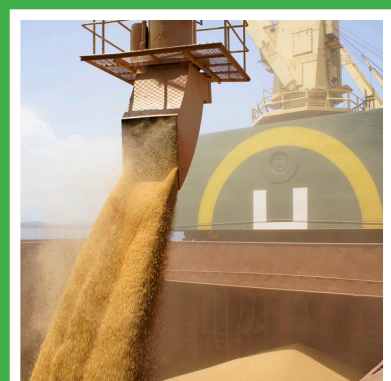
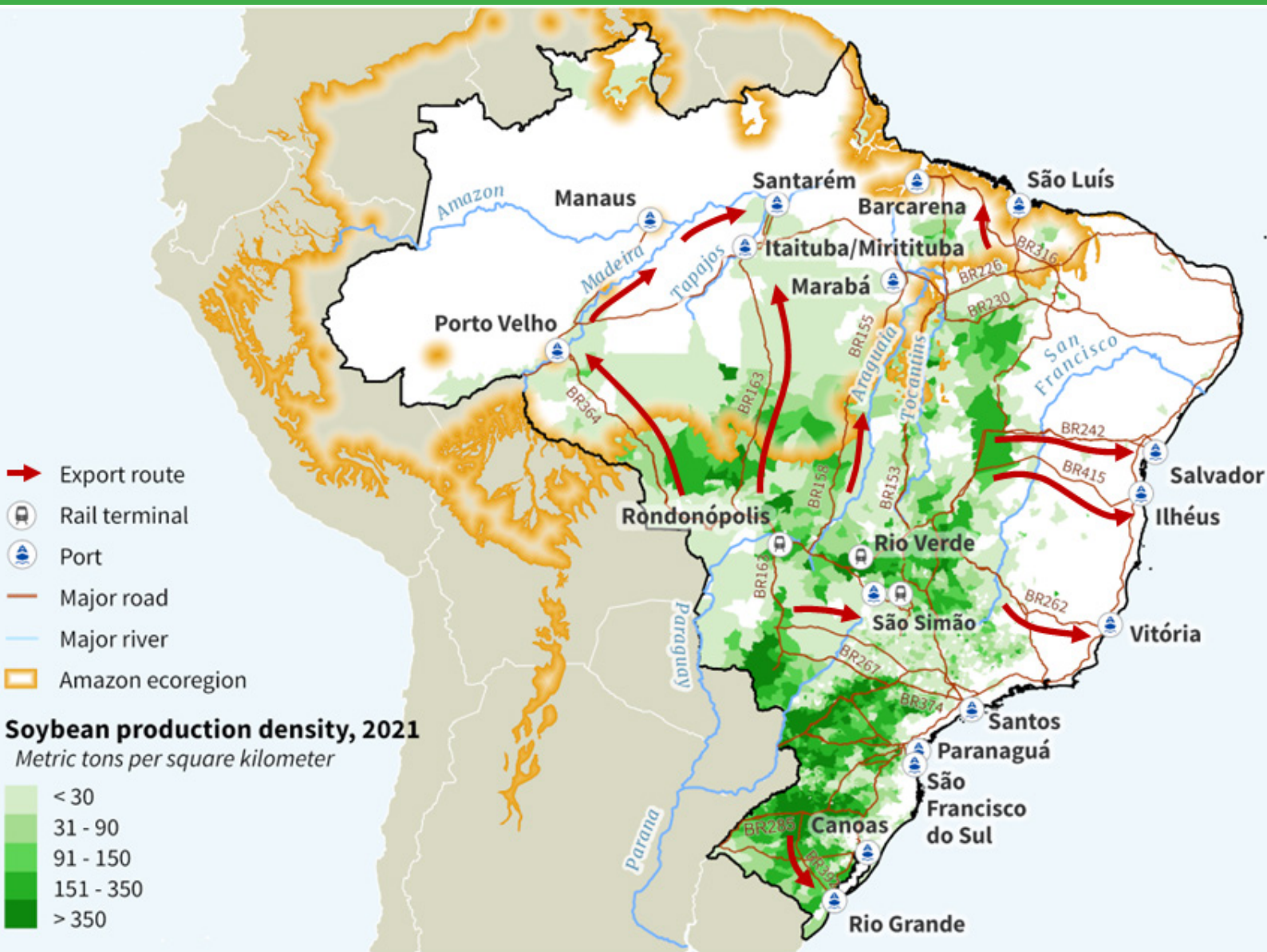




# Soybean Transportation Guide BRAZIL 2022



United States Department of Agriculture  
Marketing and Regulatory Programs  
Agricultural Marketing Service  
Transportation and Marketing Program

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# Contents

Soybean Transportation Guide: Brazil 2022 .....	1
General Information .....	3
2022 Summary .....	4
Transportation Infrastructure.....	21
Transportation Indicators.....	29
Soybean Production .....	39
Exports.....	41
Exports to China .....	46
Transportation Modes .....	55
Reference Material .....	66
Photo Credits.....	71

# Soybean Transportation Guide: Brazil 2022

## Executive Summary

The *Soybean Transportation Guide* is a visual snapshot of Brazilian soybean transportation in 2022. The Guide provides data on the cost of shipping soybeans to Shanghai, China, and Hamburg, Germany. It also includes information about soybean production, exports, railways, ports, and infrastructural developments.

In the world oilseed market, Brazil is the foremost U.S. competitor. Brazil largely sustains its competitiveness by continually improving its transportation infrastructure to reduce transportation costs. Other elements of the country's competitiveness include low production costs, increases in planted area, high productivity, and weak currency. Because Brazilian and U.S. producers use the same advanced production and technological methods, their soybeans are relatively interchangeable for buyers. Similar to Brazil, U.S. soybean competitiveness worldwide rests (at least, in part) on keeping transportation costs low through continual infrastructure improvements.

Since 2013, Brazil has held enough of a cost advantage to surpass U.S. soybean exports, maintaining its position as the top soybean exporter in the world. USDA forecasts Brazil will retain its position as the world's largest soybean exporter through 2032. However, the United States retains a significant share of global soybean exports and continues to vie for the position of the world's leading exporter. The United States remains the second-largest exporter, followed by Paraguay, Canada, and Argentina. China represents the largest market for global soybean trade, accounting for more than half of soybean imports worldwide.

## Brazil's Long-Term Infrastructure Investments Pay Off

Slowly, Brazil's decades-long efforts have improved its transportation cost competitiveness. Most recently, in June 2023, after 35 years of planning and construction, Brazil completed the North-South (EF-151) Railroad (FNS) with the inauguration of Rumo's rail terminal in Rio Verde, Goiás. This terminal has a capacity to handle 11 million metric tons of grain and soybean meal per year to serve Goiás and eastern Mato Grosso. The railroad links the northeastern port of Itaqui-São Luis, Maranhão, and the southern port of Santos, São Paulo.

The railroad has two concessions. Between Maranhão and Tocantins, FNS is operated by VLI, which has Vale as a partner, and from Tocantins to São Paulo, by Rumo S.A. According to [Rumo](#), the logistical costs of FNS transporting grain from the Rio Verde region to Santos are 15 percent lower than the average cost of shipping grain for American producers. In the short term, Rumo will concentrate on operations for southbound routes.

**Cost-advantage gain over the United States.** During 2022, Brazil's transportation cost advantage for shipping soybeans from North Mato Grosso to Shanghai, China, increased over the U.S. Gulf routes. However, this Brazilian route did not gain any additional cost advantage over the U.S. Pacific Northwest (PNW) routes. Brazil's cost advantage was especially notable for soybeans shipped from Sorriso, North Mato Grosso, by rail to Santos, and by barge to Barcarena. Brazil's cost advantage widened even more when soybeans were shipped by rail from Rio Verde, South Goiás, or from Cruz Alta, Northwest Rio Grande do Sul.

In 2022, soybeans that were shipped by rail from Rio Verde, South Goiás, via Santos to Shanghai, China, cost about \$33-35 per metric ton less than U.S. shipments by the PNW routes. From Sorriso, North Mato Grosso, via barge to Barcarena, the cost per metric ton (mt) to ship soybeans to Shanghai, China, was \$9.13 less than from Davenport, IA, via the U.S. Gulf.

## Truck and Ocean Freight Rates Rise From 2021

In 2022, Brazil exported 78.7 million metric tons (mmt) of soybeans, 9 percent less than 2021's total of 86.1 mmt. From 2021 to 2022, Brazil's soybean transportation costs rose, reflecting a significant rise in truck rates due to higher fuel prices. The cost of shipping a metric ton (mt) of soybeans 100 miles by truck rose 54 percent—from \$5.29 per mt to \$8.15 per mt. After rising in the first half of 2022, fuel prices started declining in July, but remained higher than in 2021. Fuel prices declined in response to lower State taxes and a reduced average price of fuel sold to distributors by the State-run oil firm Petrobras.

Ocean freight rates increased in the first half of 2022 and fell in the third and fourth quarters but remained higher than in 2021. On average, ocean rates from selected Brazilian export routes to Hamburg, Germany, increased 1-11 percent and to Shanghai, China, increased 4-7 percent. Ocean rates increased to a lesser degree than truck rates because of slowing global trade volumes and easing of global supply chain disruptions.

**Soybean-export shares by port.** The southern ports of Santos, Rio Grande, Paranaguá, and São Francisco do Sul still dominate the soybean trade to China, collectively accounting for 69 percent of Brazil's soybean exports to China. Also, in 2022, the northeastern ports of São Luís, Vitória, Salvador, and Barcarena accounted for nearly 31 percent of soybean exports to China. The Amazon River port of Manaus exported a small amount of soybeans to China. In 2022, the ocean freight spread between the Shanghai routes from the northeastern port of São Luís (\$61.80/mt) and the port of Santos (\$56.04/mt) was \$5.76/mt. Ocean freight spread is the cost difference between two vessel routes to the same destination.

## Landed Costs and Export Prices Increase From 2021

For selected routes of shipping Brazilian soybeans to China, total landed costs increased as both farm prices and transportation costs increased. In Mato Grosso, Brazil's top soybean-producing State, 2022 transportation costs from Sorriso were 20-22 percent of the total landed costs of shipping to Shanghai through the Port of Santos. By comparison, the transportation cost share of landed costs for the same route were 45 percent in 2006 and 34 percent in 2008.

From 2021 to 2022, average Brazilian soybean export prices increased 32 percent, from \$449 per mt to \$591 per mt. Average soybean farm gate prices increased 15 percent, from \$485.13/mt to \$556.38/mt over the same period. The Brazilian real (R\$) appreciated by 4 percent against the U.S. dollar, from R\$5.40 per U.S. dollar in 2021 to R\$5.16 in 2022. Despite the appreciation of the real in 2022, Brazilian farmers benefited from the real's relative weakness against the U.S. dollar. The farmers benefited because soybeans were priced in U.S. dollars but paid in reais. On average, in reais, farm gate prices increased 10 percent—from R\$2,614.67/mt in 2021 to R\$2,865.04/mt in 2022.

In 2022, Brazil exported 53.6 mmt of soybeans to China, valued at \$31.8 billion, accounting for 68 percent of Brazil's total soybean exports (78.7 mmt). The 2022 total exports to China were 11 percent less than the 2021 total (60.5 mmt). The next highest shares of Brazil's soybean exports (in declining order) went to Spain, Thailand, Iran, and the Netherlands.

## Acknowledgments

For data, regional information, and maps of Brazil, the author would like to thank the Associação Nacional dos Transportadores Ferroviários; Escola Superior de Agricultura "Luiz de Queiroz"/ Grupo de Pesquisa e Extensão em Logística Agroindustrial; Assessoria de Comunicação dos Portos de Paranaguá e Antonina; and USDA, Foreign Agricultural Service (FAS), Global Market Analysis. Likewise, the author is grateful for comments and critiques by Joanna Hitchner (USDA, Office of the Chief Economist); Agata Kingsbury and Timothy O'Neil (USDA, FAS); Marcos Bento and Joseph Degreenia (USDA, FAS, Office of Agricultural Affairs, Brasilia). Thanks, also, to USDA, Agricultural Marketing Service employees Maria Williams, editor; Jessica Ladd, graphic designer; and Kranti Mulik, economist.

# General Information

# BRAZIL



## State and Abbreviation

Acre (AC)	Pará (PA)
Alagoas (AL)	Paraíba (PB)
Amapá (AP)	Paraná (PR)
Amazonas (AM)	Pernambuco (PE)
Bahia (BA)	Piauí (PI)
Ceará (CE)	Rio de Janeiro (RJ)
Distrito Federal (DF)	Rio Grande do Sul (RS)
Espírito Santo (ES)	Rondônia (RO)
Goiás (GO)	Roraima (RR)
Maranhão (MA)	Santa Catarina (SC)
Mato Grosso (MT)	São Paulo (SP)
Mato Grosso do Sul (MS)	Sergipe (SE)
Minas Gerais (MG)	Tocantins (TO)

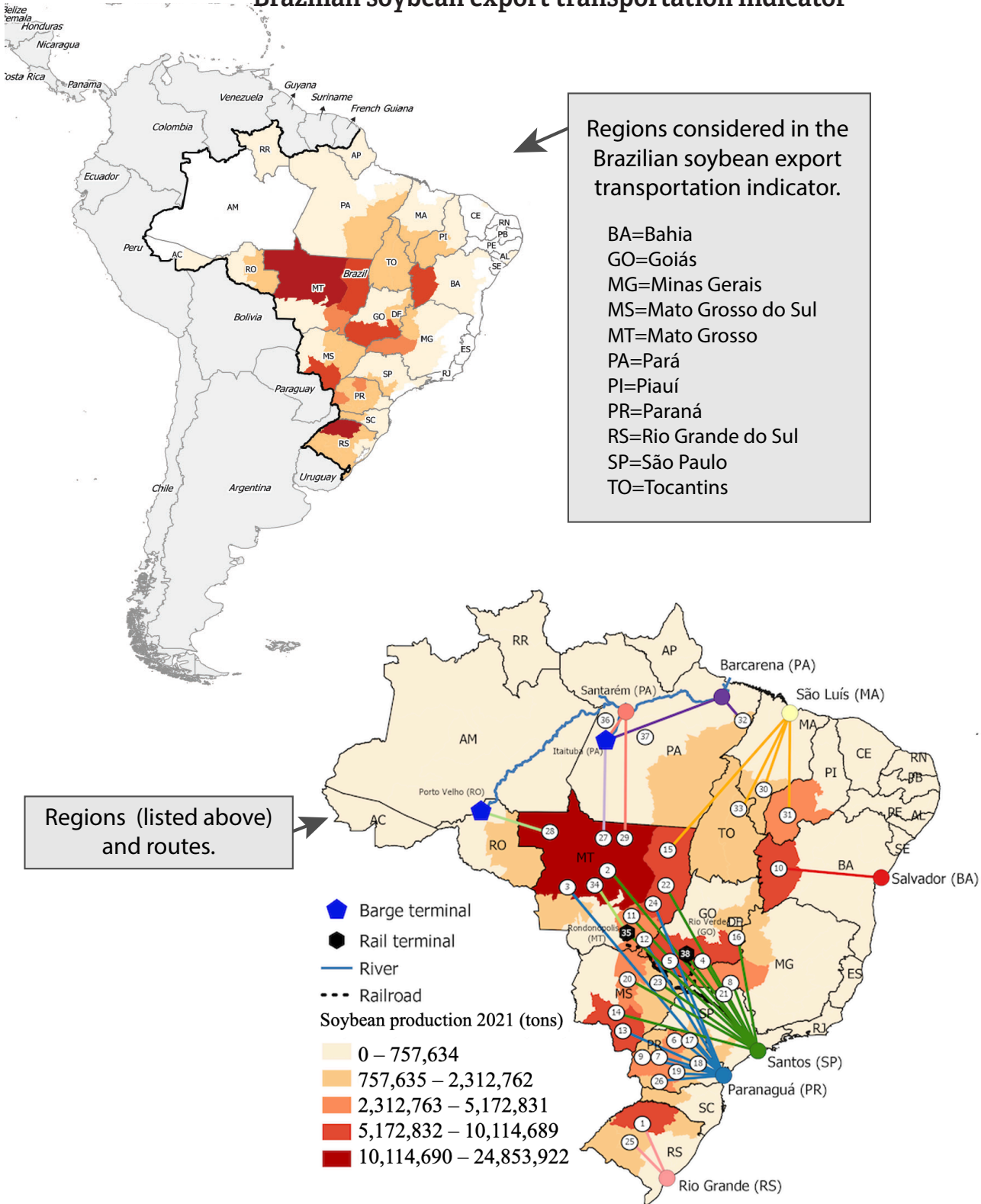


## Information about Brazil

<b>Population:</b>	215,313,498 (The World Bank)
<b>Gross Domestic Product per Capita, 2022:</b>	\$8,918 (The World Bank)
<b>Inflation, 2022:</b>	5.8 percent (Instituto Brasileiro de Geografia e Estatística (IBGE))
<b>Unemployment, 4th Quarter 2022:</b>	7.9 percent (IBGE)
<b>Area:</b>	8,515,770 square kilometers
<b>Languages:</b>	Portuguese (official), Spanish, English, and French

# 2022 Summary

## Routes<sup>1</sup> and regions considered in the Brazilian soybean export transportation indicator<sup>2</sup>



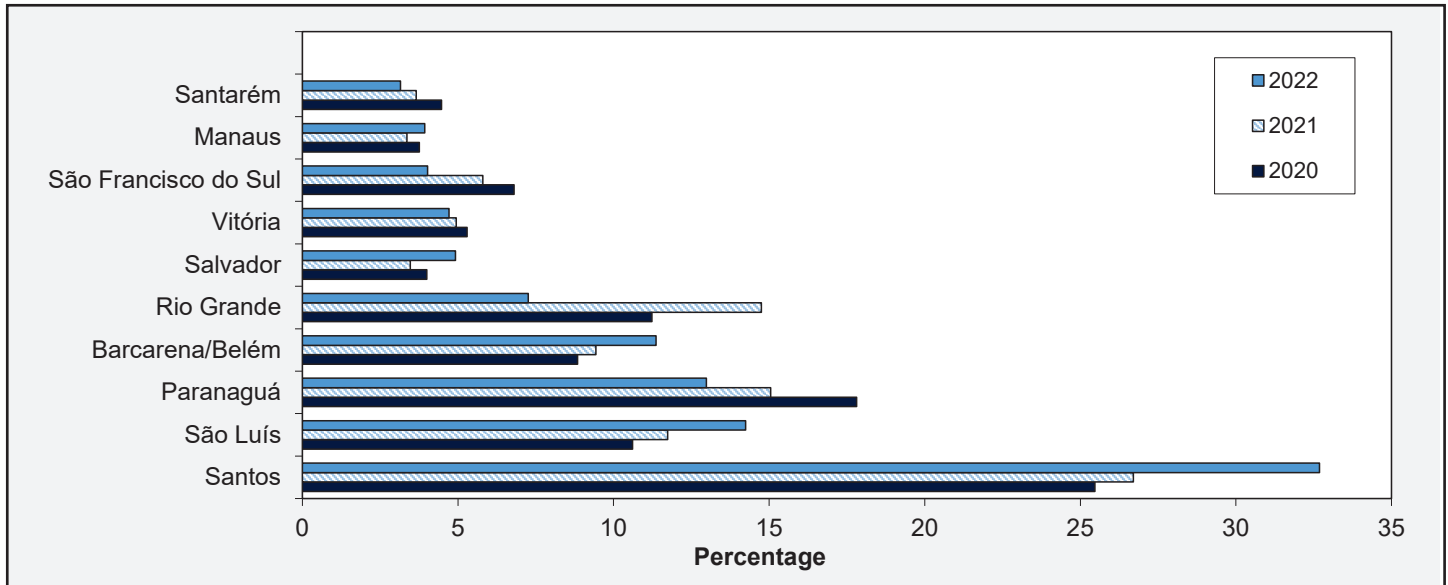
<sup>1</sup> Table defining routes by number is shown on page 29.

<sup>2</sup> Regions comprised about 79 percent of Brazilian soybean production in 2021 (Brazilian Institute of Geography and Statistics—Produção Agrícola Municipal).

Source: University of São Paulo, Escola Superior de Agricultura “Luiz de Queiroz” (ESALQ/ USP), Brazil, and USDA, Agricultural Marketing Service.

Brazil is the world's top exporter of soybeans, followed by the United States, Paraguay, Canada, and Argentina. In 2022, Santos was Brazil's top soybean export port, followed by São Luís, Paranaguá, Barcarena/Belém, Rio Grande, and Salvador. These six ports accounted for nearly 83 percent of Brazil's total soybean exports. The southern ports of Santos, Rio Grande, Paranaguá, and São Francisco do Sul still dominate Brazil's soybean exports to China, accounting for 75 percent of this trade in 2022. Also, in 2022, the northeastern ports of São Luís, Vitória, Salvador, and Barcarena accounted for nearly 25 percent of soybean exports to China, while the Amazon River ports of Manaus accounted for 0.4 percent.

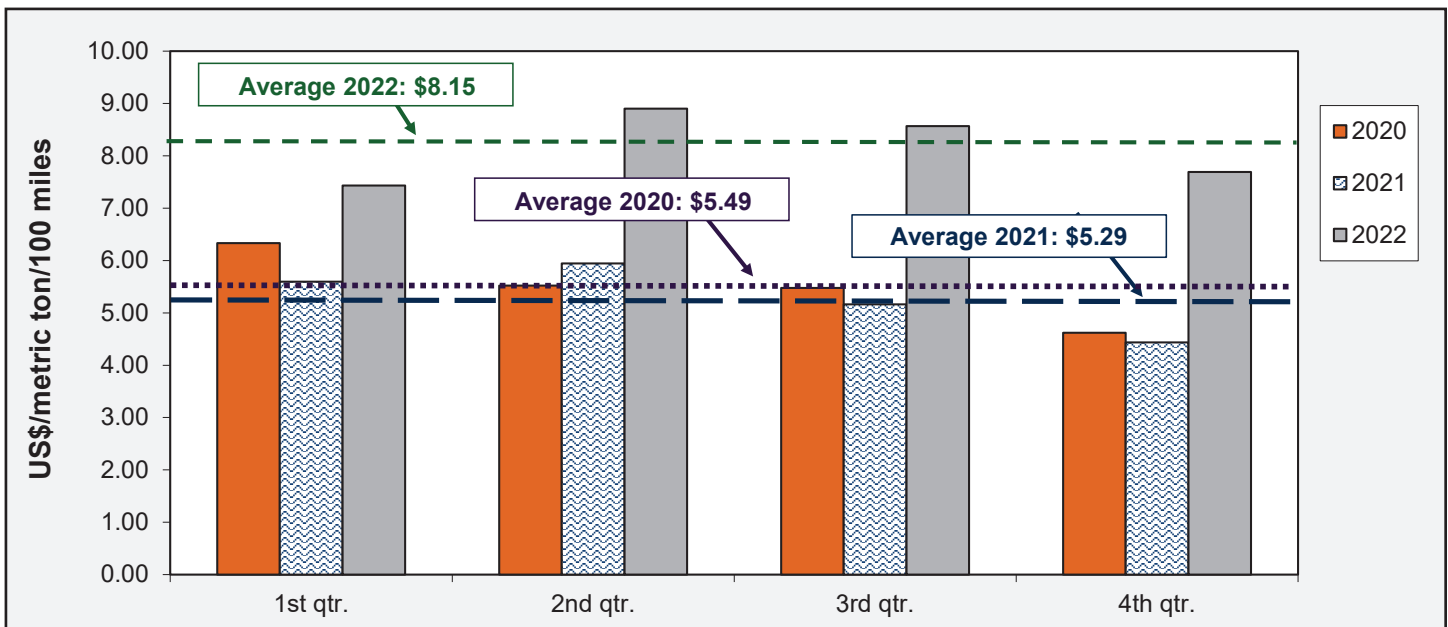
### Brazilian soybean exports by port, 2020-22



Source: Comex Stat, Ministério do Desenvolvimento, Indústria, Comércio e Serviços.

From 2021 to 2022, the average cost in Brazil of shipping a metric ton (mt) of soybeans 100 miles by truck increased from \$5.29 per mt to \$8.15 per mt.

### Brazilian soybean export truck cost index, 2019-22



Source: University of São Paulo, Escola Superior de Agricultura "Luiz de Queiroz" (ESALQ/ USP), Brazil, and USDA, Agricultural Marketing Service.



From 2021 to 2022, in selected routes of shipping Brazilian soybeans to China, total transportation costs as a share of total landed costs increased. The rising share reflected a significant increase in truck rates driven by rising fuel prices. In Mato Grosso, Brazil's top soybean-producing State, 2022 transportation costs from Sorriso were 20-22 percent of the total landed costs of shipping to Shanghai through the Port of Santos. By comparison, transportation costs were 45 percent of landed costs in 2006 and 34 percent in 2008.

