (Jun/2026), and the agency acknowledges that it lacks resources for oversight.

2026–2030 OUTLOOK

The likely scenario: consolidation of Minaçu as a rare earth export hub **under United States control** (USA Rare Earth)

The start of the **Carina project around 2028**, and a growing concentration of applications in northeastern Goiás — with conflicts over water, Kalunga and settlements, and litigation over licensing jurisdiction. Turning points: the STF's decision on the Goiás law, the resumption of federal licensing for Serra Verde, the Brazil–United States agreement, and the possible reactivation of Chinese controls (suspended until November 2026). **USA Rare Earth completed its acquisition of Serra Verde in 2026, including a US$750 million investment from the United States Department of War.**

FINDINGS FROM STUDIES AND REPORTS (2025–2026)

Science on ion-adsorption clays

The technical basis of projects in Goiás is the subject of a growing body of literature:

A review in the **Journal of Hazardous Materials (2025) documents soil acidification**, heavy metals and radioactivity (uranium/thorium) from ammonium sulfate leaching; a study in Environmental Science & Technology measures persistent water impacts in legacy mining areas in China; and a life-cycle assessment (Journal of Environmental Management, 2025) **identifies magnesium sulfate as a lower-impact pathway.**

Global outlook

The **Global Critical Minerals Outlook 2026** (IEA) projects strong growth in demand for critical minerals through 2040 and shifts the focus from "meeting demand" to "supply chain security"; rare earth processing **remains highly concentrated in China.**

Brazilian strategic studies

The CGEE/MCTI roadmap (2026–2040) places the Goiás Cerrado at the center of the rare earth strategy — **with targets such as a pilot plant for separating heavy rare earths at CETEM by 2028** — and warns that exporting raw concentrate captures less than 5% of the value. The CEBRI/Vallya report estimates that the most advanced projects, **mainly in Goiás and Minas Gerais, could produce ~38.7 thousand metric tons of oxides per year and involve ~R$13.2 billion in investment.**

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