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Brazil Soybean Area Expands According to Geospatial Analysis from Other Sources

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Soybean area expansion in Brazil's central west and northern regions has increased soybean exports in the northeast where infrastructure development rapidly expanded during the past decade (Figure 1). According to *Companhia Nacional de Abastecimento* (CONAB), soybean area expanded in all regions of Brazil, and the central west region had the largest soybean area expansion of approximately 5.4 million hectares (MHa) from 2017 through 2024 (Figure 2).

Approximately 50 percent of Brazil's soybean area is planted in the *Cerrado* biome, a tropical savanna that produces a large percentage of Brazil's corn, soy, and cattle. The *Cerrado* biome also includes the MATOPIBA region, encompassing the northeastern states of Maranhão (MA), Tocantins (TO), Piauí (PI), and Bahia (BA). The soybean area for the MATOPIBA region increased from approximately 4.1 to 5.8 MHa from 2017 through 2024 (Figure 4). The soybean harvest for MATOPIBA region is also located closer to the northeast coastline ports for easier export in comparison to other *Cerrado* states that harvest soybeans (Figure 3).

Brazil's soybean area, yield, and production (AYP) estimates at national and state levels have been reported in monthly publications by CONAB, *Instituto Brasileiro de Geografia e Estatística* (IBGE), and Safras and Mercado for decades. The soybean area estimates from these three sources are compared to soybean area estimates derived from Landsat (30-meters) and Sentinel-2 (10-meters) imagery by Agrosatélite Applied Geotechnology (30-m, 2022), GLAD-UMD (30-m, 2023), and GDA Corp (10-m, 2024), as shown in Figures 4, 5, and 6. IBGE is an appropriate source for comparing all other sources because IBGE's crop area estimates are conducted at the municipality level for all biomes in Brazil, and it allows USDA to verify and validate crop area estimates made by other sources. (For more information, please contact Curt Reynolds at Curt.Reynolds@usda.gov.)

References:

Agrosatélite Applied Geotechnology. 2022. Geospatial analysis of soy expansion in the Cerrado Biome from 2000/01 to 2021/22. Florianópolis, SC, Brazil, 2022. 30 pages.

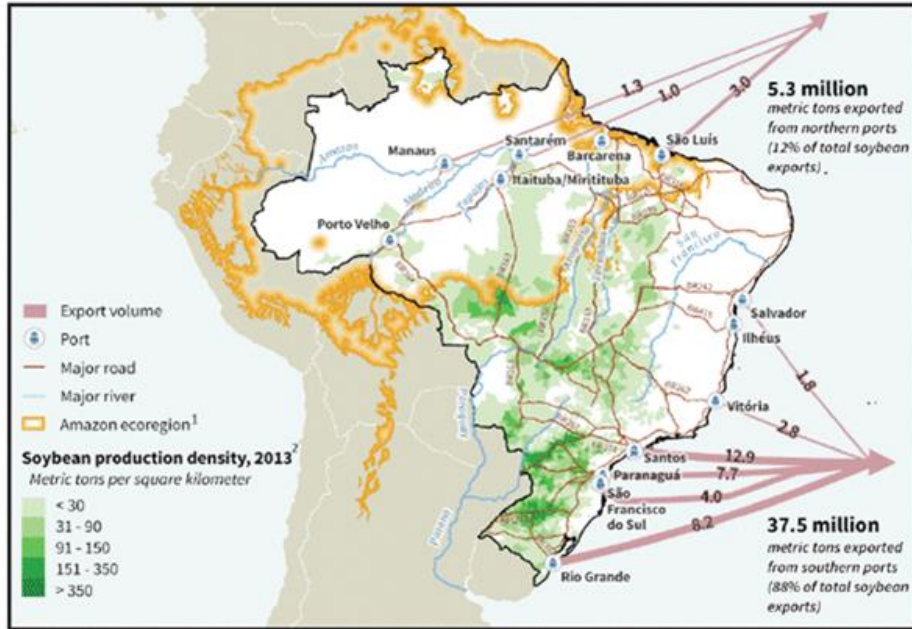


Geospatial Data Analysis (GDA) Corporation, 2024. Brazil Soybean Area Estimates for 2022, 2023, and 2024 harvest on CropSignal, and 10-meter GeoChronicles composites on GeoSynergy. <https://www.cropsignal.com/>

GLAD-UMD, 2023. Commodity Crop Mapping and Monitoring in South America from 2001-2023, Global Land Analysis and Discovery (GLAD), University of Maryland (UMD), Department of Geographical Sciences. <https://glad.umd.edu/projects/commodity-crop-mapping-and-monitoring-south-america>

USDA/FAS. 2024. GAIN report (voluntary): Sustainable Agriculture Programs in Brazil-Past Present and Future, GAIN Report No, BR2024-0006, 4/26/2024.