### Costs of transporting Brazilian soybeans from the southern ports to Shanghai, China, 2017-22

	North MT <sup>1</sup> - Santos <sup>2</sup> by truck —US\$/mt—							Northwest RS <sup>1</sup> - Rio Grande <sup>2</sup> —US\$/mt—						
	2017	2018	2019	2020	2021	2022	% Change 2021-22	2017	2018	2019	2020	2021	2022	% Change 2021-22
Truck	92.95	91.76	79.28	60.65	59.30	93.98	58.5	30.72	29.20	25.06	19.24	18.85	29.45	56.3
Ocean	26.88	30.31	33.65	31.40	53.40	56.04	4.9	27.30	31.06	33.94	32.90	53.94	56.99	5.7
Total transportation	119.82	122.08	112.92	92.04	112.70	150.02	33.1	58.02	60.27	58.99	52.13	72.78	86.43	18.8
Farm gate price <sup>3</sup>	293.60	306.03	285.35	357.23	482.47	536.97	11.3	322.30	333.21	305.56	354.57	489.39	579.79	18.5
Landed cost	413.43	428.11	398.28	449.27	595.16	686.98	15.4	380.32	393.48	364.56	406.70	562.17	666.23	18.5
Transport % of landed cost	29.0	28.5	28.4	21.2	18.9	21.8	15.4	15.3	15.3	16.2	13.1	12.9	12.9	0.2
	North MT <sup>1</sup> - Santos <sup>2</sup> by rail —US\$/mt—							South GO <sup>1</sup> - Santos <sup>2</sup> —US\$/mt—						
	2017	2018	2019	2020	2021	2022	% Change 2021-22	2017	2018	2019	2020	2021	2022	% Change 2021-22
Truck	-	33.49	27.62	21.47	20.64	31.47	52.5	44.22	43.25	37.34	28.48	27.18	43.02	58.3
Rail <sup>4</sup>	-	43.29	39.98	32.13	29.69	44.31	49.3	-	-	-	-	-	-	-
Ocean	-	30.31	33.65	31.40	53.40	56.04	4.9	26.88	30.31	33.65	31.40	53.40	56.04	4.9
Total transportation	-	107.10	101.25	85.00	103.73	131.82	27.1	71.09	73.56	70.98	59.88	80.58	99.06	22.9
Farm gate price <sup>3</sup>	-	306.03	285.35	357.23	482.47	536.97	11.3	301.99	312.31	291.46	331.01	479.82	536.05	11.7
Landed cost	-	413.13	386.60	442.22	586.19	668.79	14.1	373.08	385.88	362.45	390.88	560.39	635.11	13.3
Transport % of landed cost	-	25.9	26.2	19.9	17.7	19.7	11.4	19.1	19.1	19.6	15.8	14.4	15.6	8.4

<sup>1</sup>Producing regions: RS=Rio Grande do Sul, MT=Mato Grosso, and GO=Goiás.

<sup>2</sup>Export port.

<sup>3</sup>The source of the farm gate price is the Brazilian Government, Companhia Nacional de Abastecimento (CONAB).

<sup>4</sup>In Brazil there are no published rail tariff rates. Rail rates can be approximately 30 percent lower than truck rates, depending on volumes hauled and the terms of contracts signed between the railroad company and shippers.

Note: mt=metric ton. A hyphen in an otherwise empty cell denotes that the data are not available.

Source: University of São Paulo, Escola Superior de Agricultura "Luiz de Queiroz" (ESALQ/USP), Brazil, and USDA, Agricultural Marketing Service.

From 2021 to 2022, transportation costs to ship soybeans to Hamburg, Germany, from Mato Grosso, increased 14-18 percent as a share of total landed costs.

### Costs of transporting Brazilian soybeans from the southern ports to Hamburg, Germany, 2017-22

	North MT <sup>1</sup> - Santos <sup>2</sup> by truck —US\$/mt—							Northwest RS <sup>1</sup> - Rio Grande <sup>2</sup> —US\$/mt—						
	2017	2018	2019	2020	2021	2022	% Change 2021-22	2017	2018	2019	2020	2021	2022	% Change 2021-22
Truck	92.95	91.76	79.28	60.65	59.30	93.98	58.5	30.72	29.20	25.06	19.24	18.85	29.45	56.3
Ocean	24.50	25.25	25.63	24.75	45.11	48.34	7.1	25.50	26.25	25.63	25.13	46.28	49.48	6.9
Total transportation	117.45	117.01	104.90	85.40	104.41	142.32	36.3	56.22	55.45	50.68	44.36	65.12	78.92	21.2
Farm gate price <sup>3</sup>	293.60	306.03	285.35	357.23	482.47	536.97	11.3	322.30	333.21	305.56	354.57	489.39	579.79	18.5
Landed cost	411.05	423.05	390.25	442.62	586.88	679.28	15.7	378.52	388.66	356.25	398.93	554.51	658.71	18.8
Transport % of landed cost	28.6	27.6	26.9	20.0	17.8	20.9	17.8	14.9	14.3	14.2	11.4	11.7	12.0	2.0
	North MT <sup>1</sup> - Santos <sup>2</sup> by rail —US\$/mt—							South GO <sup>1</sup> - Santos <sup>2</sup> —US\$/mt—						
	2017	2018	2019	2020	2021	2022	% Change 2021-22	2017	2018	2019	2020	2021	2022	% Change 2021-22
Truck	-	33.49	27.62	21.47	20.64	31.47	52.5	44.22	43.25	37.34	28.48	27.18	43.02	58.3
Rail <sup>4</sup>	-	43.29	39.98	32.13	29.69	44.31	49.3	-	-	-	-	-	-	-
Ocean	-	25.25	25.63	24.75	45.11	48.34	7.1	24.50	25.25	25.63	24.75	45.11	48.34	7.1
Total transportation	-	102.03	93.23	78.35	95.44	124.12	30.1	68.72	68.50	62.96	53.23	72.29	91.36	26.4
Farm gate price <sup>3</sup>	-	306.03	285.35	357.23	482.47	536.97	11.3	301.99	312.31	291.46	331.01	479.82	536.05	11.7
Landed cost	-	408.07	378.58	435.58	577.90	661.09	14.4	370.71	380.81	354.42	384.24	552.11	627.41	13.6
Transport % of landed cost	-	25.0	24.6	18.7	16.5	18.8	13.7	18.6	18.0	17.8	14.3	13.1	14.5	11.2

<sup>1</sup>Producing regions: RS=Rio Grande do Sul, MT=Mato Grosso, and GO=Goiás.

<sup>2</sup>Export port.

<sup>3</sup>The source of the farm gate price is the Brazilian Government, Companhia Nacional de Abastecimento (CONAB).

<sup>4</sup>In Brazil there are no published rail tariff rates. Rail rates can be approximately 30 percent lower than truck rates, depending on volumes hauled and the terms of contracts signed between the railroad company and shippers.

Note: mt=metric ton. A hyphen in an otherwise empty cell denotes that the data are not available.

Source: University of São Paulo, Escola Superior de Agricultura "Luiz de Queiroz" (ESALQ/USP), Brazil, and USDA, Agricultural Marketing Service.

From 2021-22, transportation costs increased from the selected routes of Brazil's northern and northeastern ports to Shanghai, China, and Hamburg, Germany.

### Cost of transporting soybeans from the northern and northeastern ports to Shanghai, China, 2020-22

	North MT <sup>1</sup> - Santarém <sup>2</sup> —US\$/mt—				South MA <sup>1</sup> - São Luís <sup>2</sup> —US\$/mt			
	2020	2021	2022	% Change 2021-22	2020	2021	2022	% Change 2021-22
Truck	39.20	37.91	59.30	56.4	26.83	24.85	40.83	64.3
Ocean	33.66	57.31	61.68	7.6	34.02	57.90	61.80	6.7
Total transportation	72.86	95.22	120.98	27.1	60.85	82.75	102.63	24.0
Farm gate price <sup>3</sup>	357.23	482.47	536.97	11.3	353.30	484.89	558.13	15.1
Landed cost	430.08	577.69	657.95	13.9	414.15	567.63	660.76	16.4
Transport % of landed cost	17.6	16.5	18.4	11.6	15.0	14.5	15.50	6.6
	Southwest PI <sup>1</sup> - São Luís <sup>2</sup> —US\$/mt—				North MT <sup>1</sup> - Barcarena <sup>2</sup> —US\$/mt—			
	2020	2021	2022	% Change 2021-22	2020	2021	2022	% Change 2021-22
Truck	29.81	29.15	44.32	52.1	31.72	31.84	49.44	55.3
Rail <sup>4</sup>	-	-	-	-	11.94	12.63	18.32	45.0
Ocean	34.02	57.90	61.80	6.7	34.96	59.55	62.73	5.3
Total transportation	63.83	87.05	106.12	21.9	78.61	104.02	130.49	25.4
Farm gate price <sup>3</sup>	342.39	475.78	542.19	14.0	357.23	482.47	536.97	11.3
Landed cost	406.23	562.82	648.31	15.2	435.84	586.49	667.45	13.8
Transport % of landed cost	16.0	15.5	16.3	5.7	18.7	17.7	19.5	10.2

<sup>1</sup>Producing regions: RS=Rio Grande do Sul, MT=Mato Grosso, and GO=Goiás.

<sup>2</sup>Export port.

<sup>3</sup>The source of the farm gate price is the Brazilian Government, Companhia Nacional de Abastecimento (CONAB).

<sup>4</sup>In Brazil there are no published rail tariff rates. Rail rates can be approximately 30 percent lower than truck rates, depending on volumes hauled and the terms of contracts signed between the railroad company and shippers.

Note: mt=metric ton. A hyphen in an otherwise empty cell denotes that the data are not available.

Source: University of São Paulo, Escola Superior de Agricultura "Luiz de Queiroz" (ESALQ/USP), Brazil, and USDA, Agricultural Marketing Service.

## Cost of transporting soybeans from the northern and northeastern ports to Hamburg, Germany, 2020-22

	North MT <sup>1</sup> - Santarém <sup>2</sup> —US\$/mt—				South MA <sup>1</sup> - São Luís <sup>2</sup> —US\$/mt			
	2020	2021	2022	% Change 2021-22	2020	2021	2022	% Change 2021-22
Truck	39.20	37.91	59.30	56.4	26.83	24.85	40.83	64.3
Ocean	20.94	42.09	46.68	10.9	22.76	48.36	49.08	1.5
Total transportation	60.14	80.00	105.98	32.5	49.59	73.21	89.90	22.8
Farm gate price <sup>3</sup>	357.23	482.47	536.97	11.3	353.30	484.89	558.13	15.1
Landed cost	417.37	562.47	642.95	14.3	402.89	558.10	648.04	16.1
Transport % of landed cost	15.0	14.2	16.5	16.0	12.6	13.1	13.8	5.6
	Southwest PI <sup>1</sup> - São Luís <sup>2</sup> —US\$/mt—				North MT <sup>1</sup> - Barcarena <sup>2</sup> —US\$/mt—			
	2020	2021	2022	% Change 2021-22	2020	2021	2022	% Change 2021-22
Truck	29.81	29.15	44.32	52.1	31.72	31.84	49.44	55.3
Rail <sup>4</sup>	-	-	-	-	11.94	12.63	18.32	45.0
Ocean	22.76	48.36	49.08	1.5	20.31	41.00	44.43	8.4
Total transportation	52.58	77.51	93.39	20.5	63.97	85.47	112.19	31.3
Farm gate price <sup>3</sup>	342.39	475.78	542.19	14.0	357.23	482.47	536.97	11.3
Landed cost	394.97	553.28	635.58	14.9	421.19	567.94	649.15	14.3
Transport % of landed cost	13.6	14.0	14.6	4.5	15.2	15.0	17.3	14.8

<sup>1</sup>Producing regions: RS=Rio Grande do Sul, MT=Mato Grosso, and GO=Goiás.

<sup>2</sup>Export port.

<sup>3</sup>The source of the farm gate price is the Brazilian Government, Companhia Nacional de Abastecimento (CONAB).

<sup>4</sup>In Brazil there are no published rail tariff rates. Rail rates can be approximately 30 percent lower than truck rates, depending on volumes hauled and the terms of contracts signed between the railroad company and shippers.

Note: mt=metric ton. A hyphen in an otherwise empty cell denotes that the data are not available.

Source: University of São Paulo, Escola Superior de Agricultura "Luiz de Queiroz" (ESALQ/USP), Brazil, and USDA, Agricultural Marketing Service.

In response to higher transportation costs and farm prices, total landed costs of U.S. soybeans increased via the U.S. Gulf to Germany and China. From 2021 to 2022, barge rates rose significantly because of low water on the Mississippi River that began to impact barge traffic in early October 2022 and did not begin to improve until the end of November 2022.

### Average costs of transporting U.S. soybeans via U.S. Gulf to Hamburg, Germany, and Shanghai, China, 2018-22

	2018	2019	2020	2021	2022	% change 2021-22	2018	2019	2020	2021	2022	% change 2021-22
	To Hamburg, Germany											
	Minneapolis, Minnesota —US\$/mt—						Davenport, Iowa —US\$/mt—					
Truck	12.14	10.10	11.04	13.58	18.86	38.9	12.14	10.10	11.04	13.58	18.86	38.9
Rail <sup>1</sup>	46.37	47.96	36.73	36.38	38.04	4.6	30.92	32.13	33.03	33.33	34.81	4.4
Barge <sup>2</sup>	29.97	21.99	26.14	27.48	53.62	95.1	24.51	20.43	20.05	23.09	44.80	94.0
Ocean <sup>3</sup>	19.85	18.15	16.61	25.31	30.12	19.0	19.85	18.15	16.61	25.31	30.12	19.0
Total transportation <sup>4</sup>	73.55	74.22	62.97	75.47	112.11	48.5	64.23	64.73	55.96	70.32	102.49	45.8
Farm price <sup>5</sup>	330.51	305.65	321.45	481.65	539.52	12.0	336.05	307.27	330.02	482.26	541.97	12.4
Landed cost <sup>6</sup>	404.06	379.86	384.42	557.12	651.63	17.0	400.28	372.00	385.98	552.58	644.46	16.6
Transport % of landed cost	18.1	19.4	16.4	13.6	17.2	26.6	16.0	17.4	14.4	12.8	15.9	24.4
	2018	2019	2020	2021	2022	% change 2021-22	2018	2019	2020	2021	2022	% change 2021-22
	To Shanghai, China											
	Minneapolis, Minnesota —US\$/mt—						Davenport, Iowa —US\$/mt—					
Truck	12.14	10.10	11.04	13.58	18.86	38.9	12.14	10.10	11.04	13.58	18.86	38.9
Rail <sup>1</sup>	46.37	47.96	36.73	36.38	38.04	4.6	30.92	32.12	33.03	33.33	34.81	4.4
Barge <sup>2</sup>	29.97	21.99	26.14	27.48	53.62	95.1	24.51	20.43	20.05	23.09	44.80	94.0
Ocean <sup>3</sup>	44.42	44.55	40.08	68.58	67.25	-1.9	44.42	44.55	40.08	68.58	67.25	-1.9
Total transportation <sup>4</sup>	98.12	100.62	86.44	118.74	149.24	25.7	88.80	91.14	79.43	113.58	139.62	22.9
Farm price <sup>5</sup>	330.56	305.65	321.45	481.65	539.52	12.0	336.05	307.27	330.02	482.26	541.97	12.4
Landed cost <sup>6</sup>	428.68	406.27	407.89	600.39	688.76	14.7	424.85	398.41	409.45	595.85	681.59	14.4
Transport % of landed cost	22.8	24.7	21.2	19.8	21.7	9.3	20.9	22.9	19.4	19.1	20.5	7.2

<sup>1</sup>Rail rates include fuel surcharges, but do not include the cost of purchasing empty rail cars in the secondary rail markets, which could exceed the rail tariff rate plus fuel surcharge shown in the table.

<sup>2</sup>The Mississippi River closes from Minneapolis to just north of St. Louis during mid-December to late March; the distance by barge between Minneapolis and Davenport to the Port of New Orleans is 1,713 and 1,343 miles, respectively.

<sup>3</sup>Source for ocean rates: The Baltic Exchange and O’Neil Commodity Consulting; excludes handling charges.

<sup>4</sup>The average of the sum of the total costs may not be equal to the sum of the individual average costs of truck, rail, barge, and ocean because rail is used only in the first quarter.

<sup>5</sup>Source for the U.S. farm prices: USDA, National Agricultural Statistics Service.

<sup>6</sup>Landed cost is transportation cost plus farm price.

Note: mt=metric ton; totals may not add exactly due to rounding.

Source: Compiled by the USDA, Agricultural Marketing Service.

From North and South Dakota to Shanghai, China, via the Pacific Northwest (PNW), U.S. soybean transportation costs, as a share of total landed costs, decreased 2 percent from 2021 to 2022 in response to higher soybean prices.

### Average costs of transporting U.S. soybeans via Pacific Northwest to Shanghai, China, 2018-22

	2018	2019	2020	2021	2022	% change 2021-22	2018	2019	2020	2021	2022	% change 2021-22	
	<b>To Shanghai, China</b>												
	<b>Fargo, North Dakota —US\$/mt—</b>							<b>Sioux Falls, South Dakota —US\$/mt—</b>					
Truck	12.14	10.10	11.04	13.58	18.86	38.9	12.14	10.10	11.04	13.58	18.86	38.9	
Rail <sup>1</sup>	55.12	56.36	57.10	57.76	64.04	10.9	56.11	57.35	58.09	58.76	65.52	11.5	
Ocean <sup>2</sup>	24.34	24.59	21.38	38.05	38.32	0.7	24.34	24.59	21.38	38.05	38.32	0.7	
Total transportation	91.60	91.05	89.52	109.39	121.22	10.8	92.59	92.04	90.51	110.39	122.70	11.2	
Farm price <sup>3</sup>	319.55	285.65	306.11	465.42	528.50	13.6	320.38	293.98	315.51	474.61	541.61	14.1	
Landed cost <sup>4</sup>	411.14	376.70	395.62	574.81	649.72	13.0	412.96	386.02	406.01	584.99	664.31	13.6	
Transport % of landed cost	22.3	24.2	22.7	19.1	18.7	-2.1	22.5	23.8	22.4	18.9	18.5	-2.3	

<sup>1</sup>Rail rates include fuel surcharges, but do not include the cost of purchasing empty rail cars in the secondary rail markets, which could exceed the rail tariff rate plus fuel surcharge shown in the table.

<sup>2</sup>Source for the U.S. ocean freight rates: O’Neil Commodity Consulting.

<sup>3</sup>Source for the U.S. farm prices: USDA, National Agricultural Statistics Service.

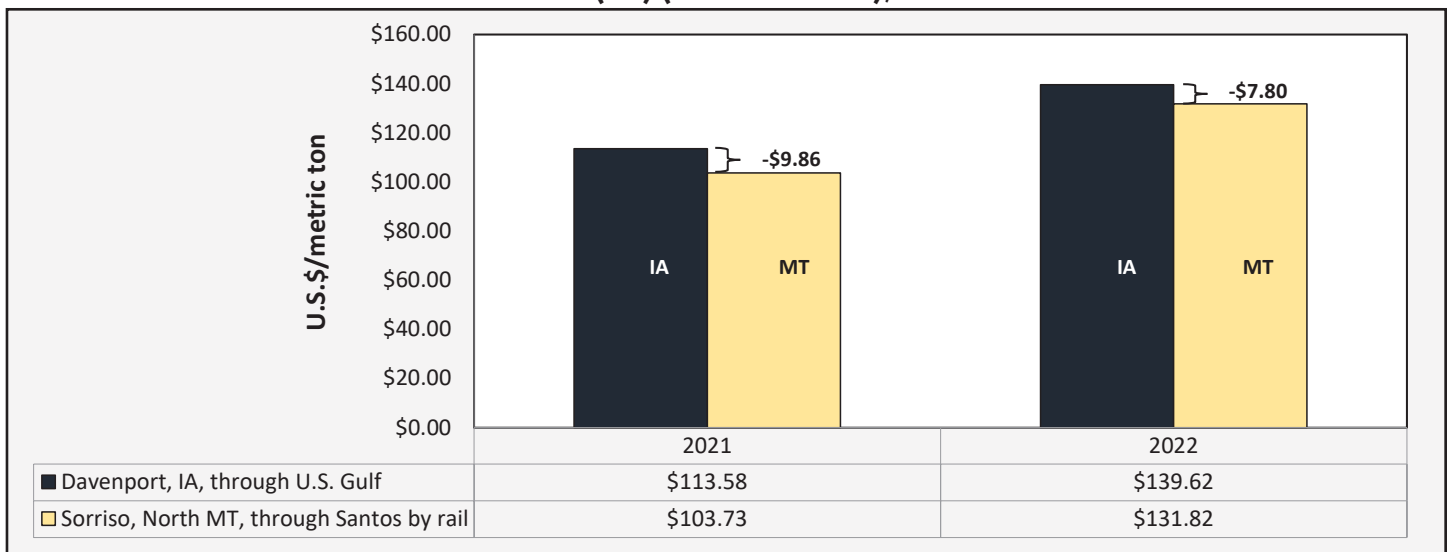
<sup>4</sup>Landed cost is transportation cost plus farm price.

Note: mt = metric ton. Truck, rail, and ocean transportation costs may not sum exactly to total transportation costs because of rounding.

Source: Compiled by the USDA, Agricultural Marketing Service.

In 2022, the cost per metric ton (mt) to ship soybeans from Sorriso, North Mato Grosso, via rail-Santos-Shanghai, China, was \$7.80 less than from Davenport, IA, via the U.S. Gulf. From 2021 to 2022, the Brazil cost advantage narrowed because Iowa transportation costs rose less than the Brazilian costs. More than two thirds of soybeans exported from Santos were hauled by rail. From the Port of Santos, Sorriso is located 1,190 miles by truck or 1,401 miles by a combination of truck (382 miles from Rondonópolis rail terminal) and rail (1,019 miles). From the Port of New Orleans, Davenport is about 900 miles by truck, 908 miles by rail, and 1,343 miles by barge.

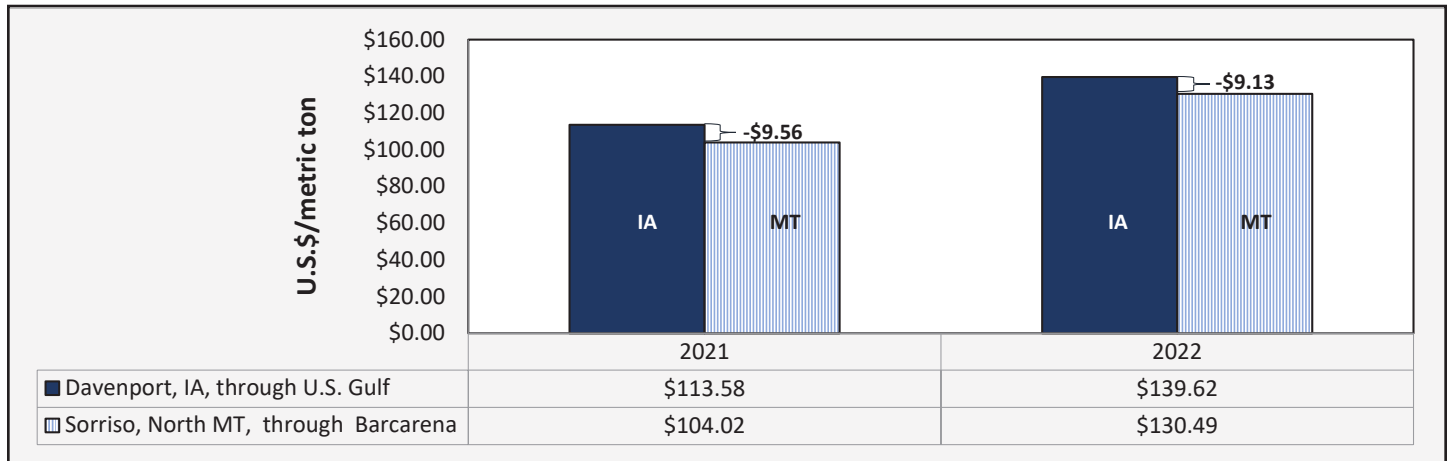
### Transportation costs to Shanghai, China, for routes from Mato Grosso (MT) (via rail) and Iowa (IA) ( via U.S. Gulf), 2021-22



Source: USDA, Agricultural Marketing Service.

In 2022, the cost per metric ton (mt) to ship soybeans from Sorriso, North Mato Grosso, via barge-Barcarena-Shanghai, China, was \$9.13 less than from Davenport, IA, via U.S. Gulf. From 2021 to 2022, the U.S. cost disadvantage slightly narrowed. Brazil’s agribusinesses exported 1 million metric ton (mmt) of soybeans from the Port of Barcarena in 2014—the year the port first began operating. By 2022, Barcarena had become the fourth-largest Brazilian port for exporting soybeans (after Santos, São Luís, and Paranaguá). In 2022, the Barcarena accounted for 9 mmt of total Brazilian soybean exports (78.7 mmt). From the Port of Barcarena, Sorriso is about 1,272 miles away (600 miles by truck to Itaituba/Miritituba barge terminal, and 600 nautical miles by barge). From the Port of New Orleans, Davenport is 1,343 miles by barge.

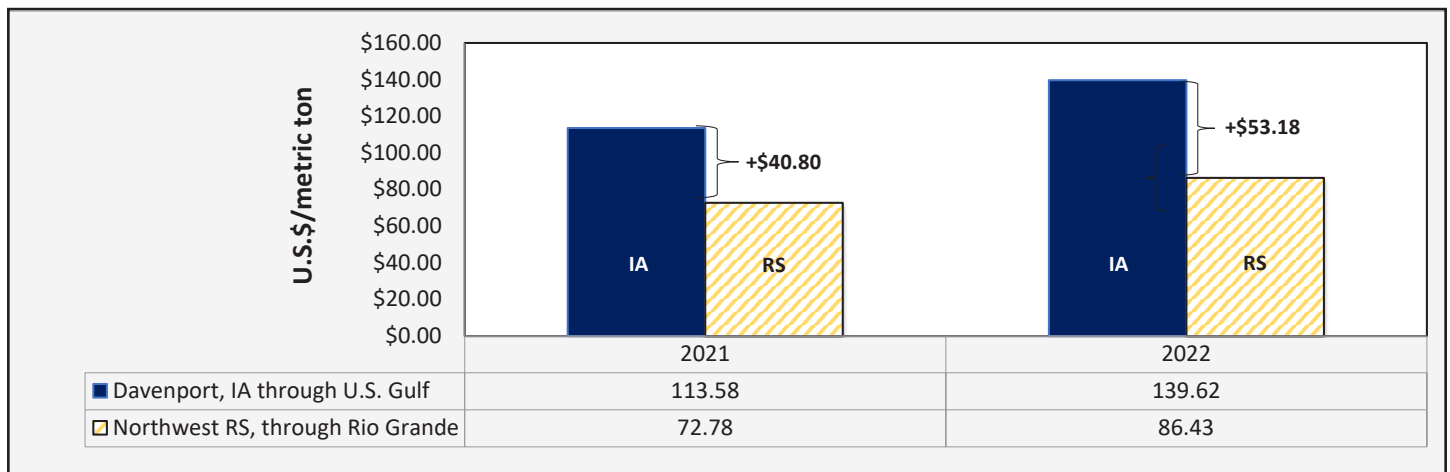
### Transportation costs to Shanghai, China, for routes from Mato Grosso (MT) (via Barcarena) and Iowa (IA) (via U.S. Gulf), 2021-22



Source: USDA, Agricultural Marketing Service.

In 2022, the cost of shipping a metric ton of soybeans from Cruz Alta, Northwest Rio Grande do Sul, to Shanghai, China, was \$53.18 less than from Davenport, IA. From 2021 to 2022, the Brazilian cost advantage widened, because Iowa transportation costs rose more than the Brazilian costs. The distance from Cruz Alta to the port of Rio Grande is 288 miles.

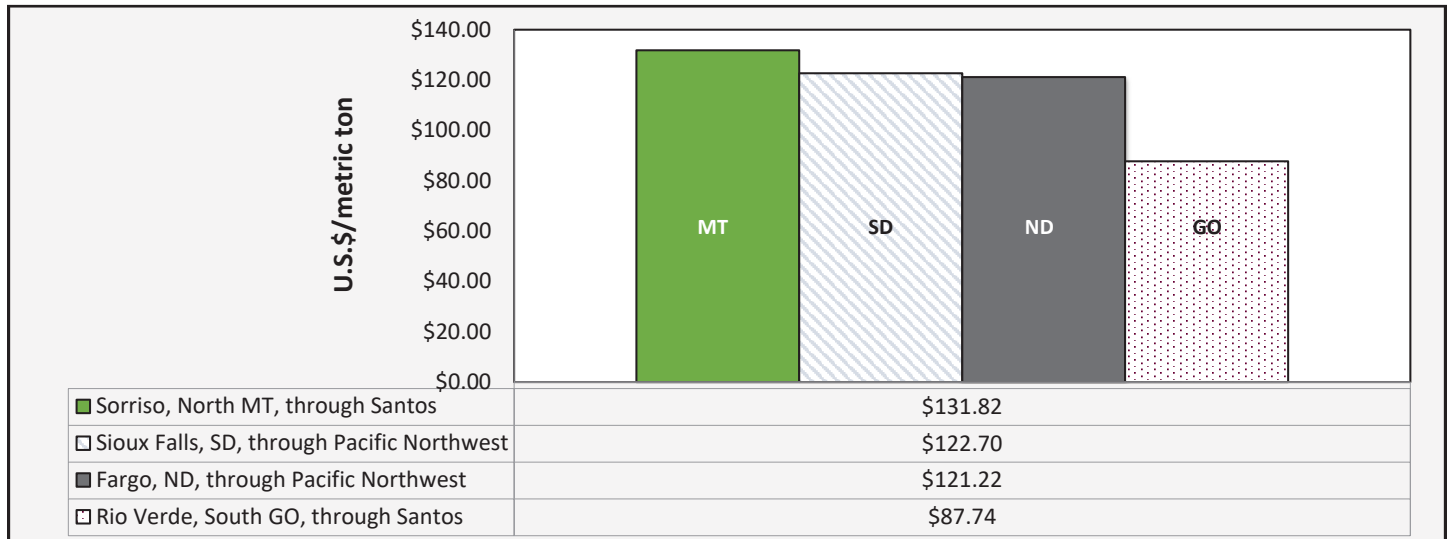
### Transportation costs to Shanghai, China, for routes from Rio Grande do Sul (RS) and Iowa (IA), 2021-22



Source: USDA, Agricultural Marketing Service.

During 2022, soybeans that shipped by rail from Rio Verde, South Goiás, via Santos to Shanghai, China, cost about \$33-35 per metric ton less than U.S. shipments by the PNW routes. Rio Verde is 546 miles from Santos. The distances from Sioux Falls, SD, and Fargo, ND, to the PNW are 1,493 and 1,441 miles, respectively.

### Transportation costs to Shanghai, China, for selected U.S. and Brazilian rail-inclusive routes, 2022

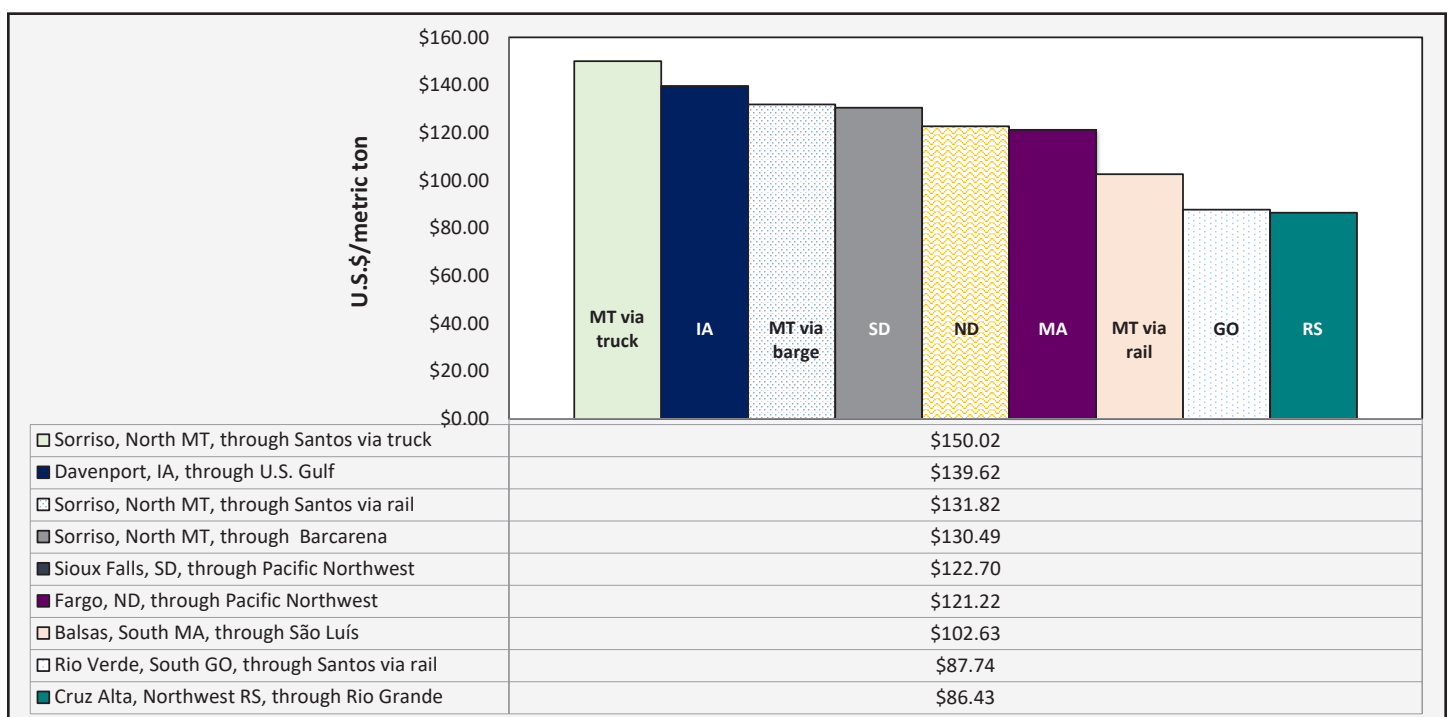


Note: MT = Mato Grosso, GO = Goiás, RS= Rio Grande do Sul, SD = South Dakota, and ND= North Dakota.

Source: USDA, Agricultural Marketing Service.

During 2022, Brazil's transportation cost advantage for shipping soybeans to Shanghai, China, increased over the U.S. Gulf route, but not the U.S. PNW routes, where the United States is still competitive. Brazil's cost advantage was especially notable for soybeans that were shipped from Sorriso, North Mato Grosso, by rail-Santos, and by barge-Barcarena. Brazil's cost advantage widened even more when soybeans were shipped by rail from Rio Verde, South Goiás, or from Cruz Alta, Northwest Rio Grande do Sul.

### Transportation costs to Shanghai, China, for selected U.S. and Brazilian routes, 2022



Note: MT=Mato Grosso, MA=Maranhão, RS=Rio Grande do Sul, SD=South Dakota, IA=Iowa, and ND=North Dakota.

Source: USDA, Agricultural Marketing Service.



In 2022, selected Brazilian export truck routes, measured in reais (R\$), had proportionally higher transportation costs than those estimated in U.S. dollars. Brazil's higher costs were due to the weak Brazilian Real (R\$) against the U.S. dollar, despite appreciating 4 percent against the U.S. dollar from 2021 to 2022.

### Truck rates for selected Brazilian soybean export routes, 2017-22

Route #	Origin <sup>1</sup> (reference city)	Destination	Distance <sup>2</sup> (miles)	2017	2018	2019	2020	2021	2022	% change 2021-22
				Freight price, US\$/metric ton <sup>3</sup>						
1	Northwest RS <sup>4</sup> (Cruz Alta)	Rio Grande	288	30.72	29.20	25.06	19.24	18.85	29.45	56.3
2	North MT (Sorriso)	Santos	1,190	92.95	91.76	79.28	60.65	59.30	93.98	58.5
3	North MT (Sorriso)	Paranaguá	1,262	89.41	90.20	75.78	59.87	58.62	93.11	58.8
4	South GO (Rio Verde)	Santos	587	44.22	43.25	37.34	28.48	27.18	43.02	58.3
6	North Central PR (Londrina)	Paranaguá	268	29.29	27.22	22.64	18.13	17.20	26.76	55.6
11	Southeast MT (Primavera do Leste)	Santos	901	63.63	62.16	53.56	41.57	40.89	64.24	57.1
27	North MT (Sorriso)	Itaituba	672	59.65	56.27	46.64	31.72	31.84	49.44	55.3
29	North MT (Sorriso)	Santarém	876	55.08	58.86	52.04	39.20	37.91	59.30	56.4
30	South MA (Balsas)	São Luís	482	37.69	37.60	32.99	26.83	24.85	40.83	64.3
31	Southwest PI (Bom Jesus)	São Luís	606	44.44	46.52	39.34	29.81	29.15	44.32	52.1
32	Southeast PA (Paragominas)	Barcarena	249	25.00	22.39	20.12	15.20	14.42	22.51	56.1
33	East TO (Campos Lindos)	São Luís	842	61.69	56.94	50.55	37.72	36.02	56.69	57.4
34	North MT (Sorriso)	Rondonópolis (Rail terminal)	382	--na--	33.49	27.62	21.47	20.64	31.47	52.5
35	Rondonópolis MT (Rail terminal) <sup>5</sup>	Santos	1,019	--na--	43.29	39.98	32.13	29.69	44.31	49.3
36	Itaituba PA (Barge terminal) <sup>6</sup>	Santarém	153	--na--	--na--	10.01	6.26	6.75	8.87	31.4
37	Itaituba PA (Barge terminal) <sup>6</sup>	Barcarena	600	--na--	--na--	15.33	11.94	12.63	18.32	45.0
38	South Rio Verde GO (Rail terminal) <sup>5</sup>	Santos	546	--na--	--na--	--na--	--na--	--na--	31.71	-

<sup>1</sup>Although each origin region comprises several cities, the main city is considered as a reference to establish the freight price; na=not available. Table defining routes by number is shown on page 29.

<sup>2</sup>Distance from the main city of the considered region to the mentioned ports.

<sup>3</sup>Average monthly exchange rate from "Banco Central do Brasil" was used to convert Brazilian reais to U.S. dollars.

<sup>4</sup>RS=Rio Grande do Sul, MT=Mato Grosso, GO=Goiás, PR=Paraná, PI=Piauí, MA=Maranhão, PA=Pará, and TO=Tocantins.

<sup>5</sup>In Brazil, there are no published rail tariff rates. Rail rates can be up to 30 percent lower than truck rates, depending on the volumes hauled and the terms of contracts signed between the railroad company and shippers.

<sup>6</sup>In Brazil, there are no published barge rates. Barge rates can be up to 60 percent lower than truck rates, depending on the volumes hauled and the terms of contracts signed between the barge company and shippers. The distance is in nautical miles.

Source: University of São Paulo, Escola Superior de Agricultura "Luiz de Queiroz" (ESALQ/ USP), Brazil, and USDA, Agricultural Marketing Service.

## Truck rates for selected Brazilian soybean export routes, 2017-22

Route #	Origin <sup>1</sup> (reference city)	Destination	Distance <sup>2</sup> (miles)	2017	2018	2019	2020	2021	2022	% change 2021-22
				Freight price, reais/metric ton <sup>3</sup>						
1	Northwest RS <sup>4</sup> (Cruz Alta)	Rio Grande	288	97.91	106.15	98.63	98.34	101.66	151.46	49.0
2	North MT (Sorriso)	Santos	1,190	296.36	334.43	312.20	310.69	319.76	484.03	51.4
3	North MT (Sorriso)	Paranaguá	1,262	285.12	328.71	298.83	306.56	316.02	479.55	51.7
4	South GO (Rio Verde)	Santos	587	140.95	157.35	146.75	145.87	146.61	221.39	51.0
6	North Central PR (Londrina)	Paranaguá	268	93.34	98.87	89.07	92.75	92.80	137.68	48.4
11	Southeast MT (Primavera do Leste)	Santos	901	202.86	226.32	210.83	212.84	220.44	330.69	50.0
27	North MT (Sorriso)	Itaituba	672	190.01	204.53	183.26	162.06	171.70	254.60	48.3
29	North MT (Sorriso)	Santarém	876	175.70	214.29	204.53	200.87	204.50	305.34	49.3
30	South MA (Balsas)	São Luís	482	120.16	137.16	129.69	138.13	133.96	209.80	56.6
31	Southwest PI (Bom Jesus)	São Luís	606	141.67	169.77	154.46	153.25	157.30	227.92	44.9
32	Southeast PA (Paragominas)	Barcarena	249	79.64	81.19	78.95	77.84	77.83	115.73	48.7
33	East TO (Campos Lindos)	São Luís	842	196.74	207.55	198.95	193.24	194.31	291.88	50.2
34	North MT (Sorriso)	Rondonópolis (Rail terminal)	382	--na--	121.48	108.61	109.95	111.36	161.94	45.4
35	Rondonópolis MT (Rail terminal) <sup>5</sup>	Santos	1,019	--na--	157.64	157.62	164.24	160.22	228.32	42.5
36	Itaituba PA (Barge terminal) <sup>6</sup>	Santarém	153	--na--	--na--	25.78	21.19	24.12	30.07	24.7
37	Itaituba PA (Barge terminal) <sup>6</sup>	Barcarena	600	--na--	--na--	74.17	75.24	83.88	115.92	38.2
38	South Rio Verde GO (Rail terminal) <sup>5</sup>	Santos	546	--na--	--na--	--na--	--na--	--na--	163.08	-

<sup>1</sup>Although each origin region comprises several cities, the main city is considered as a reference to establish the freight price; na = not available. Table defining routes by number is shown on page 29

<sup>2</sup>Distance from the main city of the considered region to the mentioned ports.

<sup>3</sup>Average monthly exchange rate from “Banco Central do Brasil” was used to convert Brazilian reais to U.S. dollars.

<sup>4</sup>RS = Rio Grande do Sul, MT= Mato Grosso, GO = Goiás, PR = Paraná, PI = Piauí, MA = Maranhão, PA = Pará, and TO = Tocantins.

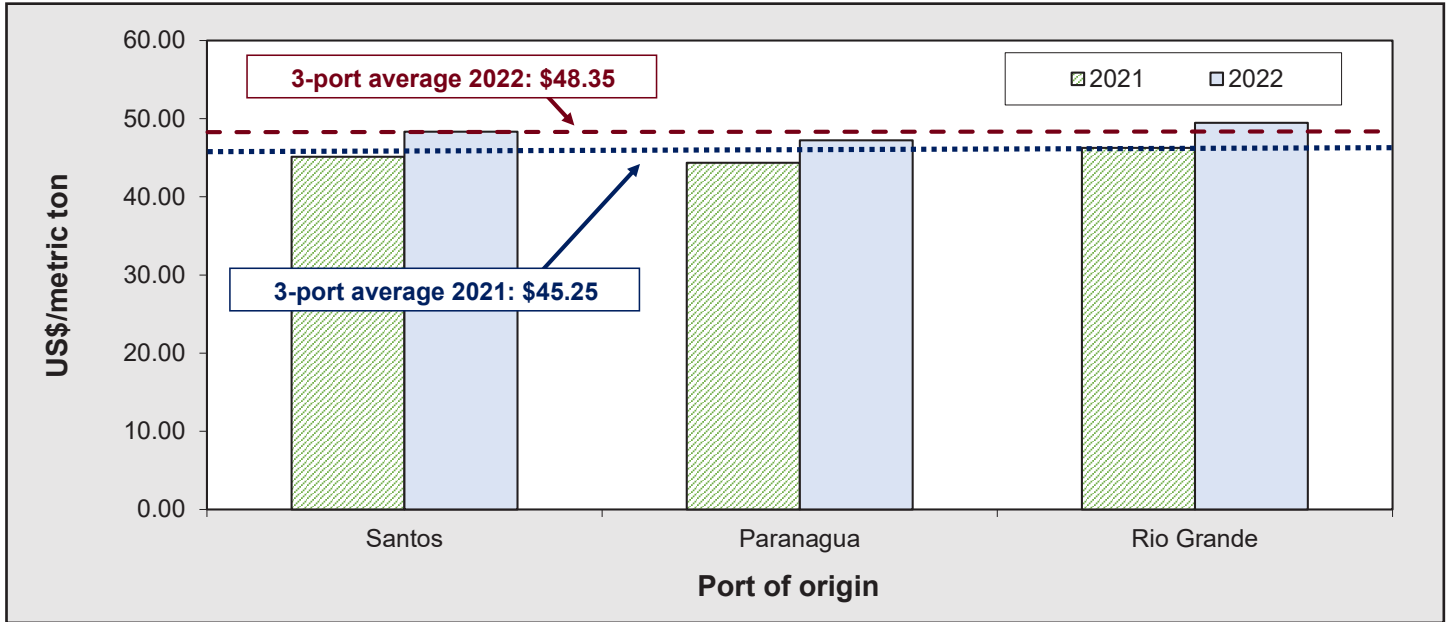
<sup>5</sup>In Brazil, there are no published rail tariff rates. Rail rates can be up to 30 percent lower than truck rates, depending on the volumes hauled and the terms of contracts signed between the railroad company and shippers.

<sup>6</sup>In Brazil, there are no published barge rates. Barge rates can be up to 60 percent lower than truck rates, depending on the volumes hauled and the terms of contracts signed between the barge company and shippers. The distance is in nautical miles.

Source: University of São Paulo, Escola Superior de Agricultura “Luiz de Queiroz” (ESALQ/ USP), Brazil, and USDA, Agricultural Marketing Service.

On average, the cost to ship 1 mt of soybeans from Brazil to Hamburg, Germany, by oceangoing vessel increased from \$45.25/mt in 2021 to \$48.25/mt in 2022.

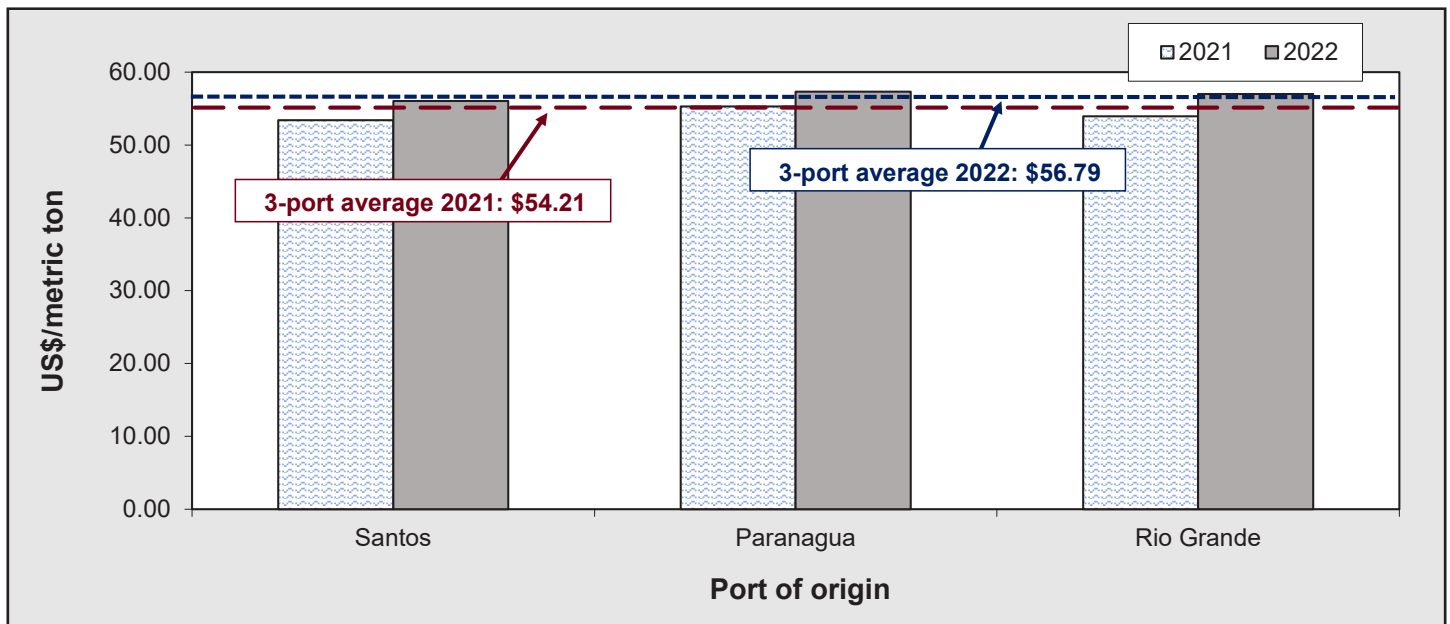
### Ocean rates from Brazil to Hamburg, Germany, increased in 2022



Source: University of São Paulo, Escola Superior de Agricultura “Luiz de Queiroz” (ESALQ/ USP), Brazil, and USDA, Agricultural Marketing Service.