Brazil Soybean Exports: 2013



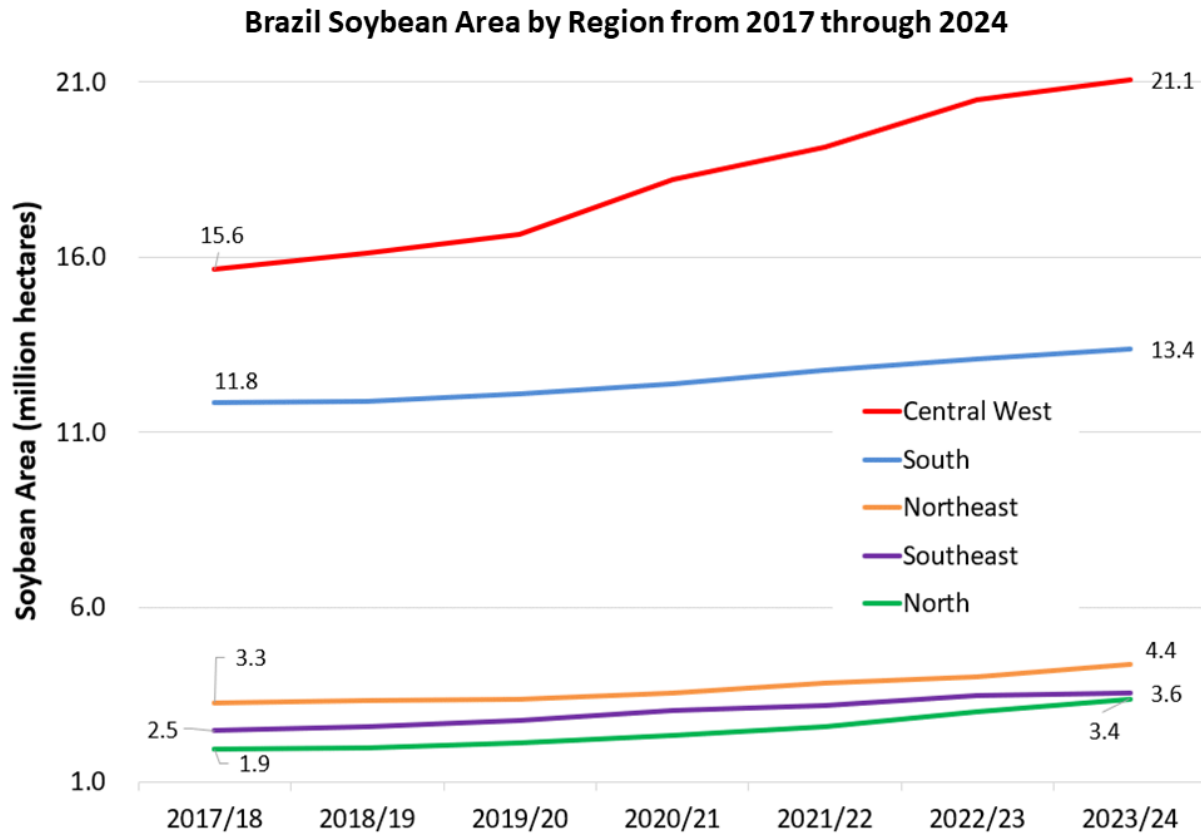
Brazil Soybean Exports: 2022



Sources:

1. Amazon ecoregion from World Wildlife Fund;
2. Produção Agrícola Municipal (PAM) from Institute of Geography and Statistics (IBGE);
3. Export data from Ministério da Economia and Comex Stat.