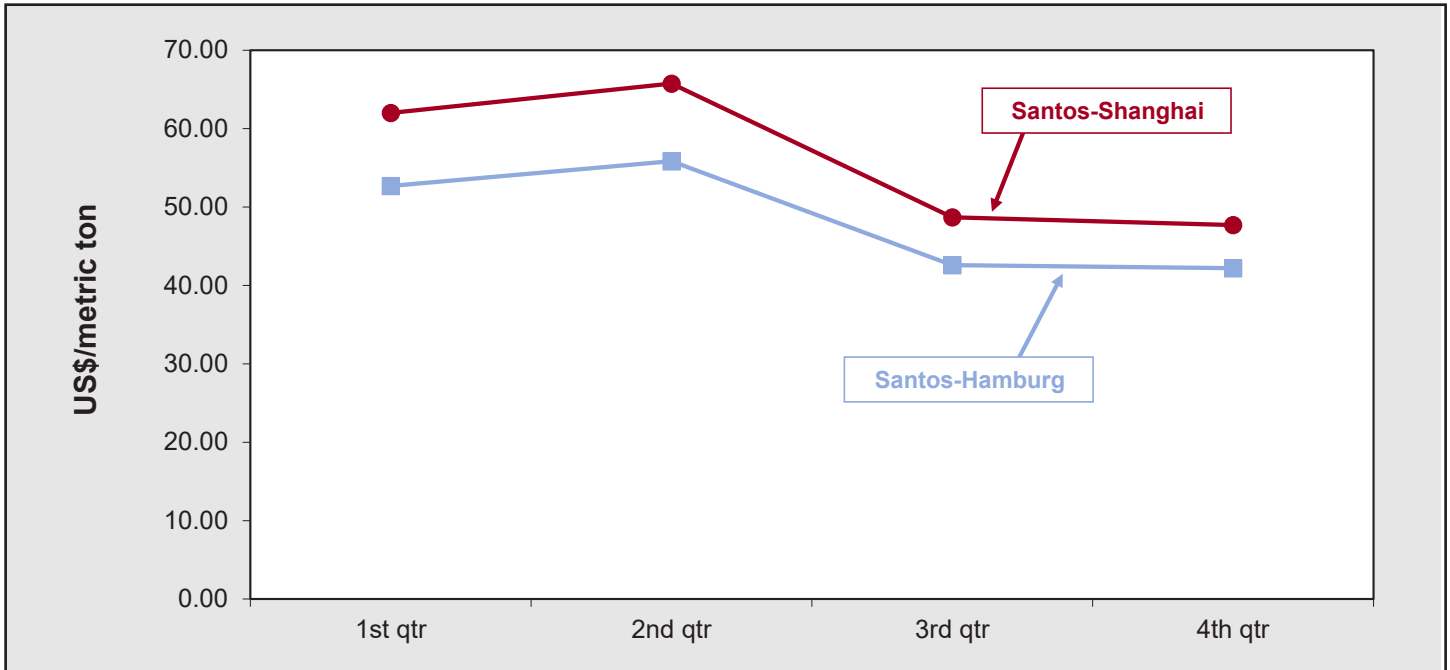
On average, the cost to ship 1 mt of soybeans from Brazil to Shanghai by ocean vessel increased from \$54.21/mt in 2021 to \$56.79/mt in 2022.

### Ocean rates from Brazil to Shanghai, China, increased in 2022



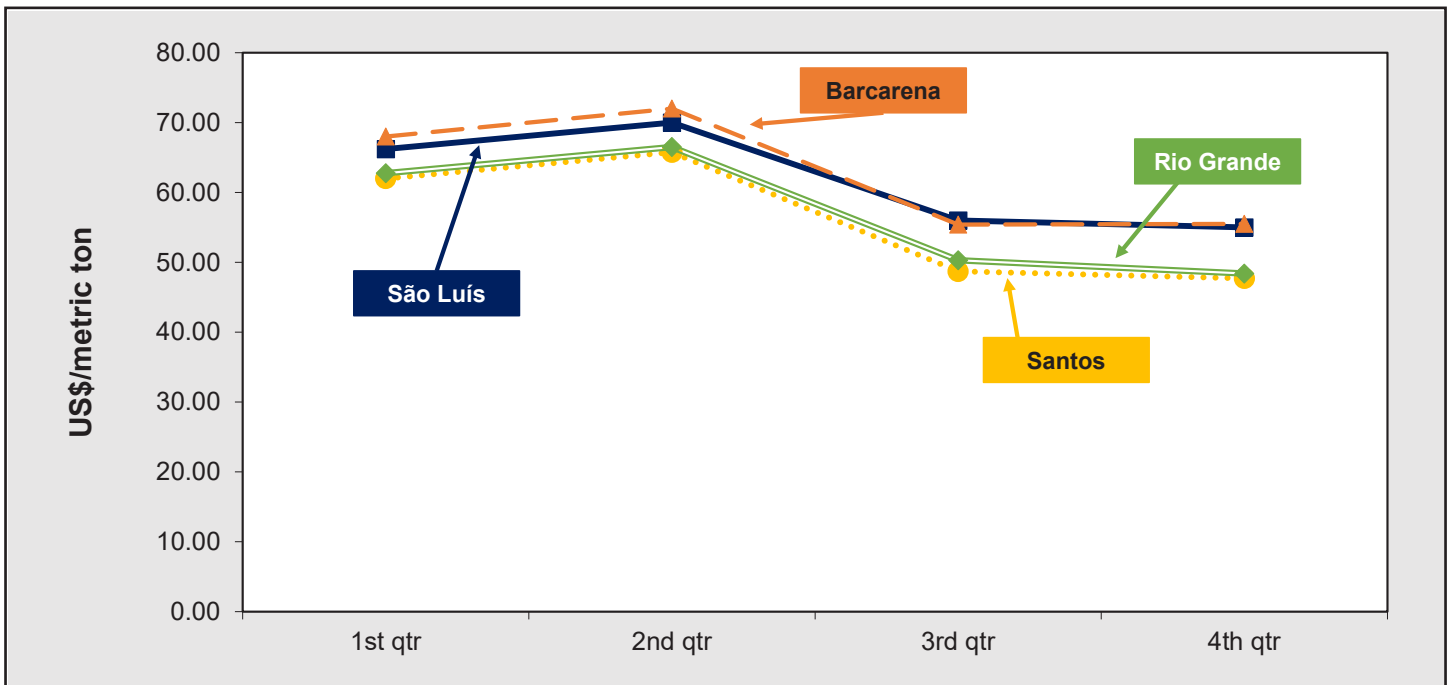
Source: University of São Paulo, Escola Superior de Agricultura “Luiz de Queiroz” (ESALQ/ USP), Brazil, and USDA, Agricultural Marketing Service.

## Ocean rates for shipping soybeans from Santos to Shanghai, China, and Hamburg, Germany, 2022



Source: University of São Paulo, Escola Superior de Agricultura “Luiz de Queiroz” (ESALQ/ USP), Brazil, and USDA, Agricultural Marketing Service.

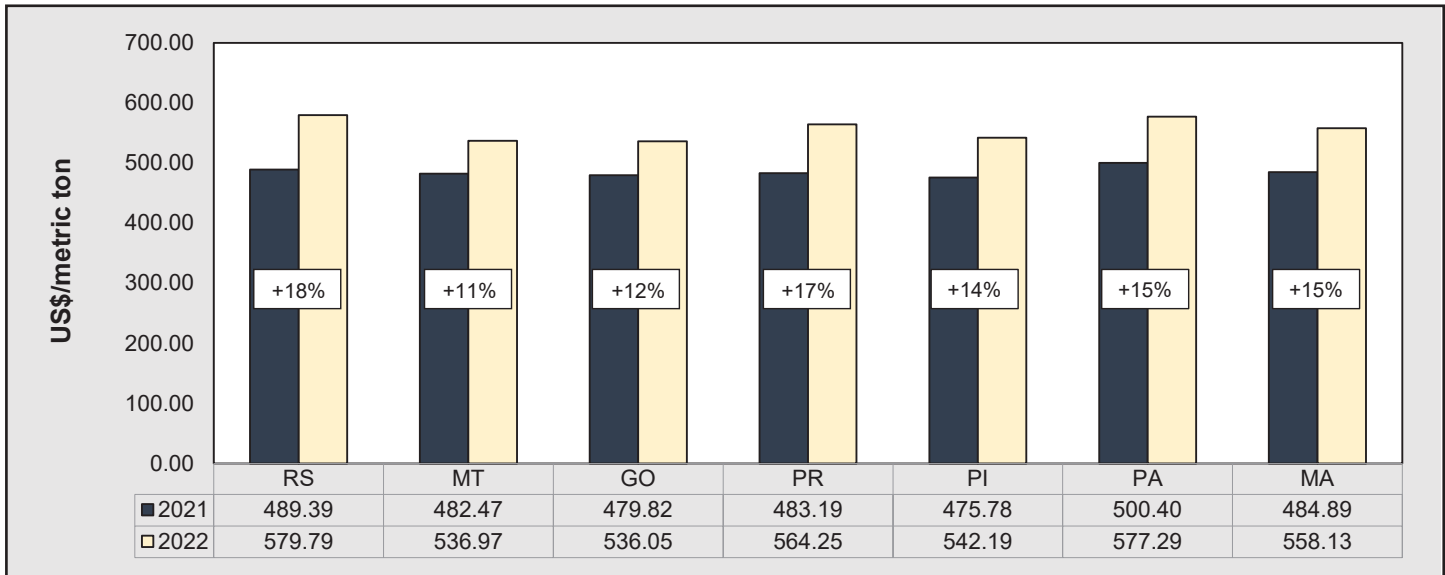
## Ocean rates for shipping soybeans from selected Brazilian ports to Shanghai, China, 2022



Source: University of São Paulo, Escola Superior de Agricultura “Luiz de Queiroz” (ESALQ/ USP), Brazil, and USDA, Agricultural Marketing Service.

Brazilian farmers have benefited from the real's depreciation against the U.S. dollar, because exported soybeans are priced in U.S. dollars, but producers are paid in reais. Measured in U.S. dollars, average soybean farm gate prices increased 15 percent from 2021 to 2022—from \$485.13/mt to \$556.38/mt. The depreciation of the real also led to higher domestic prices. On average, in reais, farm gate prices increased nearly 10 percent from 2021 to 2022—from R\$2,614.67/mt to R\$2,865.04/mt.

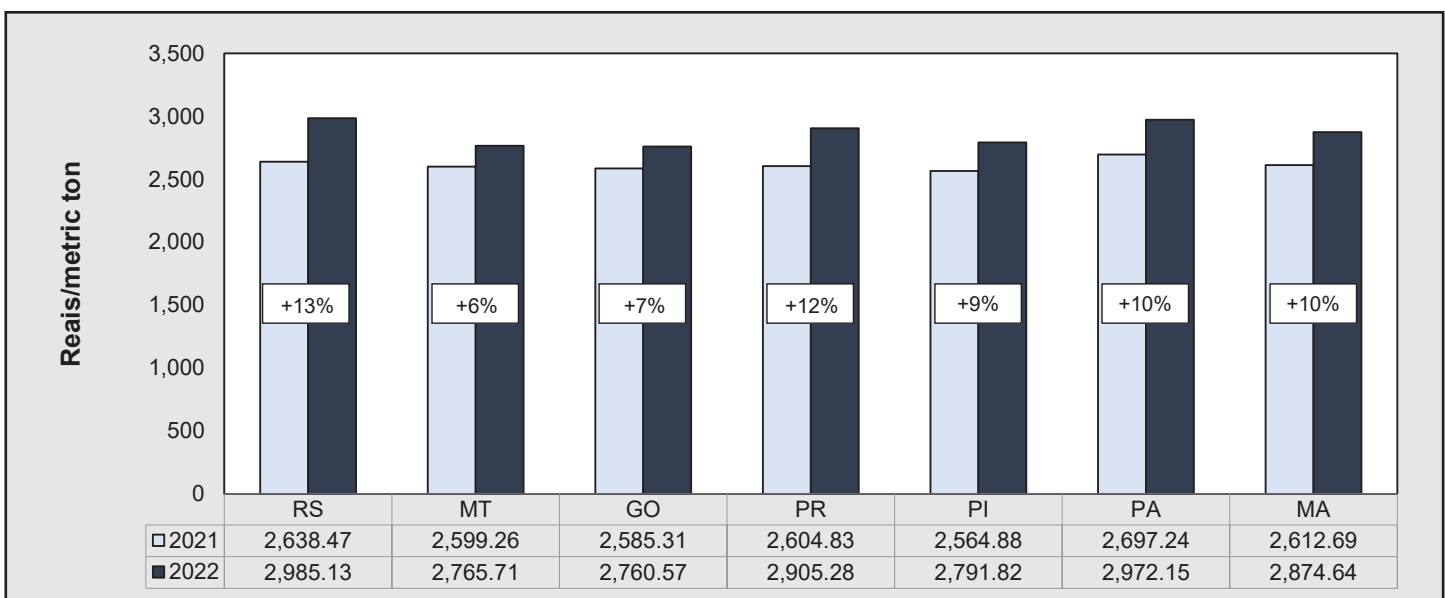
### Selected Brazilian farm prices, US\$/metric ton, 2021-22



Note: RS=Rio Grande do Sul, MT=Mato Grosso, GO=Goiás, PR=Paraná, PI=Piauí, PA=Pará, and MA=Maranhão.

Source: Companhia Nacional de Abastecimento (CONAB).

### Selected Brazilian farm prices, reais/metric ton, 2021-22

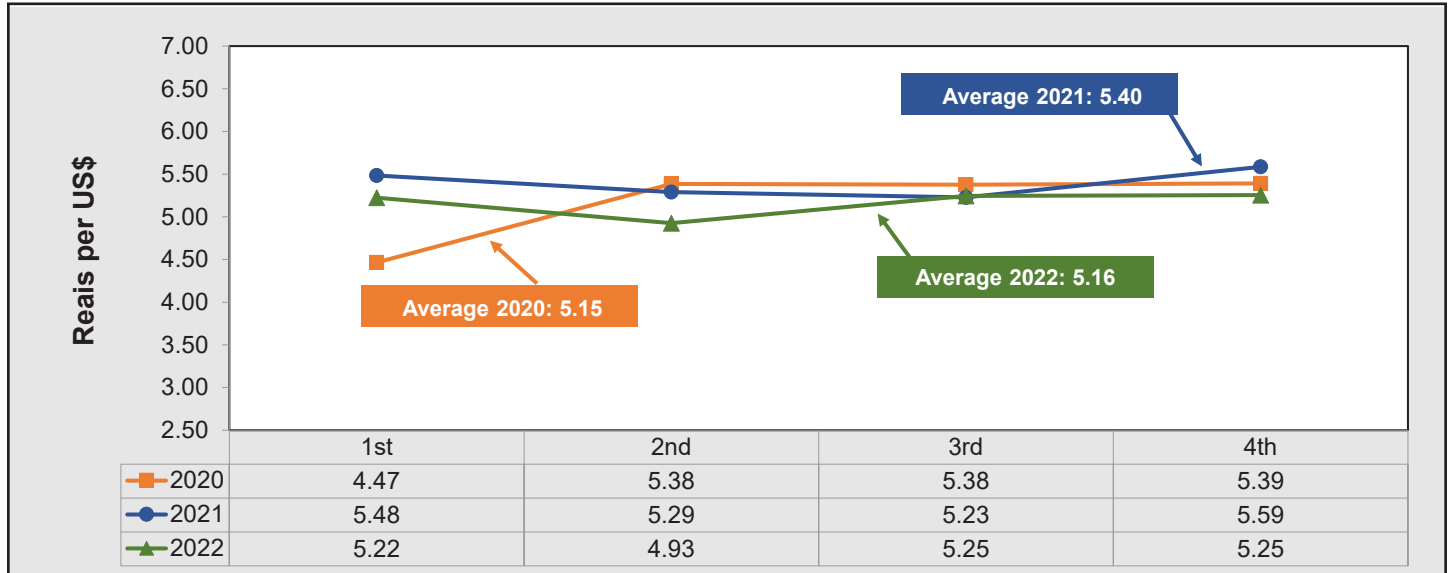


Note: RS=Rio Grande do Sul, MT=Mato Grosso, GO=Goiás, PR=Paraná, PI=Piauí, PA=Pará, and MA=Maranhão.

Source: Companhia Nacional de Abastecimento (CONAB).

From 2021 to 2022, the Brazilian real appreciated by 4 percent against the U.S. dollar, from R\$5.40 per U.S. dollar to R\$5.16 per U.S. dollar.

### Average quarterly exchange rate, real per U.S. dollar, 2020-22



Source: Banco Central do Brasil

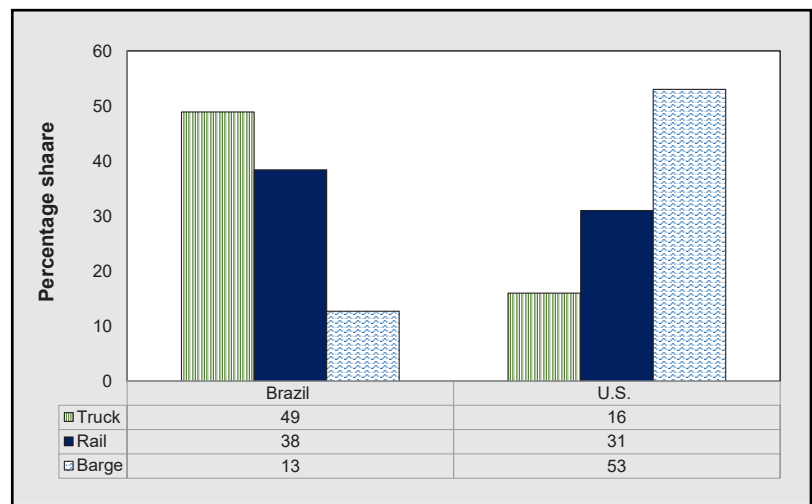
### Nearly half of Brazilian soybeans exports are moved by truck.

In Brazil, the mode that shipped the most soybeans to major export facilities was trucking, followed by rail, and barge. In contrast, in the United States, the mode that shipped the most soybeans to major export facilities was barge, followed by rail, and trucking. Brazil continues to depend heavily on trucks to transport grain to major destinations. In Brazil, short-haul movements’ average distance is about 440 miles (707 kilometers (km)) from farm to rail and barge terminals. In the United States, the average distance from farm to inland grain elevator terminals is about 25-100 miles.

### U.S.-Brazil soybeans modal share, 2019-20, percent\*

Mode	Brazil	United States
<b>Total</b>		
Truck	67	50
Rail	24	23
Barge	9	28
<b>Exports</b>		
Truck	49	16
Rail	38	31
Barge	13	53
<b>Domestic</b>		
Truck	97	83
Rail	1	14
Barge	2	2

### US-Brazil soybeans modal share for exports, 2019-20, percent\*



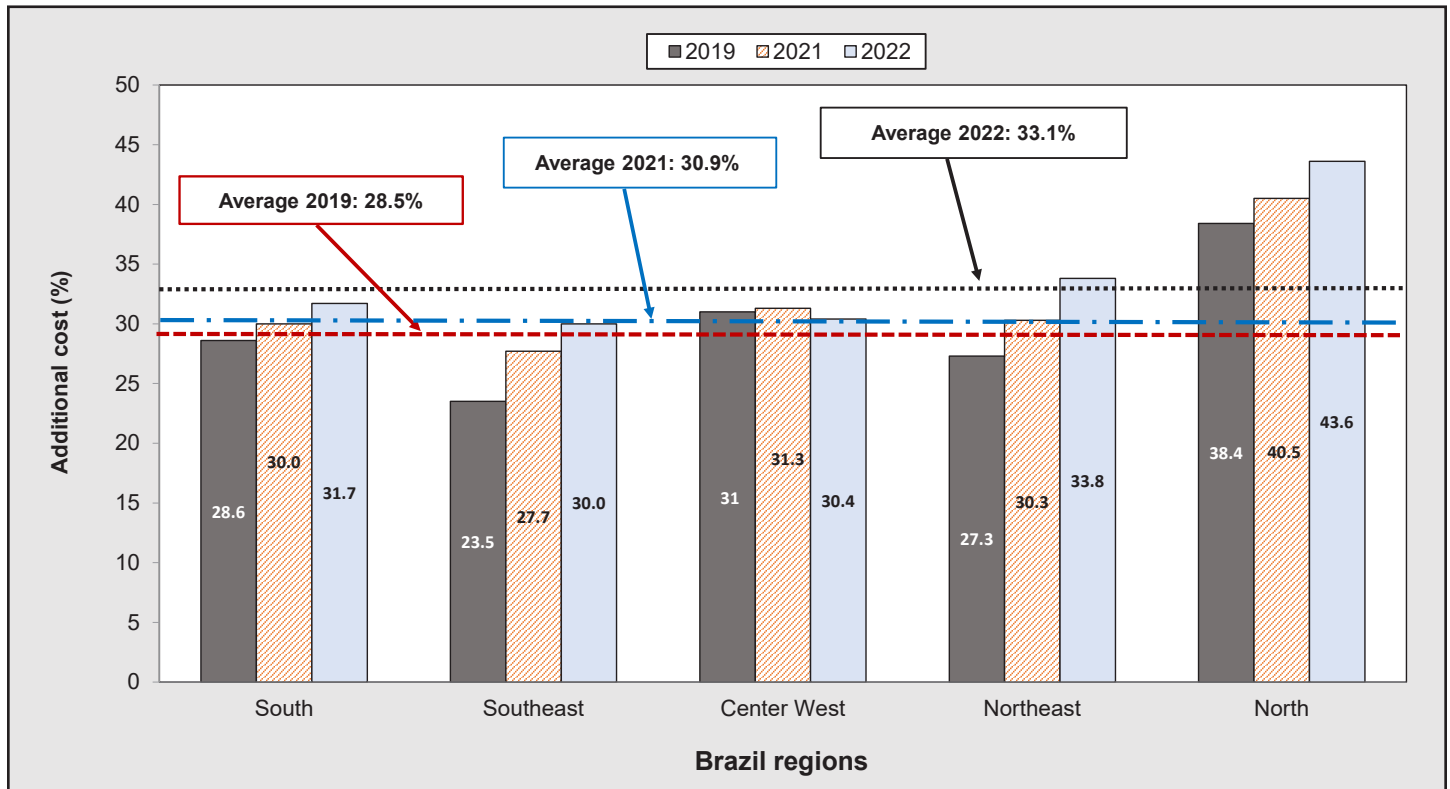
Note: Brazil 2019 data compiled from the National Land Transport Agency (ANTT); National Land Transport Agency (ANTAQ), Comex-Vis, Ministry of Economy, and National Supply Company (CONAB). Brazil 2019 is the latest data available. U.S. 2020 data is the latest available.

\*Because of rounding, shares do not sum exactly to 100.

Source: Modal share analysis results—calculations by the University of São Paulo, Escola Superior de Agricultura “Luiz de Queiroz” (ESALQ/ USP), Brazil, and USDA, Agricultural Marketing Service.

According to estimates based on the 2022 Confederação Nacional do Transporte (CNT) survey of overall highway conditions in Brazil, the 2022 marginal operational cost of cargo trucks was 33 percent higher than it would have been if the trucks had used only paved roads in optimal condition. This additional cost reflects the number of paved roads in poor condition. The share of the cost for not using paved roads in optimal condition continues to grow, rising from nearly 31 percent in 2021 to 33 percent in 2022. For example, according to CNT, the actual cost in 2022 of shipping a metric ton of soybeans from Sorriso, North MT, to Santos was \$100 per metric ton (mt), but the optimal cost was \$66.90/mt.

### Cost increases because of poor road pavement conditions, 2019-22



Note: Data for 2020 are not available.

Source: Confederação Nacional do Transporte (CNT).

# Transportation Infrastructure

## Brazilian Minimum Freight Rates Law Update

On January 16, 2020, Brazil's National Land Transportation Agency ([ANTT](#)) published updated guidelines to the National Policy of Minimum Freight Rates Law for truck cargo transportation.<sup>3</sup>

1. Shippers are obligated to pay backhaul freight rates for the return of empty containers. Shippers must also pay backhaul freight rates for trucks in specific fleets that cannot legally carry backhaul cargo—for example, trucks that carry fuel or gases and cannot return with another type of cargo.
2. The truck driver's daily rate (salary and expenses for lodging and food) is included in the calculation of the minimum rate.
3. Pressurized cargo—such as carbon dioxide, nitrogen, and oxygen gases utilized in the food industry—has been added as a new type of cargo covered by the law.
4. Two new tables were created for high efficiency loading operations that take less time to load and unload, thereby reducing the waiting time for trucks and drivers.
5. The costs of items included in the table (such as tires and maintenance) are to be updated every 6 months.

**Current status:** The Brazilian Supreme Court held several conciliation hearings about the constitutionality of the law. Conciliation hearings were suspended because of the COVID-19 pandemic. As of November 2023, a new date for the hearings has not yet been set. Until then, the current law remains in force. The [Brazilian Government](#) created a provisional measure that changes the automatic parameters of the freight table. Because of the high volatility of Brazilian fuel prices, the table's new parameters account for up to a 10-percent variation in the diesel price. In August 2023, [ANTT's](#) adjustments to the minimum freight rates resulted in an average increase of 3-5 percent.

**Background:** On August 9, 2018, the National Policy of Minimum Freight Rates Law was enacted to end an 11-day nationwide strike in late May by the truck drivers who blocked highways, creating immediate shortages of critical products such as fuel, food, and medicines. The poultry and pork industries were hit especially hard ([USDA, FAS, Gain Report BR1810](#)). Shortages of fuel and animal feed affected farms and feedlots. Slaughterhouses idled their production lines when transportation to the ports was cut off and their refrigerated warehouses reached full capacity ([USDA, FAS, Gain Report BR1810](#)). Soybean exports were not significantly affected for the limited duration of the strike. The law allows ANTT to set minimum freight rates for trucking nationwide, reflecting total operating costs based on fuel costs, distances, tolls, and other factors ([Confederação Nacional do Transporte \(CNT\)](#) and [AgriCensus](#)). The minimum freight rates include a charge on backhaul trips, even if the truck is empty. Truckers are forbidden to negotiate contracts below the ANTT minimum. The law requires freight rates to be equal to, or above, the minimum rates set by the ANTT. Rates are published twice a year, on January 20 and July 20.<sup>4</sup> The minimum freight rates are adjusted every 6 months, based on several criteria, including fuel prices, inflation, and the cost of operations for independent drivers. Since 2018, organizations opposing these minimum mandatory freight rates have challenged the constitutionality of the law before Brazil's Supreme Court.

<sup>3</sup> On January 1, 2019, [ANTT](#) and the Fundação de Estudos Agrários Luiz de Queiroz (FEALQ) signed a 21-month contract to update the methodology and the minimum freight rate table.

<sup>4</sup> The frequency with which freight rates will be published will change if the price of diesel fluctuates more than 10 percent from the set minimum price ([USDA, FAS, Gain Report BR1812](#)). If the freight rates are not published within the identified timeframe, the previous period's freight rates—updated by the National Consumer Price Index (IPCA)—will be valid.



## New Growth Acceleration Plan Investment (PAC): Selected Infrastructure Project Priorities That Facilitate Agricultural Exports

On August 11, 2023, the Brazilian Government announced a New Growth Acceleration Plan ([PAC](#)) to promote expansion of the railway networks, extend coverage to the new Brazilian production frontiers, and increase the capacity of this mode of transport. The PAC entrusts Public-Private Partnership (PPP) with fiscal and environmental responsibility, as well as looking after social needs. The new PAC will invest R\$94.2 billion (\$18.9 billion) in the railway sector between 2023 and 2026.<sup>5</sup> Key to the export sector, railways transfer part of long-distance cargo handling from highways to railroads, and reduce the logistical costs and environmental impacts of transportation. The New PAC will promote the railroad industry, encouraging the production of railroad materials and inputs in Brazil.

### 1. The West-East Integration (FIOL) Railroad (EF-334): Ilhéus, Bahia, to Figueirópolis, Tocantins.

Extension: 949 miles (1,527 km). FIOL railway will haul grains from Western Bahia and iron ore typical of the Caetité region in Central Bahia to the port city of Ilhéus. In the future, FIOL may be integrated with the North-South railroad. The project is divided into three sections: FIOL I: Ilhéus - Caetité, Bahia (334 miles (537 km)); FIOL II: Caetité - Barreiras, Bahia (301 miles (485 km)); and FIOL III: Barreiras - Figueirópolis, Tocantins (314 miles (505 km)).

**Current Status:** In July 2023, the construction of FIOL I (between Ilhéus and Caetité) started. China Railway No.10 Engineering Group Co Ltd. (CREC 10), a subsidiary of China Railway (State-owned enterprise in China), has been tasked with constructing the first 78 miles (126 km) of railway. In 2027 (36 months), this section is expected to be available for use. The Brazilian mining company Bahia Mineração S.A. (Bamin) financed the \$301 million (1.5 billion reais (R\$)) investment for this project. This project is China Railway's first rail project in Brazil. On April 8, 2021, Bamin was named to run the 35-year concession to complete and operate FIOL I, which will facilitate iron ore exports from Bamin's mines to the ports.

[The Ministry of Transport](#) is working on projects for the concession of two other stretches of FIOL II, between Caetité (BA) and Barreiras (BA), with works in progress; and FIOL III, from Barreiras (BA) to Figueirópolis (TO).

### 2. Center-West Integration (FICO) Railroad (EF - 354): Mara Rosa, Goiás – Água Boa, Mato Grosso (MT)–Lucas do Rio Verde (MT)–Vilhena, Rondônia (RO). Extension: 1,020 miles (1,641 km) divided in three sections:

- Section I, called FICO 1: from Mara Rosa-Água Boa, MT (238 miles (383 km));
- Section II: Água Boa-Lucas do Rio Verde, MT (314 miles (505 km));
- Section III: Lucas do Rio Verde-Vilhena, RO (401 miles (646 km)).

The 238 miles stretch of FICO 1, will connect the Araguaia Valley, a productive and developing region of Mato Grosso to Goiás with the North-South Railway. The route will facilitate the flow of grain to the ports of Santos (SP), Itaquí (MA)—and in the future, Ilhéus, (BA) via FIOL. FICO 1 eventually will be extended from Lucas do Rio Verde (MT) to Mara Rosa, and finally, to Vilhena in Rondônia.

<sup>5</sup> Exchange rate of 4.98 real per U.S. dollar, August 17, 2023.

**Current Status:** In 2023, FICO 1 construction started. Vale S.A. is building the railroad at an estimated cost of \$538.1 million (R\$2.73 billion). In 2021, the Brazilian Government announced its agreement with the World Bank to grant the FIOL-FICO rail concession to the private sector.

- 3. Ferrogrão Railroad (EF-170):** The purpose is to consolidate the new Brazilian export rail corridor of the “Arco Norte” by connecting the grain-producing region of the Center-West to the State of Pará, ending at Miritituba Port. By serving as an alternative route for soybean and corn exports, the EF-170 is expected to increase transport capacity and competitiveness within the corridor and alleviate traffic conditions on highway BR-163. The estimated cost of the project is \$5.1 billion (R\$ 25.2 billion). The concession is for 69 years. Public hearings and technical studies are complete.

**Current status:** Currently, the project is under evaluation by the Federal Supreme Court and the Federal Audit Court. The Federal Supreme Court will determine the constitutionality of the [Law 13,452/2017](#), which allows the construction of the railroad in an environmental conservation area, previously owned by the Jamanxim National Park. The railroad faced resistance from the region’s indigenous peoples, who will be impacted by the socio-environmental risks associated with the project. In 2021, the project was stopped by court order, because the law did not consider environmental compensation to the region’s indigenous people by the project executors.

- 4. BR-163:** On May 4, 2023, the Brazilian Government transferred—from [Rota do Oeste](#) to the State of Mato Grosso (Brazil’s largest grain producer)—the concession of the 529 miles (850.9 km) stretch of BR-163 between the border of Mato Grosso do Sul and Sinop, North Mato Grosso. In 2013, the concession-holder Rota do Oeste committed to duplicate 280 miles (450 km) of the road but only 75 miles (120 km) were delivered.

**Current Status:** The State of Mato Grosso should begin working on the highway in 2023, estimating that at least 52 miles (84 km) of additional lanes will be delivered in the first year of the concession. The government of Mato Grosso will invest \$321.2 million (R\$1.6 billion) within the next 2 years ([Canalrural](#)).

**The 663-mile (1,067 km) stretch of BR-163 from Sorriso, North Mato Grosso,** to Miritituba was completed in late November 2019. Currently, via this new route, it takes about 2 days to ship grain by truck to Miritituba.

**Current status:** On April 1, 2022, Consortium Via Brasil signed the contract to operate the Brazilian toll road BR 163. The concession is for 10 years, renewable for 2 more years. There are reports of road deterioration ([A Tribuna](#)).

- 5. BR 158:** Together with BR 163 and BR 164, BR 158 is one of the longest and main highways in the interior of Brazil. The stretch of 2,452 miles (3,946 km) connects the northern part of Brazil from Altamira, Pará, to the southern part of do Livramento, Rio Grande do Sul, on the Uruguayan border, where the highway joins Route 5. It crosses the states of Pará, Goiás, Mato Grosso, Mato Grosso do Sul, Paraná, and Rio Grande do Sul. Since it goes through Mato Grosso, it will facilitate the export of agricultural products to ports in the Northeast and Southeast of Brazil.

**Current status:** Estimated investment of around \$27.3 million (R\$136.6 million) in the extension of the BR 158 ([CanalRural](#)). Under study.

**Port Santos:** In 2022, [COFCO International Brasil SA](#) won the auction of the 25-year concession to build a new agriculture solid bulk terminal (STS 11). In 2026, the terminal will be fully operational, expanding COFCO's port capacity in Brazil to 14 million tons. As part of the lease agreement, COFCO will invest in the modernization and expansion of the terminal facilities.

- **The Santos-Guarujá underwater tunnel:** The tunnel is one of the State of São Paulo's top-priority infrastructure initiatives, which is integrated into the New PAC. As specified, an underwater tunnel—stretching 2,822 feet (860 meters)—will connect the right and left banks of the Port of Santos. Construction on the tunnel will begin in 2024 and finish in 2 years. It will facilitate the flow of cargo and passengers between the ports of Santos and Guarujá. ([DatamarNews](#) and [World Highways](#)).

**Current Status:** The Brazilian Federal Government and the government of the State of São Paulo have agreed to construct the Santos-Guarujá tunnel through a Public-Private Partnership (PPP). The project will involve a combination of public funds and concessions to the private sector. Construction should start in 2024 and take 24 months to complete. Reaching a depth of 115 feet (35 meters), the tunnel will be tolled and is likely to measure 1.1 miles (1.7 km) in length, with three lanes of traffic in either direction. The project will receive an estimated investment of \$1.1 billion (R\$5.4 billion) in Federal resources, of which \$502 million (R\$2.5 billion) are already available for the Port Authority of Santos ([CNNBrasil](#)).

- **Port of Santos:** A project to increase the port's access channel from the current depth of 15 meters to 17 meters is planned to start construction as early as 2024.

**Port of Belem/Vila de Conde:** A channel dredging project in the Port of Barcarena, Pará, will deepen the port to handle larger vessels, in the Pará region, and expand export logistical facilities in the Arco Norte.

**6. The North-South (EF-151) Railroad (FSN):** Porto Nacional, Tocantins-Estrela d'Oeste, São Paulo. Stretching for 1,402 miles (2,257 km), this new railroad represents a major connection in Brazil's rail network. The North-South Railroad links the northeastern port of Itaqui-São Luis, Maranhão, with the southern port of Santos-São Paulo. The four States receiving new access are Tocantins, Goiás, Minas Gerais, and São Paulo. Since 2019, Rumo S.A. has signed the 30-year concession contract for Ferrovia Norte-Sul (North-South Railway) from Estrela d'Oeste to Porto Nacional.

**Current status:** The railroad's construction, which began 35 years ago, was completed in June 2023 with the opening of Rumo's rail terminal in Rio Verde (Goiás). Serving Goiás and eastern Mato Grosso, the new facility will handle 11 million metric tons of grain and soybean meal per year. Despite being 124 miles (200 km) from São Simão, the terminal is now the closest one to the southwest Goiás producers. These infrastructure investments facilitate the production flow from the largest agribusiness region in the country to the southern Port of Santos, bringing fertilizers in as backhaul. Offering an alternative route to Center-West producers, shipping via this rail expansion currently costs 15-20 percent less than by trucking (according to [Rumo](#)), and it offers even greater savings over barge through the Tietê-Paraná waterway. Also, the new railroad will be used to transport containers from Maranhão to the Southeast region. Currently, Rumo focuses on transporting grain and oilseeds, such as soybeans, corn, and soybean meal. However, there is potential for other cargoes.

In July 2023, Rumo joined a new partnership with an American company, Central Harvest States (CHS), to build and operate a multimodal grain terminal in Alvorada, southern Tocantins, in north-central Brazil. The terminal will handle 1.5 mmt of grain annually, destined for the Port of Santos. It will link into the newly completed North-South Railroad. The terminal will handle grain volumes (soybeans and corn) from CHS and other interested parties in the region. Construction is scheduled to begin during the second half of 2023 with the first grain shipments in mid-2024 ([Soybean & Corn Advisor](#)). Since 2021, Rumo and CHS have had a fertilizer terminal in Rio Verde through Andali—a joint venture of BRFertil with CHS. The plant offers structures for cargo transportation and fertilizer mixing.

## Brazil's New Transportation Regulations

**Rail regulations:** On December 3, 2021, Brazil's [National Land Transport Agency \(ANTT\)](#) established rules for the execution of projects by railroad concessionaires, [ANTT Resolution nº 5956](#). The purpose of the regulation is to expedite the technical analysis required for the ANTT to approve infrastructure improvements of the Concessionaire's Interest Projects (PIC) and Third-Party Interest (PIT) projects.

The PIC are now categorized as the following:

- **Small-scale railway projects** are developed within the area covered by the concession, without the need for expropriation and with low environmental impact. Examples of small-scale projects include an expansion of a yard and the installation and relocation or demolition of a lane-change device.
- **Large-scale railway projects** extend to lengths that are equal to or greater than 6.2 miles (10 kilometers). Examples include a railway bypass, new stretch of track, branch, variant, or addition of a railway line.
- **Special artwork design projects** can involve as a bridge, railway viaduct, underpass, or footbridge.
- **Auxiliary installation projects** include such examples as an administrative building, filling and washing station, sandpit, or wagon and locomotive workshop; and
- **Diverse projects** cover such items as level crossing (PN), pedestrian crossing (PNP) and signaling, or control system.

In the case of the PIC, projects that are classified as small-scale railway, special artwork, auxiliary installations, or diverse will be automatically authorized—unless they impact the economic-financial balance of the contract.

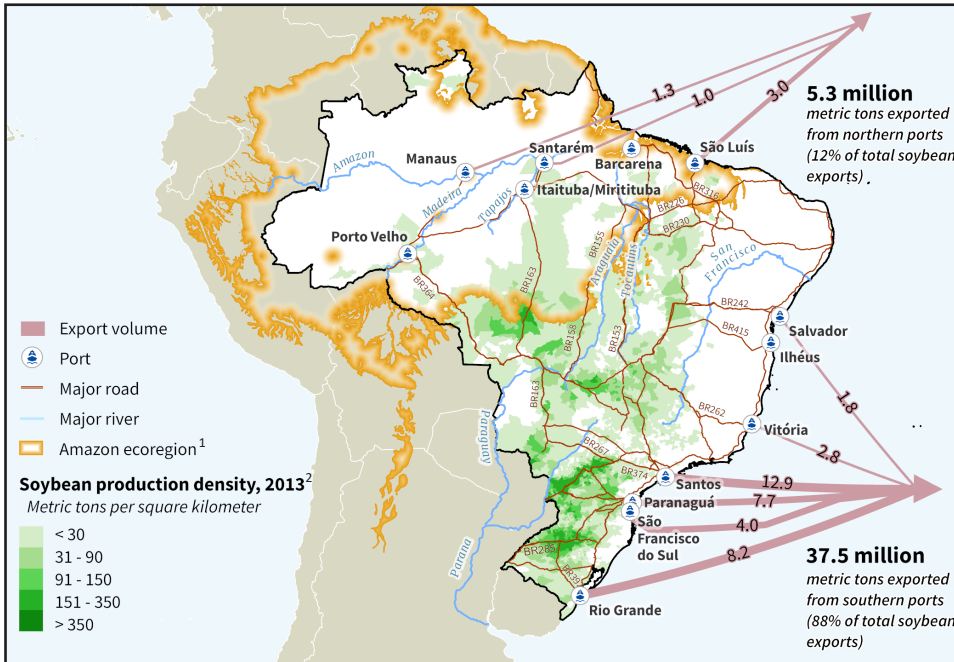
In the case of PIT projects, the works will be authorized after the concessionaire approves them. Most PIT projects encompass essential public services, such as railway crossings; sanitation networks (water supply network, sewage collection network, urban drainage network); and electric-power-transmission lines, required by third parties (city halls, sanitation, and energy companies, among others).

**BR do Mar Law:** On January 10, 2022, the Brazilian Congress approved a cabotage project called “BR do Mar” (Road of the Sea) changing the rules to allow foreign ships to compete with Brazilian ones. The change increases fleet availability to engage in cabotage within the national territory. With “[BR do Mar](#),” the Government's intention is to make the cabotage sector more attractive, stimulating competition and lowering costs. According to the Planning and Logistics Company (EPL), a public company linked to the Federal Government, cabotage accounts for only 11 percent of cargo transport in Brazil. Most of the freight is carried by truck (65 percent). EPL estimates that the BR do Mar program could reduce cabotage costs by more than 15 percent. According to EPL, the program could also increase containers transported per year from 1.2 million containers in 2019 to 2 million in 2022. Finally, EPL estimates the fleet dedicated to cabotage could increase by 40 percent in the next 3 years.

Since 2013, Brazil's total export volumes increased more than 80 percent. The expansion is the result of a comprehensive infrastructure improvement plan between the Brazilian Government and the private sector that started in 2007.

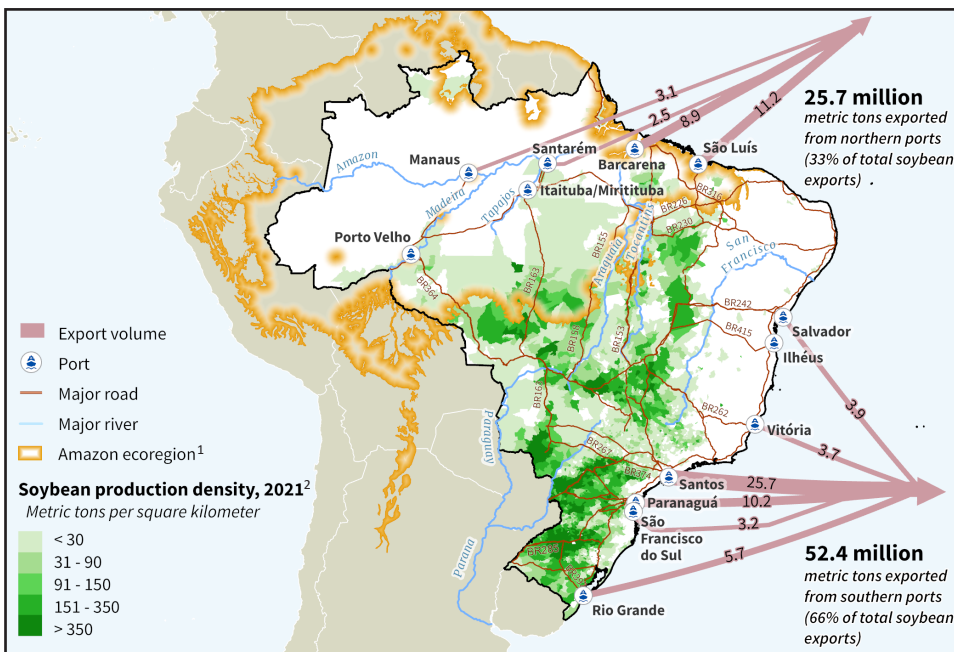
## Brazilian soybean exports capacity expansion by port, 2013-22

### Brazil soybean exports: 2013



Ports	Million metric tons		
	2013	2014	2022
Santos	12.9	12.7	25.7
São Luís	3.0	3.1	11.2
Paranaguá	7.7	7.5	10.2
Barcarena/ Belém	-	1.1	8.9
Rio Grande	8.2	8.2	5.7
Salvador	1.8	2.0	3.9
Vitória	2.8	3.1	3.7
São Francisco do Sul	4.0	4.9	3.2
Manaus	1.3	1.4	3.1
Santarém	1.0	0.9	2.5
Others	0.1	0.7	0.6
<b>Total</b>	<b>42.8</b>	<b>45.7</b>	<b>78.7</b>

### Brazil soybean exports: 2022



1 World Wildlife Fund.

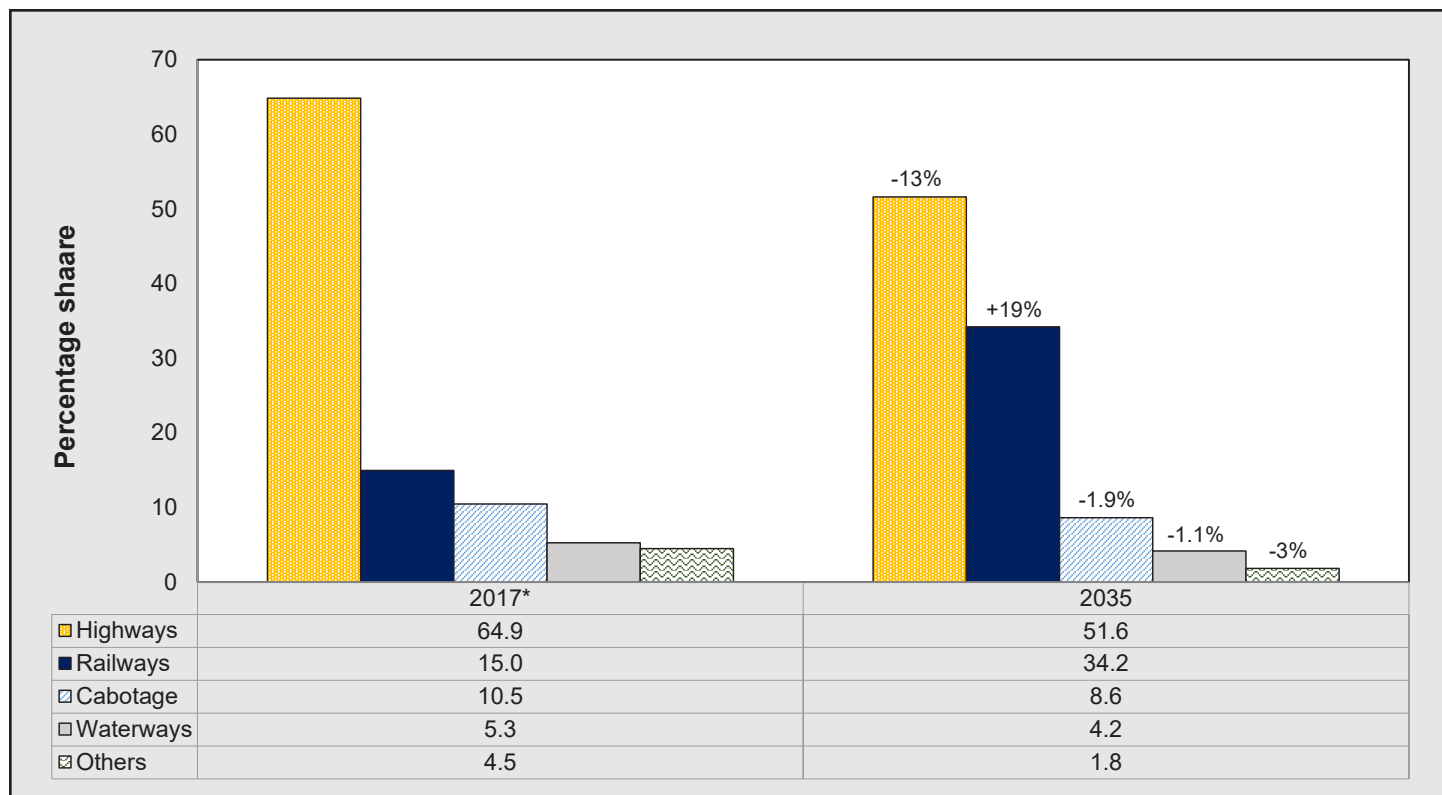
2 Brazilian Institute of Geography and Statistics—Produção Agrícola Municipal.

Note: A hyphen in an otherwise empty cell denotes that the data are not available.

Source: Comex Stat, Ministério da Economia and USDA, Foreign Agricultural Service.

In 2021, through joint efforts with the Ministry of Infrastructure, the Brazilian Enterprise for Planning and Logistics (EPL) presented the Brazilian National Logistics Plan 2035 (NLP 2035) to systematize and integrate the entire transport planning cycle at the Federal level. Over the next 12 years, the plan aims to reduce truck shipments by 13 percent, from 65 to nearly 52 percent; raise railway participation by 19 percent; as a result, cabotage will decrease about 2 percent while waterway use slightly decreases. The improved infrastructure has facilitated higher production of corn and soybeans in major agricultural producing regions. The NLP 2035 is a database with an integrated strategic plan of all modes of transport.

### Brazil modal share for general cargo, 2017-35



\*Because of rounding, shares do not sum exactly to 100.

Source: National Logistics Plan (NLP) 2035, Scenario 7: includes the maintenance and completion of ongoing infrastructure projects, Brazil Ministry of Infrastructure, Planning and Logistics Company (EPL) 2021.