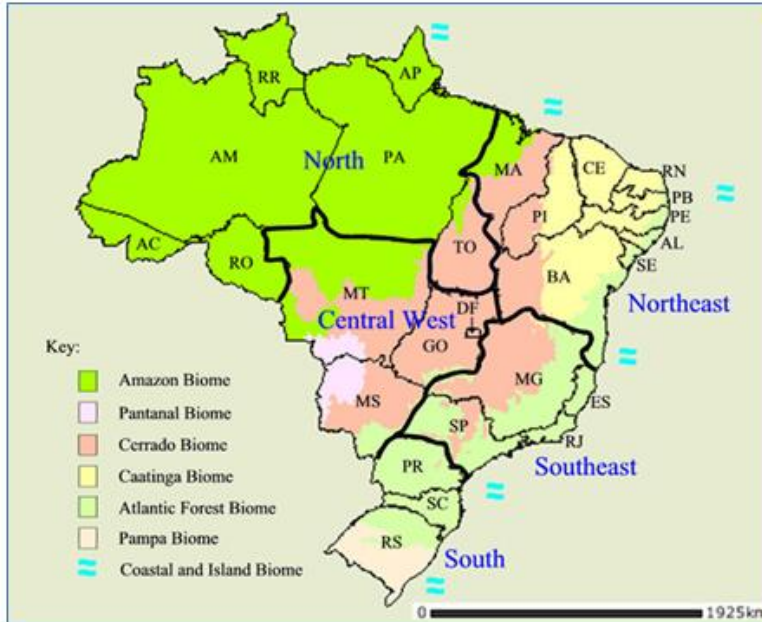
Figure 1. Soybean Production and Exports Expand to Brazil's Northern Arc Ports along the Amazon River



Source: Soybean Area Estimates by Region from Companhia Nacional de Abastecimento (CONAB), May 2024

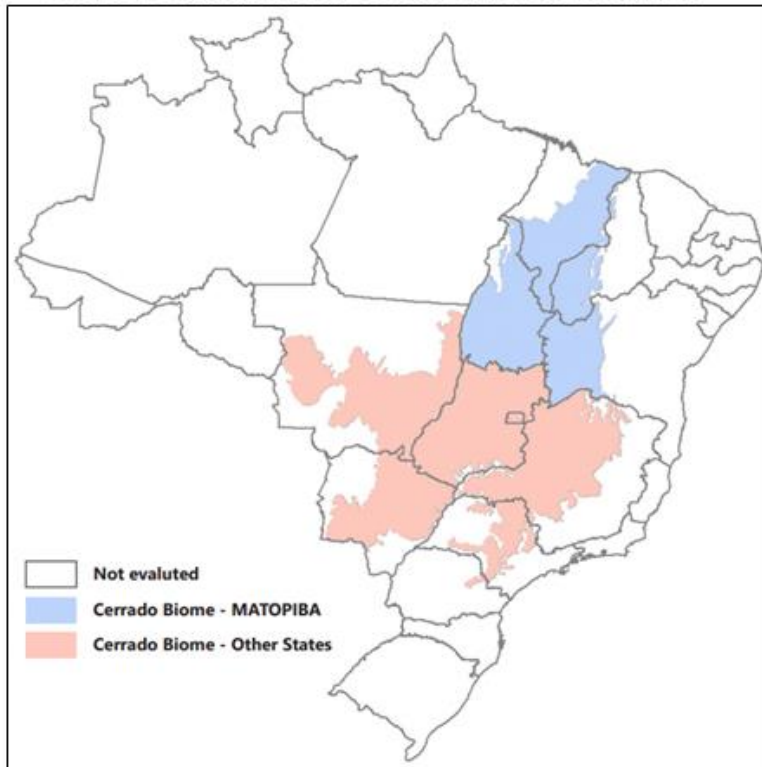
Figure 2. Brazil Soybean Area by Region from 2017 through 2024

Major Crop Reporting Regions for Brazil



Sources: Crop reporting regions by Companhia Nacional de Abastecimento (CONAB), and biomes defined by the Instituto Brasileiro de Geografia e Estatística (IBGE) at the municipality level.