## Tonnages and modal share for Brazil soybeans, 2010-19

Year	Long-haul truck*		Short-haul truck*				Total soybeans
	1,000 tons	Percent	Rail		Barge		
			1,000 tons	Percent	1,000 tons	Percent	1,000 tons
<b>Total</b>							
2010	51,218	74.7	13,908	20.2	3,562	5.1	68,688
2011	54,936	73.0	16,169	21.4	4,219	5.6	75,324
2012	47,679	72.0	14,596	21.9	4,108	6.1	66,383
2013	60,908	74.9	16,120	19.7	4,472	5.4	81,500
2014	66,119	76.8	15,985	18.5	4,069	4.7	86,173
2015	73,941	76.2	17,691	18.2	5,462	5.6	97,094
2016	71,408	74.7	17,666	18.4	6,624	6.9	95,698
2017	81,817	71.2	24,324	21.1	8,886	7.7	115,027
2018	79,390	64.5	32,841	26.6	11,028	8.9	123,259
2019	80,557	67.4	28,783	24.0	10,378	8.6	119,718
<b>Export</b>							
2010	12,980	44.7	13,676	47.0	2,417	8.3	29,073
2011	13,964	42.4	15,960	48.4	3,051	9.2	32,975
2012	15,396	46.9	14,462	43.9	3,048	9.2	32,906
2013	23,492	55.0	15,997	37.3	3,307	7.7	42,796
2014	26,320	57.7	15,796	34.5	3,577	7.8	45,693
2015	31,406	57.9	17,456	32.1	5,462	10.0	54,324
2016	28,165	54.7	17,393	33.7	6,024	11.6	51,582
2017	36,323	53.4	24,017	35.2	7,815	11.4	68,154
2018	40,975	49.3	32,565	39.1	9,718	11.6	83,258
2019	36,225	49.1	28,442	38.3	9,406	12.6	74,073
<b>Domestic</b>							
2010	38,239	96.7	232	0.5	1,145	2.9	39,614
2011	40,972	96.9	208	0.4	1,168	2.8	42,349
2012	32,283	96.5	134	0.4	1,060	3.1	33,477
2013	37,416	96.7	123	0.3	1,165	3.0	38,703
2014	39,799	98.4	190	0.4	492	1.2	40,481
2015	42,535	99.5	234	0.5	0	0	42,770
2016	43,243	98.1	273	0.6	600	1.3	44,116
2017	45,494	97.2	307	0.6	1,071	2.2	46,873
2018	38,416	96.2	276	0.6	1,310	3.2	40,001
2019	44,332	97.2	342	0.7	972	2.1	45,645

Note: Data compiled from the National Land Transport Agency (ANTT); National Water Transport Agency (ANTAQ), Comex Stat, Ministry of Development, Industry, Trade and Services (MDIC), and National Supply Company (CONAB). Data for 2020-22 is not available.

\*Short-haul truck shipments refer to the average distance of 440 miles (707 kilometers) from the farm to rail and barge terminals.

Source: Modal share analysis results—calculations by the University of São Paulo, Escola Superior de Agricultura “Luiz de Queiroz” (ESALQ/ USP), Brazil, and USDA, Agricultural Marketing Service.

# Transportation Indicators

## Quarterly costs of transporting Brazilian soybeans from the southern ports to Shanghai, China, 2022

	1st qtr	2nd qtr	3rd qtr	4th qtr	Avg	1st qtr	2nd qtr	3rd qtr	4th qtr	Avg
	North MT <sup>1</sup> - Santos <sup>2</sup> by truck —US\$/mt—					North MT <sup>1</sup> - Paranaguá <sup>2</sup> —US\$/mt—				
Truck	83.64	102.44	99.71	90.13	93.98	82.88	101.50	98.83	89.22	93.11
Ocean	62.00	65.75	48.70	47.70	56.04	64.00	67.75	49.00	48.60	57.34
Total transportation	145.64	168.19	148.41	137.83	150.02	146.88	169.25	147.83	137.82	150.44
Farm gate price <sup>3</sup>	550.71	566.29	514.98	515.89	536.97	550.71	566.29	514.98	515.89	536.97
Landed cost	696.34	734.48	663.39	653.73	686.98	697.58	735.55	662.81	653.71	687.41
Transport % of landed cost	20.9	22.9	22.4	21.1	21.8	21.1	23.0	22.3	21.1	21.9
	1st qtr	2nd qtr	3rd qtr	4th qtr	Avg	1st qtr	2nd qtr	3rd qtr	4th qtr	Avg
	North MT <sup>1</sup> - Santos <sup>2</sup> by rail —US\$/mt—					Northwest RS <sup>1</sup> - Rio Grande <sup>2</sup> —US\$/mt—				
Truck	27.91	34.83	32.45	30.70	31.47	27.55	32.57	30.05	27.61	29.45
Rail <sup>4</sup>	37.69	45.54	46.56	47.45	44.31	-	-	-	-	-
Ocean	62.00	65.75	48.70	47.70	56.04	62.75	66.50	50.30	48.40	56.99
Total transportation	127.60	146.12	127.71	125.85	131.82	90.30	99.07	80.35	76.01	86.43
Farm gate price <sup>3</sup>	550.71	566.29	514.98	515.89	536.97	604.37	617.87	552.66	544.28	579.79
Landed cost	678.31	712.41	642.69	641.74	668.79	694.66	716.94	633.01	620.29	666.23
Transport % of landed cost	18.8	20.5	19.9	19.6	19.7	13.0	13.8	12.7	12.3	12.9

<sup>1</sup>Producing regions: RS=Rio Grande do Sul and MT=Mato Grosso.

<sup>2</sup>Export port.

<sup>3</sup>The source of the farm gate price is the Brazilian Government, Companhia Nacional de Abastecimento (CONAB).

<sup>4</sup>In Brazil, there are no published rail tariff rates. Rail rates can be up to 30 percent lower than truck rates, depending on the volumes hauled and the terms of contracts signed between the railroad company and shippers.

Note: qtr=quarter. mt=metric ton. Avg=average. A hyphen in an otherwise empty cell denotes that the data are not available.

Source: University of São Paulo, Escola Superior de Agricultura “Luiz de Queiroz,” Brazil (ESALQ/USP) and USDA, Agricultural Marketing Service.



## Quarterly costs of transporting Brazilian soybeans from the southern ports to Hamburg, Germany, 2022

	1st qtr	2nd qtr	3rd qtr	4th qtr	Avg	1st qtr	2nd qtr	3rd qtr	4th qtr	Avg
	North MT <sup>1</sup> - Santos <sup>2</sup> by truck —US\$/mt—					North MT <sup>1</sup> - Paranaguá <sup>2</sup> —US\$/mt—				
Truck	83.64	102.44	99.71	90.13	93.98	82.88	101.50	98.83	89.22	93.11
Ocean	52.70	55.85	42.60	42.20	48.34	51.50	54.60	41.60	41.20	47.23
Total transportation	136.34	158.29	142.31	132.33	142.32	134.38	156.10	140.43	130.42	140.33
Farm gate price <sup>3</sup>	550.71	566.29	514.98	515.89	536.97	550.71	566.29	514.98	515.89	536.97
Landed cost	687.04	724.58	657.29	648.23	679.28	685.08	722.40	655.41	646.31	677.30
Transport % of landed cost	19.8	21.8	21.7	20.4	20.9	19.6	21.6	21.4	20.2	20.7
	1st qtr	2nd qtr	3rd qtr	4th qtr	Avg	1st qtr	2nd qtr	3rd qtr	4th qtr	Avg
	North MT <sup>1</sup> - Santos <sup>2</sup> by rail —US\$/mt—					Northwest RS <sup>1</sup> - Rio Grande <sup>2</sup> —US\$/mt—				
Truck	27.91	34.83	32.45	30.70	31.47	27.55	32.57	30.05	27.61	29.45
Rail <sup>4</sup>	37.69	45.54	46.56	47.45	44.31	-	-	-	-	-
Ocean	52.70	55.85	42.60	42.20	48.34	54.00	57.20	43.60	43.10	49.48
Total transportation	118.30	136.22	121.61	120.35	124.12	81.55	89.77	73.65	70.71	78.92
Farm gate price <sup>3</sup>	550.71	566.29	514.98	515.89	536.97	604.37	617.87	552.66	544.28	579.79
Landed cost	669.01	702.51	636.59	636.24	661.09	685.91	707.64	626.31	614.99	658.71
Transport % of landed cost	17.7	19.4	19.1	18.9	18.8	11.9	12.7	11.8	11.5	12.0

<sup>1</sup>Producing regions: RS=Rio Grande do Sul and MT=Mato Grosso.

<sup>2</sup>Export port.

<sup>3</sup>The source of the farm gate price is the Brazilian Government, Companhia Nacional de Abastecimento (CONAB).

<sup>4</sup>In Brazil, there are no published rail tariff rates. Rail rates can be up to 30 percent lower than truck rates, depending on the volumes hauled and the terms of contracts signed between the railroad company and shippers.

Note: qtr=quarter. mt=metric ton. Avg=average. A hyphen in an otherwise empty cell denotes that the data are not available.

Source: University of São Paulo, Escola Superior de Agricultura “Luiz de Queiroz,” Brazil (ESALQ/USP) and USDA, Agricultural Marketing Service.

## Quarterly costs of transporting Brazilian soybeans from the northern and northeastern ports to Shanghai, China, 2022

	1st qtr	2nd qtr	3rd qtr	4th qtr	Avg	1st qtr	2nd qtr	3rd qtr	4th qtr	Avg
	<b>North MT<sup>1</sup> - Santarém<sup>2</sup></b> —US\$/mt—					<b>South MA<sup>1</sup> - São Luís<sup>2</sup></b> —US\$/mt—				
Truck	53.57	64.82	63.19	55.64	59.30	38.28	46.68	44.47	33.88	40.83
Ocean	66.00	69.90	56.00	54.80	61.68	66.20	70.00	56.00	55.00	61.80
Total transportation	119.57	134.72	119.19	110.44	120.98	104.48	116.68	100.47	88.88	102.63
Farm gate price <sup>3</sup>	550.71	566.29	514.98	515.89	536.97	558.85	591.24	545.43	537.00	558.13
Landed cost	670.27	701.01	634.17	626.33	657.95	663.33	707.92	645.91	625.88	660.76
Transport % of landed cost	17.8	19.2	18.8	17.6	18.4	15.8	16.5	15.6	14.2	15.5
	1st qtr	2nd qtr	3rd qtr	4th qtr	Avg	1st qtr	2nd qtr	3rd qtr	4th qtr	Avg
	<b>Southwest PI<sup>1</sup> - São Luís<sup>2</sup></b> —US\$/mt—					<b>North MT<sup>1</sup> - Barcarena<sup>2</sup></b> —US\$/mt—				
Truck	38.32	51.28	47.29	40.38	44.32	46.94	52.63	52.49	45.72	49.44
Barge <sup>4</sup>	-	-	-	-	-	16.28	19.93	19.43	17.62	18.32
Ocean	66.20	70.00	56.00	55.00	61.80	68.00	72.00	55.40	55.50	62.73
Total transportation	104.52	121.28	103.29	95.38	106.12	131.22	144.56	127.32	118.84	130.49
Farm gate price <sup>3</sup>	543.56	585.80	529.04	510.35	542.19	550.71	566.29	514.98	515.89	536.97
Landed cost	648.08	707.08	632.33	605.72	648.31	681.92	710.86	642.29	634.73	667.45
Transport % of landed cost	16.1	17.2	16.3	15.7	16.3	19.2	20.3	19.8	18.7	19.5

<sup>1</sup>Producing regions: MT=Mato Grosso, PI=Piauí, and MA=Maranhão.

<sup>2</sup>Export port.

<sup>3</sup>The source of the farm gate price is the Brazilian Government, Companhia Nacional de Abastecimento (CONAB).

<sup>4</sup>In Brazil, there are no published barge rates. Barge rates can be up to 60 percent lower than truck rates, depending on the volumes hauled and the terms of contracts signed between the barge company and shippers. The distance is in nautical miles.

Note: qtr=quarter. mt=metric ton. Avg=average. A hyphen in an otherwise empty cell denotes that the data are not available.

Source: University of São Paulo, Escola Superior de Agricultura “Luiz de Queiroz,” Brazil (ESALQ/USP) and USDA, Agricultural Marketing Service.

## Quarterly costs of transporting Brazilian soybeans from the northern and northeastern ports to Hamburg, Germany, 2022

	1st qtr	2nd qtr	3rd qtr	4th qtr	Avg	1st qtr	2nd qtr	3rd qtr	4th qtr	Avg
	<b>North MT<sup>1</sup> - Santarém<sup>2</sup></b> —US\$/mt—					<b>South MA<sup>1</sup> - São Luís<sup>2</sup></b> —US\$/mt—				
Truck	53.57	64.82	63.19	55.64	59.30	38.28	46.68	44.47	33.88	40.83
Ocean	49.10	52.00	46.00	39.60	46.68	56.50	60.00	40.00	39.80	49.08
Total transportation	102.67	116.82	109.19	95.24	105.98	94.78	106.68	84.47	73.68	89.90
Farm gate price <sup>3</sup>	550.71	566.29	514.98	515.89	536.97	558.85	591.24	545.43	537.00	558.13
Landed cost	653.37	683.11	624.17	611.13	642.95	653.63	697.92	629.91	610.68	648.04
Transport % of landed cost	15.7	17.1	17.5	15.6	16.5	14.5	15.3	13.4	12.1	13.8
	1st qtr	2nd qtr	3rd qtr	4th qtr	Avg	1st qtr	2nd qtr	3rd qtr	4th qtr	Avg
	<b>Southwest PI<sup>1</sup> - São Luís<sup>2</sup></b> —US\$/mt—					<b>North MT<sup>1</sup> - Barcarena<sup>2</sup></b> —US\$/mt—				
Truck	38.32	51.28	47.29	40.38	44.32	46.94	52.63	52.49	45.72	49.44
Barge <sup>4</sup>	-	-	-	-	-	16.28	19.93	19.43	17.62	18.32
Ocean	56.50	60.00	40.00	39.80	49.08	48.00	50.80	39.70	39.20	44.43
Total transportation	94.82	111.28	87.29	80.18	93.39	111.22	123.36	111.62	102.54	112.19
Farm gate price <sup>3</sup>	543.56	585.80	529.04	510.35	542.19	550.71	566.29	514.98	515.89	536.97
Landed cost	638.38	697.08	616.33	590.52	635.58	661.92	689.66	626.59	618.43	649.15
Transport % of landed cost	14.9	16.0	14.2	13.6	14.6	16.8	17.9	17.8	16.6	17.3

<sup>1</sup>Producing regions: MT=Mato Grosso, PI=Piauí, and MA=Maranhão.

<sup>2</sup>Export port.

<sup>3</sup>The source of the farm gate price is the Brazilian Government, Companhia Nacional de Abastecimento (CONAB).

<sup>4</sup>In Brazil, there are no published barge rates. Barge rates can be up to 60 percent lower than truck rates, depending on the volumes hauled and the terms of contracts signed between the barge company and shippers. The distance is in nautical miles.

Note: qtr=quarter. mt=metric ton. Avg=average. A hyphen in an otherwise empty cell denotes that the data are not available.

Source: University of São Paulo, Escola Superior de Agricultura “Luiz de Queiroz,” Brazil (ESALQ/USP) and USDA, Agricultural Marketing Service.

## Quarterly truck rates for selected Brazilian soybean export transportation routes, 2022

Route #	Origin <sup>1</sup> (reference city)	Destination	Distance (miles) <sup>2</sup>	Share (%) <sup>3</sup>	Freight price (US\$/mt/100miles) <sup>4</sup>				
					1st qtr	2nd qtr	3rd qtr	4th qtr	Avg
1	Northwest RS <sup>5</sup> (Cruz Alta)	Rio Grande	288	6.7	9.56	11.31	10.43	9.59	10.22
2	North MT (Sorriso)	Santos	1,190	3.3	7.03	8.61	8.38	7.57	7.90
3	North MT (Sorriso)	Paranaguá	1,262	3.1	6.57	8.04	7.83	7.07	7.38
4	South GO (Rio Verde)	Santos	587	5.1	6.65	8.15	7.62	6.89	7.33
5	South GO (Rio Verde)	Paranaguá	726	4.1	6.79	8.18	8.10	7.28	7.59
6	North Central PR (Londrina)	Paranaguá	268	3.4	9.14	10.88	10.52	9.41	9.99
7	Western Central PR (Mamborê)	Paranaguá	311	2.5	8.46	10.20	9.87	9.00	9.38
8	Triangle MG (Uberaba)	Santos	339	3.3	9.03	10.94	10.18	9.28	9.86
9	West PR (Assis Chateaubriand)	Paranaguá	377	4.1	7.91	9.46	8.90	8.19	8.62
10	West Extreme BA (São Desidério)	Salvador	535	6.1	7.25	8.61	8.28	7.72	7.96
11	Southeast MT (Primavera do Leste)	Santos	901	2.5	6.30	7.87	7.63	6.72	7.13
12	Southeast MT (Primavera do Leste)	Paranaguá	975	2.3	6.08	7.45	7.20	6.49	6.81
13	Southwest MS (Maracaju)	Paranaguá	612	3.6	6.99	8.00	8.26	7.50	7.69
14	Southwest MS (Maracaju)	Santos	652	3.4	6.97	8.41	8.20	7.40	7.74
15	West PR (Assis Chateaubriand)	Santos	550	2.0	7.23	7.47	7.14	6.54	7.09
16	East GO (Cristalina)	Santos	585	2.1	7.71	9.39	8.97	8.13	8.55
17	North PR (Cornélio Procópio)	Paranaguá	306	1.8	7.46	8.86	8.57	7.59	8.12
18	Eastern Central PR (Castro)	Paranaguá	130	2.1	11.07	13.55	13.44	11.60	12.42
19	South Central PR (Guarapuava)	Paranaguá	204	2.5	10.42	12.38	12.10	10.56	11.37
20	North Central MS (São Gabriel do Oeste)	Santos	720	2.6	6.11	7.37	7.19	6.49	6.79
21	Ribeirão Preto SP (Guairá)	Santos	314	0.5	7.41	8.71	8.35	7.45	7.98
22	Northeast MT (Canarana)	Santos	950	2.5	6.47	7.85	7.63	6.89	7.21
23	East MS (Chapadão do Sul)	Santos	607	1.3	6.15	7.35	7.00	6.41	6.73
24	Northeast MT (Canarana)	Paranaguá	1,075	2.2	6.42	7.66	7.71	6.90	7.17
25	Western Central RS (Tupanciretã)	Rio Grande	273	1.4	8.51	9.92	9.06	8.49	8.99
26	Southwest PR (Chopinzinho)	Paranaguá	291	1.8	7.70	10.19	9.76	8.70	9.09
27	North MT (Sorriso)	Itaituba	672	5.8	6.99	7.84	7.81	6.81	7.36
28	North MT (Sorriso)	Porto Velho	632	6.1	6.43	7.62	7.16	6.54	6.94
29	North MT (Sorriso)	Santarém	876	4.4	6.11	7.40	7.21	6.35	6.77
30	South MA (Balsas)	São Luís	482	2.1	7.95	9.69	9.23	7.04	8.48
31	Southwest PI (Bom Jesus)	São Luís	606	2.4	6.33	8.46	7.81	6.66	7.32
32	Southeast PA (Paragominas)	Barcarena	249	1.6	8.42	9.77	9.57	8.46	9.05
33	East TO (Campos Lindos)	São Luís	842	1.4	6.05	7.32	7.12	6.43	6.73
	<b>Weighted average</b>		<b>587</b>	<b>100.0</b>	<b>7.43</b>	<b>8.90</b>	<b>8.57</b>	<b>7.69</b>	<b>8.15</b>
34	North MT (Sorriso)	Rondonópolis (Rail terminal)	382		7.31	9.12	8.50	8.04	8.24
35	Rondonópolis MT (Rail terminal) <sup>6</sup>	Santos	1,019		3.70	4.47	4.57	4.66	4.35
36	Itaituba PA (Barge terminal) <sup>7</sup>	Santarém	153		4.95	6.63	6.00	5.62	5.80
37	Itaituba PA (Barge terminal) <sup>7</sup>	Barcarena	600		2.71	3.32	3.24	2.94	3.05
38	South GO (Rio Verde)(Rail terminal) <sup>6</sup>	Santos	546		4.97	6.59	6.00	5.68	5.81

<sup>1</sup>The main city in the region is considered as a reference to establish the freight price.

<sup>2</sup>Distance from the main city of the considered region to the mentioned ports.

<sup>3</sup>Share of exports in total production (percentage).

<sup>4</sup>Average monthly exchange rate from “Banco Central do Brasil” was used to convert Brazilian reais to U.S. dollars.

<sup>5</sup>RS=Rio Grande do Sul, MT=Mato Grosso, GO=Goiás, PR=Paraná, MG=Minas Gerais, BA=Bahia, MS=Mato Grosso do Sul, SP=São Paulo, PI=Piauí, MA=Maranhão, PA=Pará, and TO=Tocantins.

<sup>6</sup>Weighted average is calculated from production-based shares to weight high-volume routes more heavily than low-volume routes. The share associated with each route is used to define the weight of a given route’s freight price in the composition of the weighted export freight index for trucks (calculated monthly).

<sup>7</sup>In Brazil, there are no published rail tariff rates. Rail rates can be up to 30 percent lower than truck rates, depending on the volumes hauled and the terms of contracts signed between the railroad company and shippers.

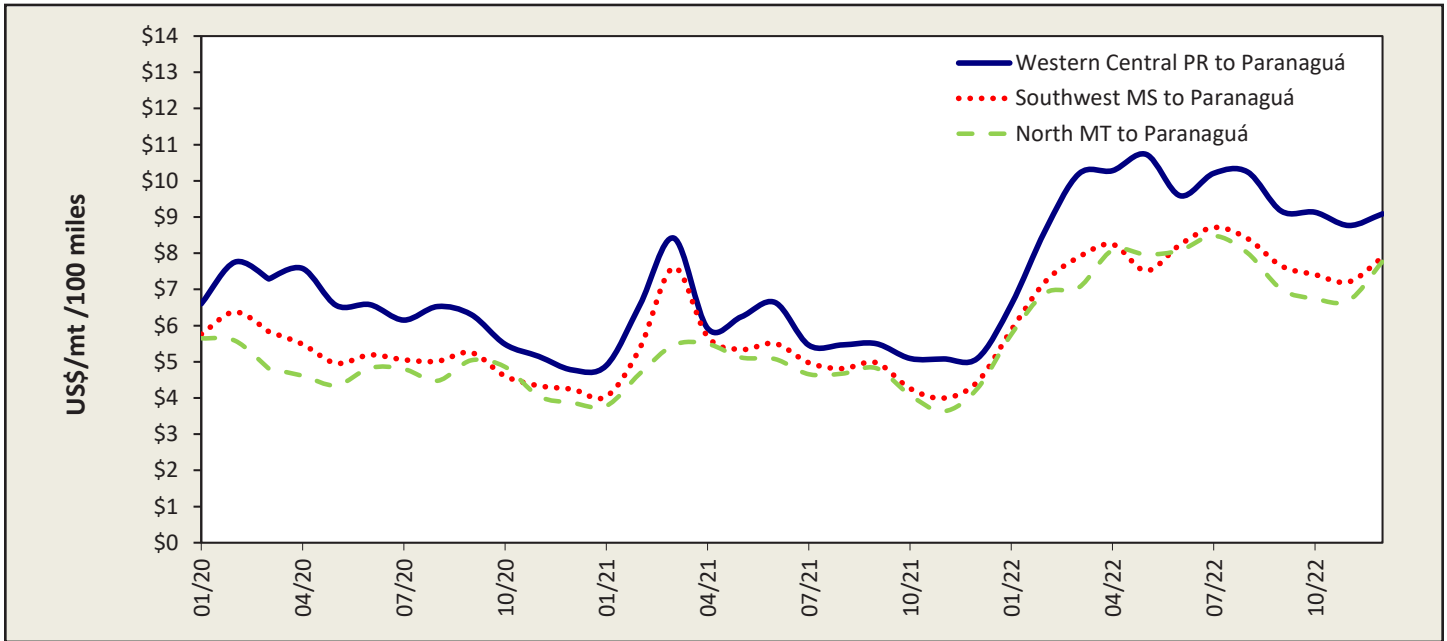
<sup>8</sup>In Brazil, there are no published barge rates. Barge rates can be up to 60 percent lower than truck rates, depending on the volumes hauled and the terms of contracts signed between the barge company and shippers. The distance is in nautical miles.

Note: qtr=quarter. mt=metric ton. Avg=average.

For more details, on the definitions/calculations contact [esalqlog@esalqlog.esalq.usp.br](mailto:esalqlog@esalqlog.esalq.usp.br).

Source: University of São Paulo, Escola Superior de Agricultura “Luiz de Queiroz,” Brazil (ESALQ/USP) and USDA, Agricultural Marketing Service.

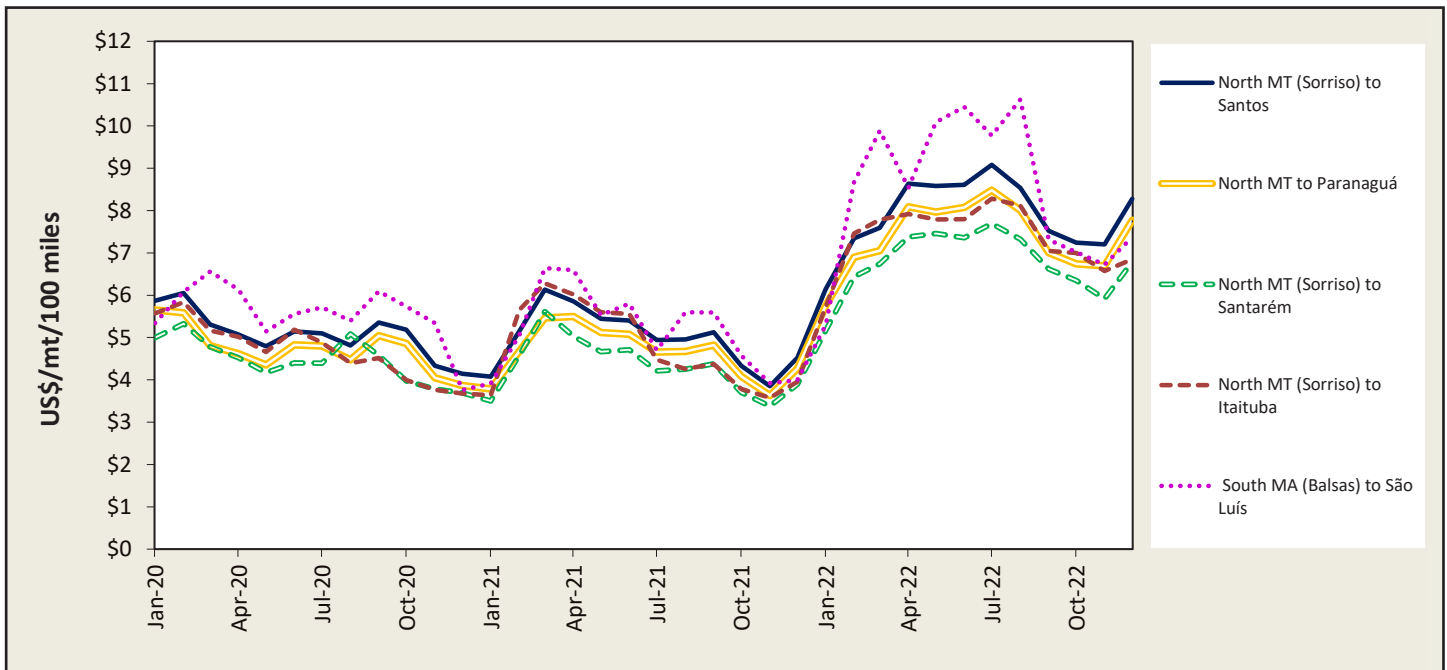
## Truck rates for selected southern Brazilian soybean export transportation routes, 2020-22



Note: mt=metric ton. PR=Paraná, MT=Mato Grosso, and MS=Mato Grosso do Sul.

Source: University of São Paulo, Escola Superior de Agricultura “Luiz de Queiroz,” Brazil (ESALQ/USP) and USDA, Agricultural Marketing Service.

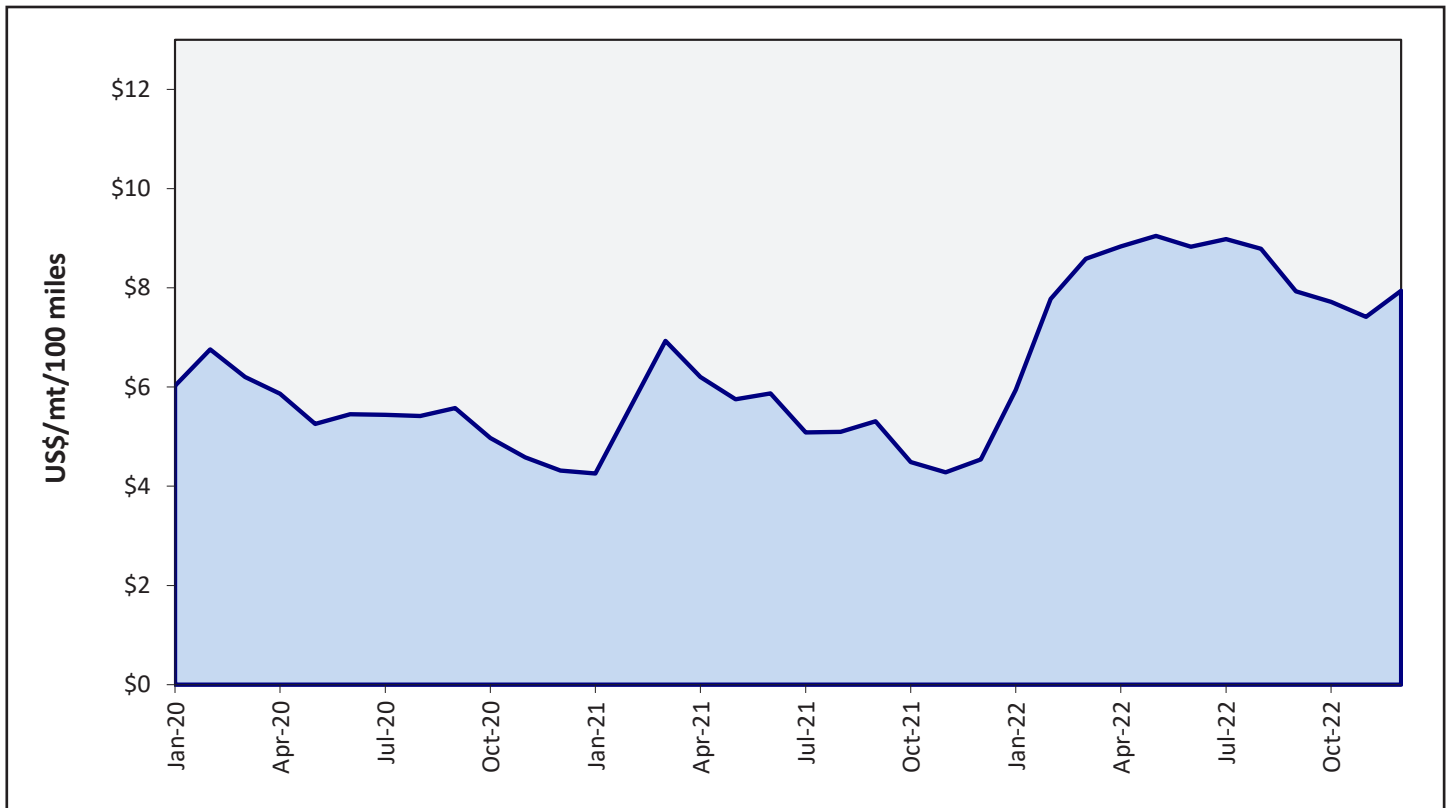
## Truck rates for selected north, south, and northeastern Brazilian soybean export transportation routes, 2020-22



Note: mt=metric ton. MT=Mato Grosso and MA=Maranhão.

Source: University of São Paulo, Escola Superior de Agricultura “Luiz de Queiroz,” Brazil (ESALQ/USP) and USDA, Agricultural Marketing Service.

## Brazilian soybean export truck transportation weighted average prices, 2020-22



Note: mt=metric ton.

Source: University of São Paulo, Escola Superior de Agricultura "Luiz de Queiroz," Brazil (ESALQ/USP) and USDA, Agricultural Marketing Service.

## Monthly Brazilian soybean export truck transportation cost index, 2015-22

Month	Freight price* (per 100 miles)	Index variation (%) (Base: prior month)	Index value (Base: Jan. 05 = 100)	Month	Freight price* (per 100 miles)	Index variation (%) (Base: prior month)	Index value (Base: Jan. 05 = 100)
Jan-15	8.01	0.7	138.15	Jan-19	7.72	7.5	133.13
Feb-15	8.02	0.1	138.29	Feb-19	8.19	6.0	141.15
Mar-15	8.32	3.7	143.44	Mar-19	7.34	-10.3	126.61
Apr-15	9.00	8.2	155.13	Apr-19	7.16	-2.6	123.35
May-15	8.39	-6.8	144.58	May-19	6.73	-5.9	116.02
Jun-15	8.01	-4.5	138.12	Jun-19	6.94	3.1	119.56
Jul-15	7.56	-5.7	130.25	Jul-19	8.33	20.1	143.60
Aug-15	7.38	-2.4	127.15	Aug-19	7.85	-5.8	135.23
Sep-15	6.60	-10.5	113.78	Sep-19	7.09	-9.7	122.17
Oct-15	6.70	1.5	115.43	Oct-19	6.57	-7.4	113.19
Nov-15	7.08	5.8	122.08	Nov-19	6.41	-2.3	110.54
Dec-15	6.76	-4.5	116.56	Dec-19	5.93	-7.5	102.21
Jan-16	6.42	-5.1	110.63	Jan-20	6.03	1.7	103.90
Feb-16	6.73	4.8	115.98	Feb-20	6.76	12.2	116.52
Mar-16	7.79	15.8	134.33	Mar-20	6.20	-8.2	106.95
Apr-16	8.30	6.5	143.05	Apr-20	5.86	-5.5	101.09
May-16	7.28	-12.3	125.43	May-20	5.26	-10.4	90.58
Jun-16	7.16	-1.5	123.51	Jun-20	5.45	3.7	93.95
Jul-16	7.46	4.2	128.64	Jul-20	5.44	-0.2	93.74
Aug-16	7.33	-1.7	126.41	Aug-20	5.41	-0.4	93.34
Sep-16	6.35	-13.3	109.53	Sep-20	5.58	3.0	96.14
Oct-16	5.88	-7.5	101.35	Oct-20	4.97	-10.8	85.71
Nov-16	5.00	-14.9	86.21	Nov-20	4.58	-7.9	78.95
Dec-16	5.47	9.4	94.32	Dec-20	4.32	-5.8	74.39
Jan-17	7.32	33.8	126.20	Jan-21	4.26	-1.3	73.39
Feb-17	9.85	34.6	169.85	Feb-21	5.60	31.5	96.50
Mar-17	10.38	5.3	178.90	Mar-21	6.93	23.8	119.49
Apr-17	9.52	-8.3	164.05	Apr-21	6.20	-10.5	106.96
May-17	8.75	-8.0	150.90	May-21	5.76	-7.2	99.22
Jun-17	8.18	-6.5	141.04	Jun-21	5.87	2.0	101.22
Jul-17	8.74	6.8	150.66	Jul-21	5.09	-13.4	87.70
Aug-17	9.85	12.7	169.76	Aug-21	5.09	0.1	87.81
Sep-17	8.97	-9.0	154.55	Sep-21	5.31	4.2	91.53
Oct-17	8.64	-3.6	148.93	Oct-21	4.49	-15.5	77.36
Nov-17	8.36	-3.2	144.11	Nov-21	4.28	-4.6	73.80
Dec-17	7.23	-13.5	124.63	Dec-21	4.54	6.0	78.26
Jan-18	7.59	5.0	130.90	Jan-22	5.94	30.9	102.42
Feb-18	8.65	13.9	149.04	Feb-22	7.77	30.8	134.02
Mar-18	10.59	22.5	182.61	Mar-22	8.59	10.4	147.99
Apr-18	9.78	-7.7	168.59	Apr-22	8.83	2.9	152.27
May-18	8.96	-8.4	154.45	May-22	9.05	2.4	155.94
Jun-18	8.89	-0.8	153.24	Jun-22	8.83	-2.4	152.18
Jul-18	8.97	0.9	154.58	Jul-22	8.98	1.7	154.78
Aug-18	8.24	-8.1	142.00	Aug-22	8.79	-2.1	151.51
Sep-18	7.24	-12.1	124.78	Sep-22	7.93	-9.8	136.68
Oct-18	7.69	6.2	132.55	Oct-22	7.71	-2.7	132.98
Nov-18	7.51	-2.3	129.44	Nov-22	7.42	-3.9	127.84
Dec-18	7.19	-4.3	123.87	Dec-22	7.94	7.1	136.89

\*Weighted average is calculated from production-based shares to weigh high-volume routes more heavily than low-volume routes. The share associated with each route is used to define the weight of a given route's freight price in the composition of the monthly weighted export truck freight index.

Source: University of São Paulo, Escola Superior de Agricultura "Luiz de Queiroz," Brazil (ESALQ/USP) and USDA, Agricultural Marketing Service.

## Quarterly ocean freight rates for shipping soybeans from selected Brazilian ports to Shanghai, China, 2016-22 (US\$/metric ton)\*

Port	1st qtr 2016	2nd qtr 2016	3rd qtr 2016	4th qtr 2016	2016 Average
Santos	17.50	16.50	12.50	20.00	16.63
Paranaguá	18.00	18.50	14.50	21.50	18.13
Rio Grande	18.50	17.00	13.00	20.50	17.25
Santarém	22.00	21.00	19.40	23.75	21.54
São Luís	20.00	18.40	17.50	22.00	19.48
Barcarena	22.50	21.50	20.00	23.75	21.94
Port	1st qtr 2017	2nd qtr 2017	3rd qtr 2017	4th qtr 2017	2017 Average
Santos	18.50	29.00	30.00	30.00	26.88
Paranaguá	20.50	30.50	31.00	31.50	28.38
Rio Grande	18.00	29.50	31.00	30.70	27.30
Santarém	24.00	33.50	31.00	34.50	30.75
São Luís	23.50	30.25	31.00	33.50	29.56
Barcarena	24.00	33.50	31.00	34.50	30.75
Port	1st qtr 2018	2nd qtr 2018	3rd qtr 2018	4th qtr 2018	2018 Average
Santos	32.50	31.00	27.75	30.00	30.31
Paranaguá	32.00	32.00	28.75	31.00	30.94
Rio Grande	33.00	31.50	28.25	31.00	30.94
Santarém	38.50	35.50	31.25	34.00	34.81
São Luís	37.00	34.80	30.75	33.00	33.89
Barcarena	37.50	33.80	32.25	35.00	34.64
Port	1st qtr 2019	2nd qtr 2019	3rd qtr 2019	4th qtr 2019	2019 Average
Santos	32.25	30.92	33.25	38.17	33.65
Paranaguá	33.75	31.42	34.75	39.50	34.86
Rio Grande	31.58	30.25	30.58	39.67	33.94
Santarém	32.25	30.58	38.25	39.17	35.06
São Luís	31.00	30.58	38.25	39.42	34.81
Barcarena	32.25	29.92	38.25	39.42	34.96
Port	1st qtr 2020	2nd qtr 2020	3rd qtr 2020	4th qtr 2020	2020 Average
Santos	35.50	27.08	31.33	31.67	31.40
Paranaguá	37.25	28.83	33.08	33.42	33.15
Rio Grande	37.00	28.58	32.83	33.17	32.90
Santarém	36.50	28.08	34.83	35.21	33.66
São Luís	36.75	28.33	35.33	35.67	34.02
Barcarena	38.50	28.33	36.33	36.67	34.96
Port	1st qtr 2021	2nd qtr 2021	3rd qtr 2021	4th qtr 2021	2021 Average
Santos	37.00	50.60	64.00	62.00	53.40
Paranaguá	38.75	52.40	66.00	64.00	55.29
Rio Grande	37.25	51.00	64.75	62.75	53.94
Santarém	40.54	55.60	67.50	65.60	57.31
São Luís	41.00	56.60	68.00	66.00	57.90
Barcarena	42.00	58.20	70.00	68.00	59.55
Port	1st qtr 2022	2nd qtr 2022	3rd qtr 2022	4th qtr 2022	2022 Average
Santos	62.00	65.75	48.70	47.70	56.04
Paranaguá	64.00	67.75	49.00	48.60	57.34
Rio Grande	62.75	66.50	49.00	48.40	56.99
Santarém	66.00	69.90	56.00	54.80	61.68
São Luís	66.20	70.00	56.00	55.00	61.80
Barcarena	68.00	72.00	55.40	55.50	62.73

\*The rates correspond to the average actual values negotiated between shippers and carriers and weighted according to the magnitude of the shipped volume.

Note: qtr=quarter.

Source: University of São Paulo, Escola Superior de Agricultura "Luiz de Queiroz" (ESALQ/ USP), Brazil, and USDA, Agricultural Marketing Service.



## Quarterly ocean freight rates for shipping soybeans from selected Brazilian ports to Hamburg, Germany, 2016-22 (US\$/metric ton)\*

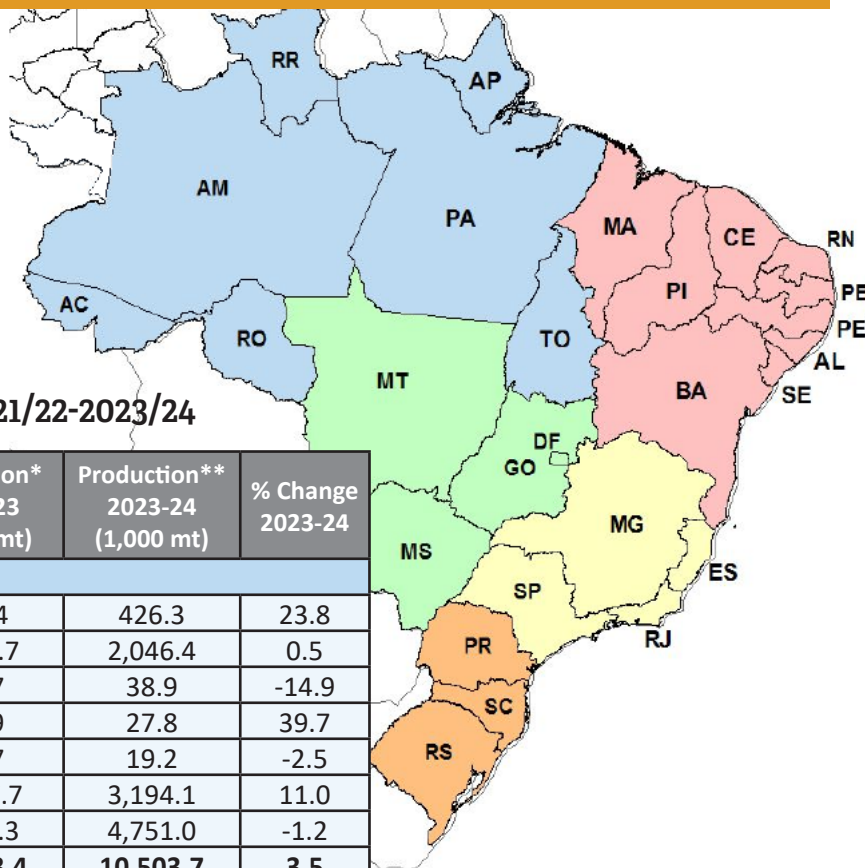
Port	1st qtr 2016	2nd qtr 2016	3rd qtr 2016	4th qtr 2016	2016 Average
Santos	16.00	17.00	16.50	23.00	18.13
Paranaguá	16.00	17.00	16.50	24.00	18.38
Rio Grande	16.00	17.00	16.50	23.00	18.13
Santarém	11.03	14.13	15.00	19.80	14.99
São Luís	8.25	11.00	11.80	15.80	11.71
Barcarena	9.60	12.45	13.20	17.35	13.15
Port	1st qtr 2017	2nd qtr 2017	3rd qtr 2017	4th qtr 2017	2017 Average
Santos	21.00	24.00	26.00	27.00	24.50
Paranaguá	22.00	25.00	27.00	28.00	25.50
Rio Grande	22.00	25.00	27.00	28.00	25.50
Santarém	21.00	23.60	25.00	26.00	23.90
São Luís	17.60	20.00	21.20	22.00	20.20
Barcarena	18.00	20.60	21.80	22.70	20.78
Port	1st qtr 2018	2nd qtr 2018	3rd qtr 2018	4th qtr 2018	2018 Average
Santos	27.00	25.00	24.00	25.00	25.25
Paranaguá	28.00	26.00	25.00	26.00	26.25
Rio Grande	28.00	26.00	25.00	26.00	26.25
Santarém	25.00	22.90	22.50	23.00	23.35
São Luís	21.00	19.10	18.50	19.00	19.40
Barcarena	23.00	20.90	20.20	20.00	21.03
Port	1st qtr 2019	2nd qtr 2019	3rd qtr 2019	4th qtr 2019	2019 Average
Santos	23.00	21.50	27.00	31.00	25.63
Paranaguá	23.00	21.25	27.00	30.75	25.50
Rio Grande	23.00	21.25	27.00	31.25	25.63
Santarém	21.00	20.25	25.92	26.50	23.42
São Luís	18.00	17.10	22.77	23.50	20.34
Barcarena	19.00	17.85	23.52	24.25	21.16
Port	1st qtr 2020	2nd qtr 2020	3rd qtr 2020	4th qtr 2020	2020 Average
Santos	29.25	20.50	24.00	25.25	24.75
Paranaguá	30.00	21.50	25.00	25.35	25.46
Rio Grande	29.50	20.75	24.50	25.75	25.13
Santarém	25.00	16.00	20.75	22.00	20.94
São Luís	22.25	17.50	25.00	26.30	22.76
Barcarena	24.00	15.00	20.50	21.75	20.31
Port	1st qtr 2021	2nd qtr 2021	3rd qtr 2021	4th qtr 2021	2021 Average
Santos	31.25	42.70	54.00	52.50	45.11
Paranaguá	31.00	41.90	53.00	51.50	44.35
Rio Grande	32.00	43.80	55.50	53.80	46.28
Santarém	28.65	40.00	50.60	49.10	42.09
São Luís	33.25	45.90	58.00	56.30	48.36
Barcarena	28.10	38.90	49.20	47.80	41.00
Port	1st qtr 2022	2nd qtr 2022	3rd qtr 2022	4th qtr 2022	2022 Average
Santos	52.70	55.85	42.60	42.20	48.34
Paranaguá	51.50	54.60	41.60	41.20	47.23
Rio Grande	54.00	57.20	43.60	43.10	49.48
Santarém	49.10	52.00	46.00	39.60	46.68
São Luís	56.50	60.00	40.00	39.80	49.08
Barcarena	48.00	50.80	39.70	39.20	44.43

\*The rates correspond to the average actual values negotiated between shippers and carriers and weighted according to the magnitude of the shipped volume.

Note: qtr=quarter.

Source: University of São Paulo, Escola Superior de Agricultura "Luiz de Queiroz" (ESALQ/ USP), Brazil, and USDA, Agricultural Marketing Service.

# Soybean Production



Soybean production by state, 2021/22-2023/24

Region/State	Production 2021-22 (1,000 mt)	Production* 2022-23 (1,000 mt)	Production** 2023-24 (1,000 mt)	% Change 2023-24
<b>NORTH</b>				
Roraima (RR)	285	344.4	426.3	23.8
Rondônia (RO)	1668.8	2,036.7	2,046.4	0.5
Acre (AC)	20.4	45.7	38.9	-14.9
Amazonas (AM)	13.5	19.9	27.8	39.7
Amapá (AP)	17.2	19.7	19.2	-2.5
Pará (PA)	2497.9	2,877.7	3,194.1	11.0
Tocantins (TO)	3877.1	4,809.3	4,751.0	-1.2
<b>Total</b>	<b>8,379.9</b>	<b>10,153.4</b>	<b>10,503.7</b>	<b>3.5</b>
<b>NORTHEAST</b>				
Maranhão (MA)	3,573.6	3,910.0	3,903.2	-0.2
Piauí (PI)	3,014.0	3,549.0	3,691.9	4.0
Ceará (CE)	-	17.9	15.5	-13.4
Alagoas (AL)	6.2	19.1	17.2	-9.9
Bahia (BA)	7,283.1	7,717.2	7,741.2	0.3
<b>Total</b>	<b>13,876.9</b>	<b>15,213.2</b>	<b>15,369.0</b>	<b>1.0</b>
<b>CENTER-WEST</b>				
Mato Grosso (MT)	41,490.20	45,600.50	43,492.90	-4.6
Mato Grosso do Sul (MS)	8,932.7	14,054.3	13,885.9	-1.2
Goiás (GO)	17,389.9	17,734.9	17,045.8	-3.9
Distrito Federal (DF)	313.2	318.5	310.5	-2.5
<b>Total</b>	<b>68,126.00</b>	<b>77,708.2</b>	<b>74,735.1</b>	<b>-3.8</b>
<b>SOUTHEAST</b>				
Minas Gerais (MG)	7,590.5	8,346.5	8,381.6	0.4
São Paulo (SP)	4,176.5	4,911.4	4,705.2	-4.2
<b>Total</b>	<b>11,767.0</b>	<b>13,257.9</b>	<b>13,086.8</b>	<b>-1.3</b>
<b>SOUTH</b>				
Paraná (PR)	12,250.3	22,384.9	21,773.1	-2.7
Santa Catarina (SC)	2,038.7	2,873.5	2,821.7	-1.8
Rio Grande do Sul (RS)	9,111.0	13,018.4	21,887.8	68.1
<b>Total</b>	<b>23,400.0</b>	<b>38,276.8</b>	<b>46,482.6</b>	<b>21.4</b>
<b>TOTAL PRODUCTION</b>	<b>125,549.8</b>	<b>154,609.5</b>	<b>160,177.2</b>	<b>3.6</b>

Note: CONAB's 2023-2024 season refers to the crop planted in 2023 and harvested in 2024.