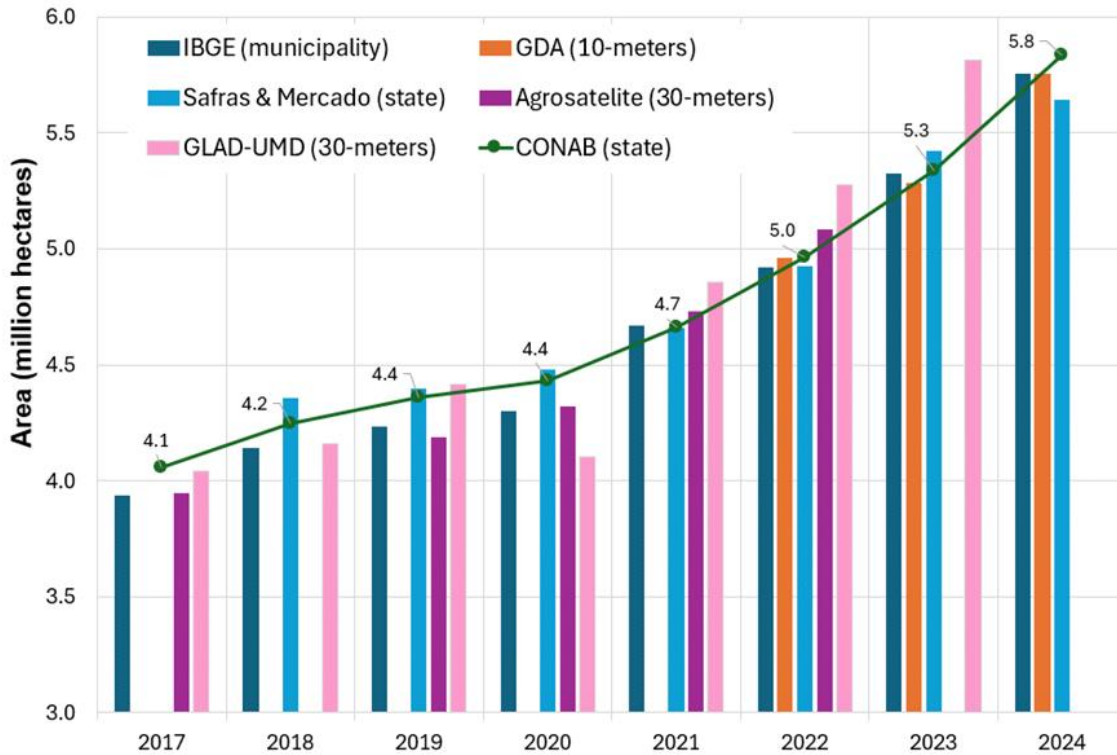
Brazil's Cerrado Biome for the MATOPIBA Region



Source: Agrosatélite (2022), Geospatial analysis of soy expansion in the Cerrado Biome from 2000/01 to 2021/22.

Figure 3. Major Crop Reporting Regions and Brazil's Cerrado Biome for the MATOPIBA Region

Brazil Soybean Area Estimates for MATOPIBA Region from 2017 through 2024



Sources: Instituto Brasileiro de Geografia e Estatística (IBGE, municipality-level); Companhia Nacional de Abastecimento (CONAB, state-level); Safras and Mercado (state-level); Global Land Analysis and Discovery laboratory at the University of Maryland (GLAD-UMD, 30-meters); Agrosatélite (30-meters); Geospatial Data Analysis (GDA, 10-meters)

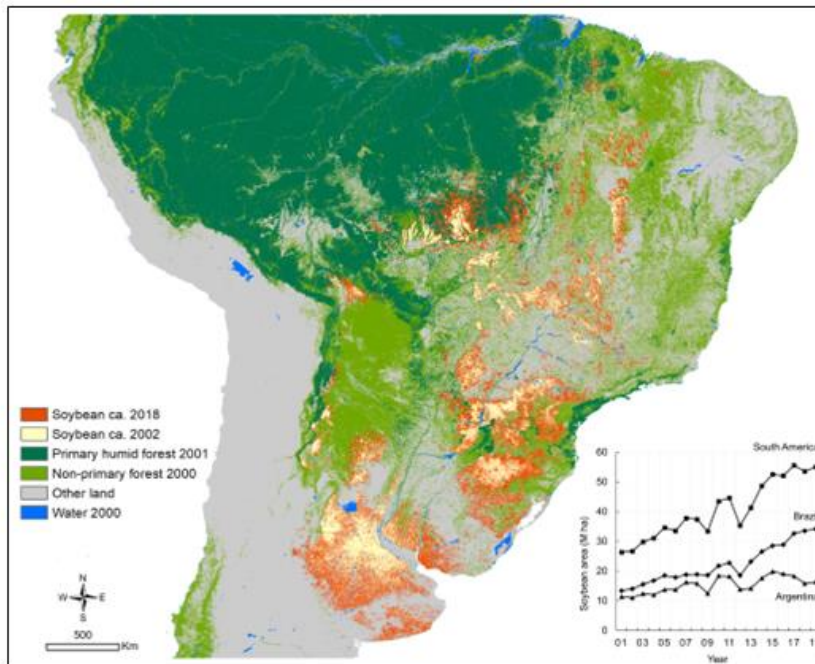
Figure 4. Brazil Soybean Area Estimates for MATOPIBA Region from 2017-2024. MATOPIBA region encompasses the northeastern states of Maranhão (MA), Tocantins (TO), Piauí (PI), and Bahia (BA).

GDA Soybean Area Estimates (10-m) for South America from 2021-2024



Source: Geospatial Data Analysis (GDA, 10-meters)

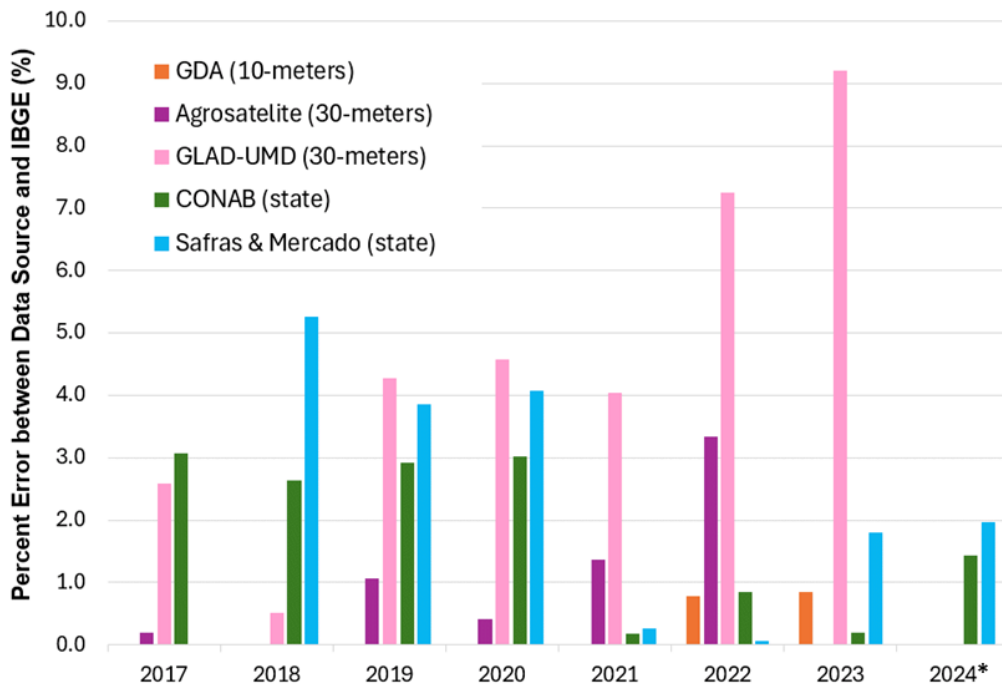
GLAD-UMD Commodity Crop Mapping and Monitoring (30-m) in South America from 2001-2023



Source: Global Land Analysis and Discovery laboratory at the University of Maryland (GLAD-UMD, 30-meters).

Figure 5. Annual Brazil Soybean Area Estimates Derived from Sentinel- 2 (10-m) and Landsat (30-m) Imagery

Percent Error between Data Source and IBGE
(Soybean Area Estimates for MATOPIBA Region, Brazil)



* GDA's 2024 soybean area estimate agreed with IBGE's 2024 area estimate so that GDA's percent error is zero in 2024.

Sources: Instituto Brasileiro de Geografia e Estatística (IBGE, municipality-level); Companhia Nacional de Abastecimento (CONAB, state-level); Instituto Brasileiro de Geografia e Estatística (IBGE, municipality-level); Safras and Mercado (state-level); Global Land Analysis and Discovery laboratory at the University of Maryland (GLAD-UMD, 30-meters); Agrosatellite soybean area estimates for Cerrado biome (30-meters); Geospatial Data Analysis (GDA, 10-meters).

Figure 6. Percent Error between Data Source and IBGE
(Soybean Area Estimates for MATOPIBA Region, Brazil)



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Production, Supply and Distribution Database (PSD Online)

<https://apps.fas.usda.gov/psdonline/app/index.html#/app/home>

Global Agricultural Information Network (Agricultural Attaché Reports)

<https://www.fas.usda.gov/databases/global-agricultural-information-network-gain>

Crop Explorer

<https://ipad.fas.usda.gov/cropexplorer/>

Global Agricultural and Disaster Assessment System (GADAS)

<https://geo.fas.usda.gov/GADAS/index.html>