\* = estimated and \*\* = forecast, December 2023

Source: Companhia Nacional de abastecimento (CONAB).

## Brazil soybean supply and distribution (local marketing years)

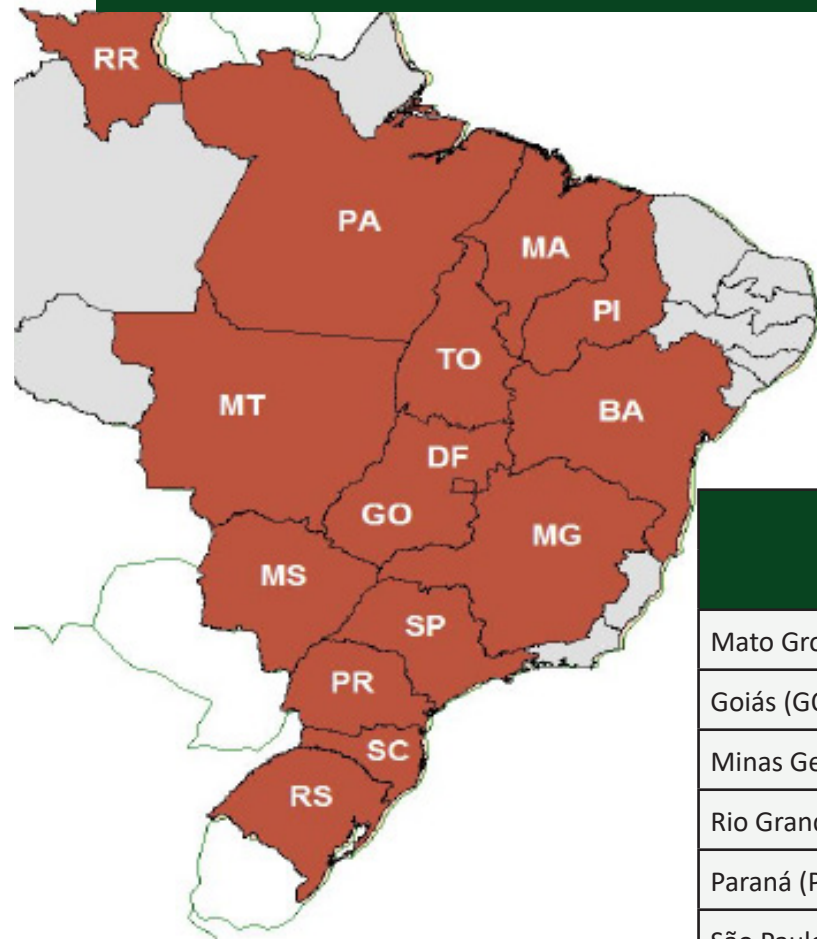
Year*	Area harvested	Beginning stocks	Production	Imports	Total supply	Exports	Crush	Domestic consumption	Ending stocks
	1,000 hectares	1,000 metric tons							
2010/11	24,200	7,739	75,300	40	83,079	33,789	37,264	39,664	9,626
2011/12	25,000	9,626	66,500	298	76,424	31,905	36,230	38,630	5,889
2012/13	27,700	5,889	82,000	240	88,129	42,826	36,432	38,807	6,496
2013/14	30,100	6,496	86,200	579	93,275	45,747	38,195	40,745	6,783
2014/15	32,100	6,783	97,100	329	104,212	54,635	40,339	42,989	6,588
2015/16	33,300	6,588	95,700	362	102,650	52,099	39,967	42,642	7,909
2016/17	33,900	7,909	114,900	267	123,076	68,806	42,161	44,936	9,334
2017/18	35,150	9,334	123,400	190	132,924	83,728	43,389	46,224	2,972
2018/19	35,900	2,972	120,500	145	123,617	73,436	43,495	46,410	3,771
2019/20	36,900	3,771	128,500	884	133,155	81,626	46,461	49,556	1,973
2020/21	39,500	1,973	139,500	791	142,264	88,512	48,121	51,326	2,426
2021/22	41,500	2,426	130,500	416	133,342	77,118	51,196	54,441	1,783
2022/23	44,300	1,783	160,000	200	161,983	102,000	53,700	57,500	2,483
2023/24**	45,600	2,483	161,000	450	163,933	101,000	55,500	59,450	3,483

\*Data based on Brazil's local February/January Marketing Year (MY). Where February 2021-January 2022 is the 2020/21 MY.

\*\*Forecast, December 8, 2023.

Source: USDA/Foreign Agricultural Service/Market and Trade Data/Reports/Oilseeds

# Exports

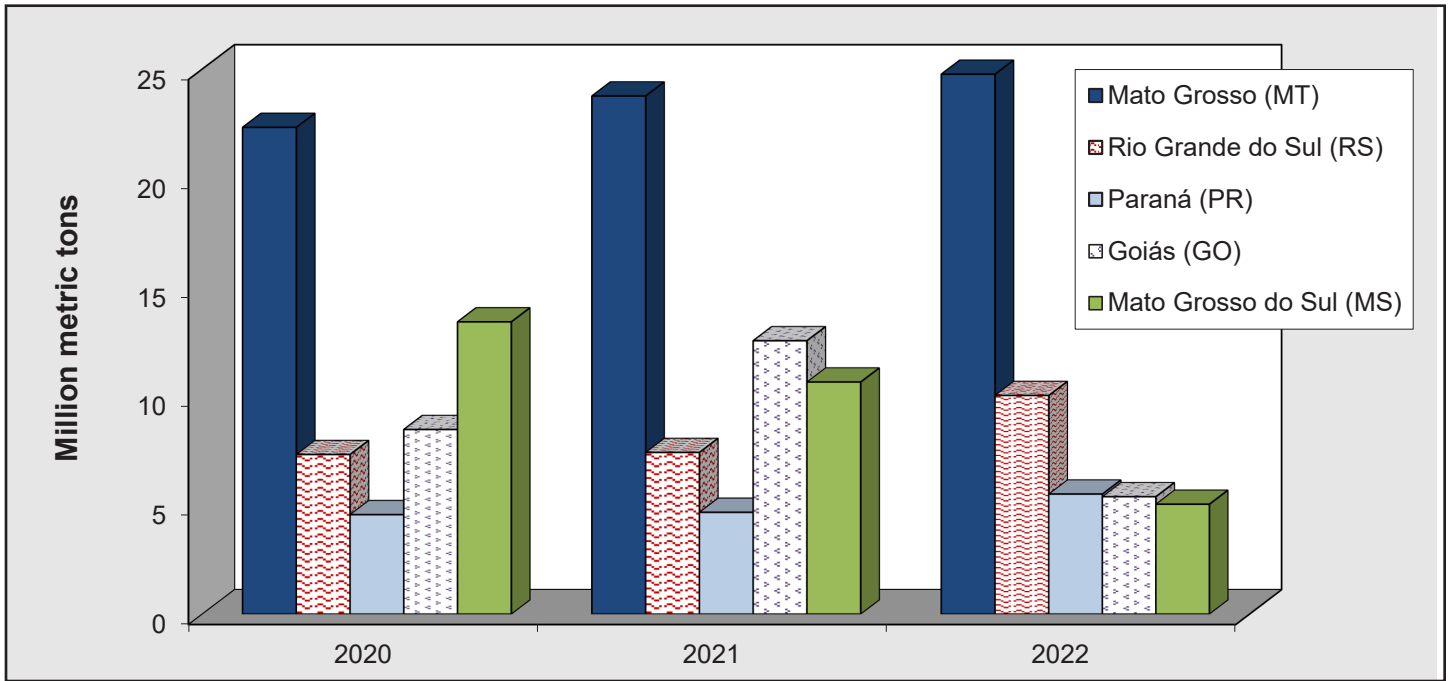


**Top 15 Brazilian soybean exporting states, 2020-22**

State	2020	2021	2022	Rank
	1,000 metric ton			
Mato Grosso (MT)	22,326	23,766	24,765	1
Goiás (GO)	7,318	7,414	10,027	2
Minas Gerais (MG)	4,560	4,668	5,503	3
Rio Grande do Sul (RS)	8,466	12,538	5,383	4
Paraná (PR)	13,404	10,644	5,038	5
São Paulo (SP)	4,901	4,959	5,060	6
Bahia (BA)	3,761	3,990	4,521	7
Mato Grosso do Sul (MS)	4,796	5,426	3,574	8
Maranhão (MA)	2,299	2,794	3,449	9
Tocantins (TO)	2,554	2,904	3,144	10
Pará (PA)	2,227	1,961	2,424	11
Piauí (PI)	1,188	1,501	1,940	12
Rondônia (RO)	1,244	1,539	1,721	13
Santa Catarina (SC)	1,935	1,455	1,025	14
Roraima (RR)	100	146	208	15
Others	1,890	397	946	
<b>Total</b>	<b>82,968</b>	<b>86,100</b>	<b>78,726</b>	

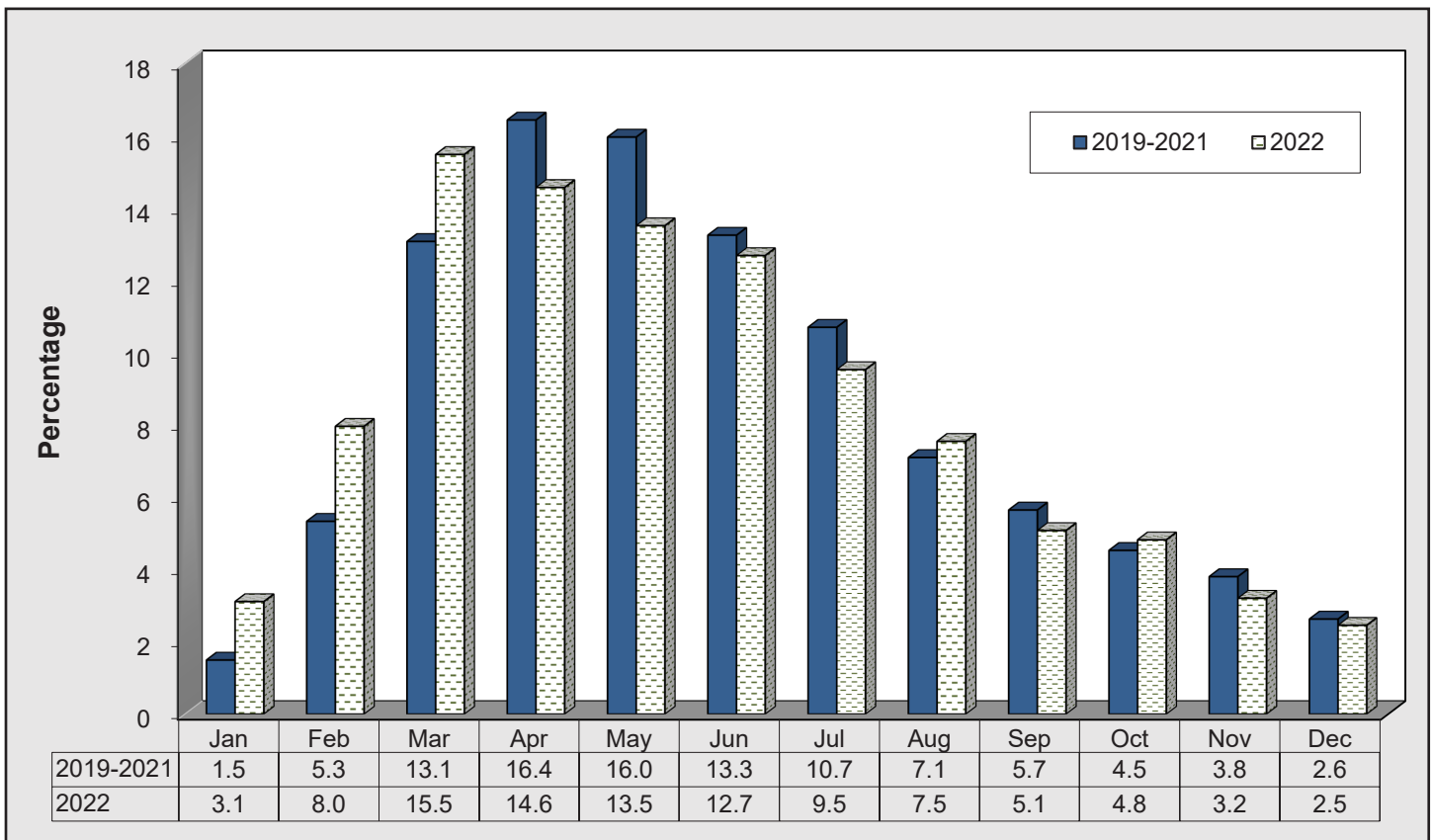
Source: Comex Stat, Ministério do Desenvolvimento, Indústria, Comércio e Serviços.

### Top five Brazilian soybean exporting states, 2020-22



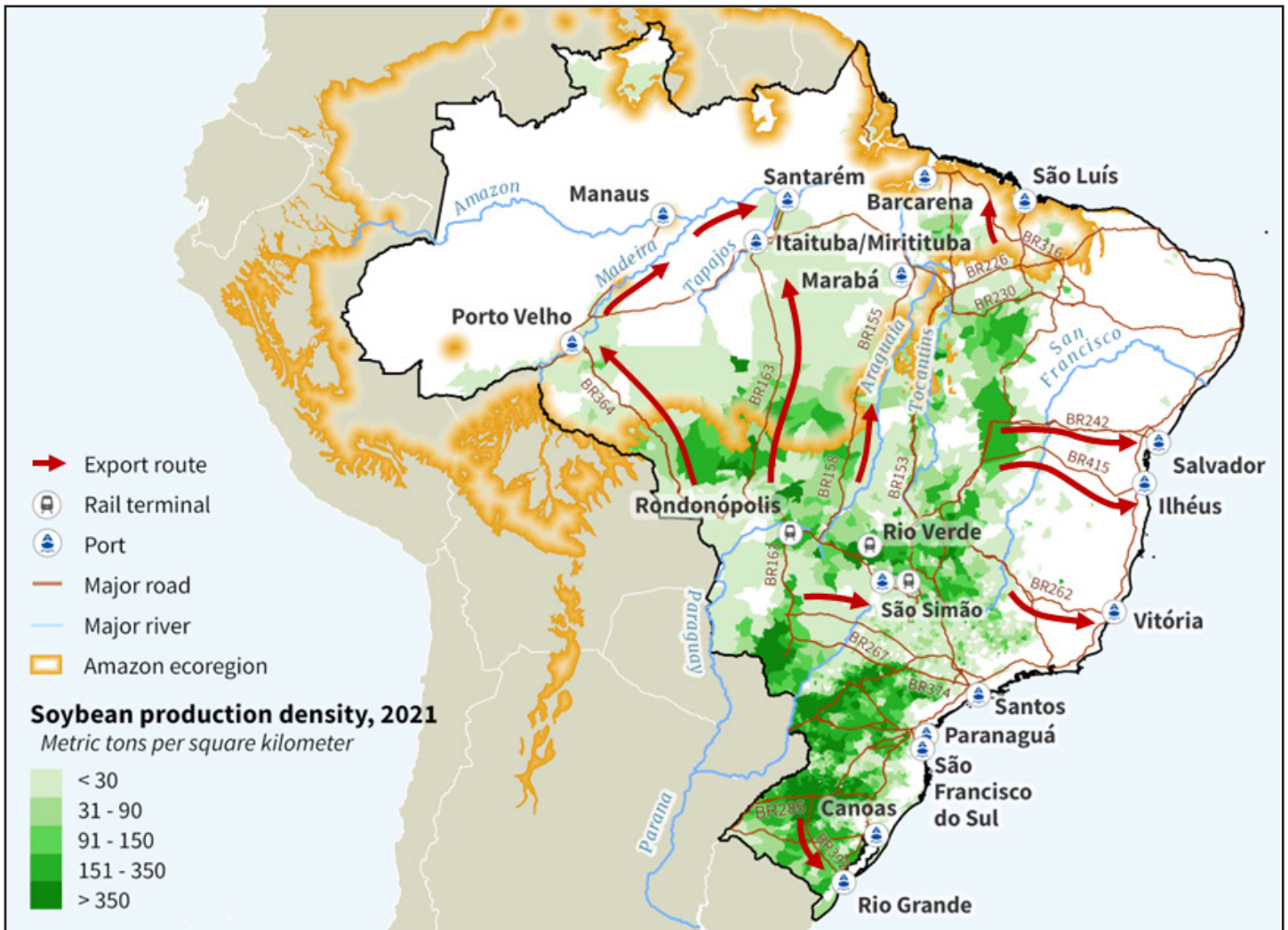
Source: Comex Stat, Ministério do Desenvolvimento, Indústria, Comércio e Serviços.

### Brazil average monthly soybean exports, 2019-22



Source: Comex Stat, Ministério do Desenvolvimento, Indústria, Comércio e Serviços.

## Main export routes for soybeans



<sup>1</sup>World Wildlife Fund.

<sup>2</sup>Brazilian Institute of Geography and Statistics—Produção Agrícola Municipal.

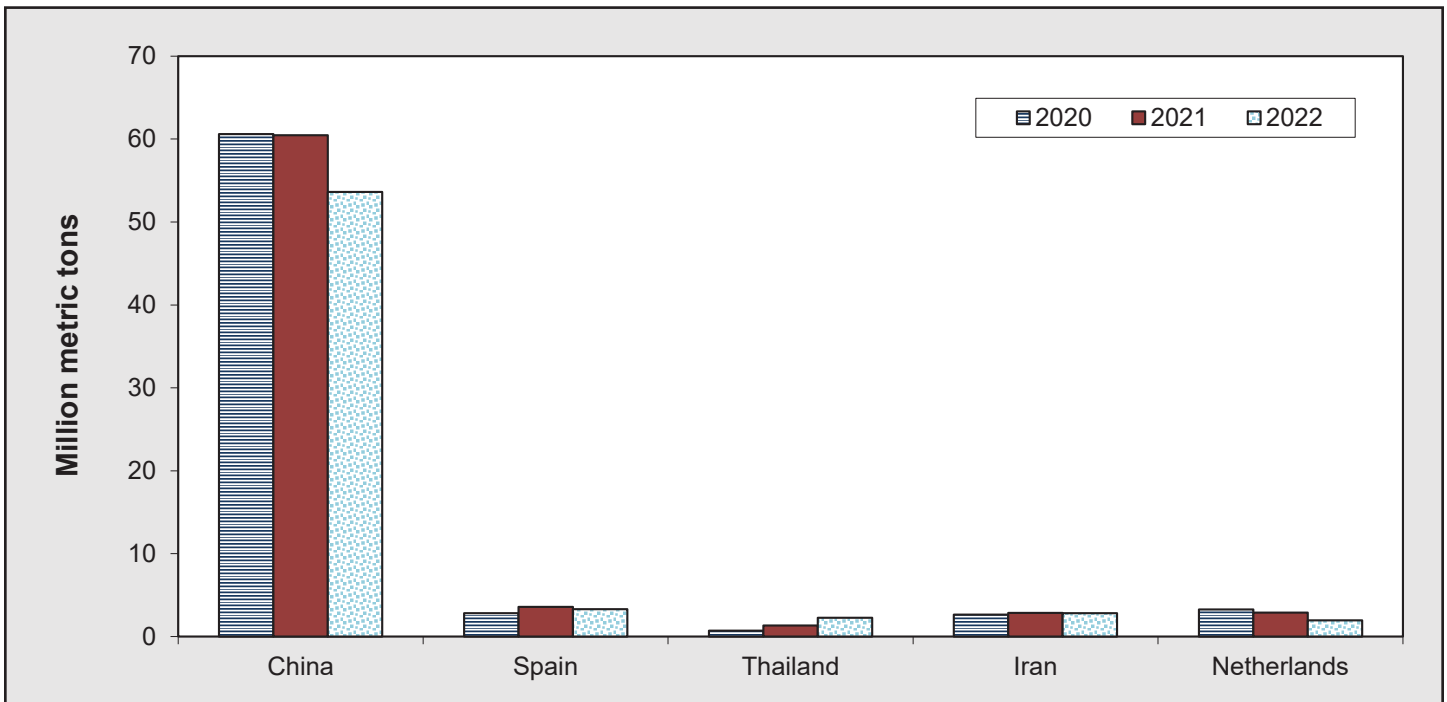
Source: USDA/Agricultural Marketing Service (AMS) and USDA/Foreign Agricultural Service (FAS).

## World export routes for Brazilian soybeans



Source: USDA/Agricultural Marketing Service and USDA/Foreign Agricultural Service.

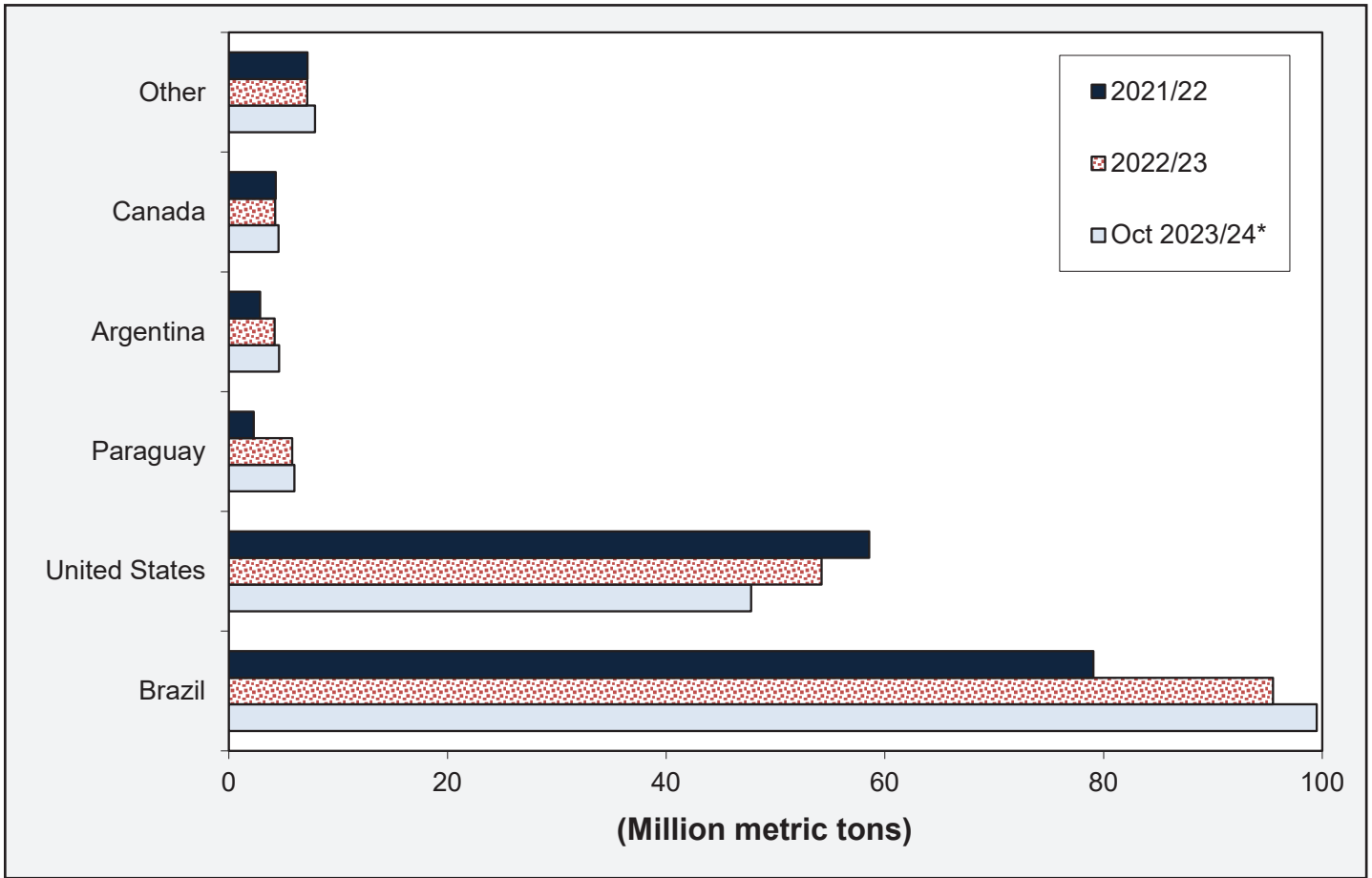
## Top five Brazilian soybean-export destinations, 2020-22



Source: Comex Stat, Ministério do Desenvolvimento, Indústria, Comércio e Serviços.

In 2022, Brazil was the leading soybean exporter, followed by the United States, Paraguay, Canada, and Argentina. USDA forecasts that Brazil will sustain its leadership position in 2023.

### Top five world soybean-exporting countries, 2021/22- 2023/24\*



\*Forecast December 2023.

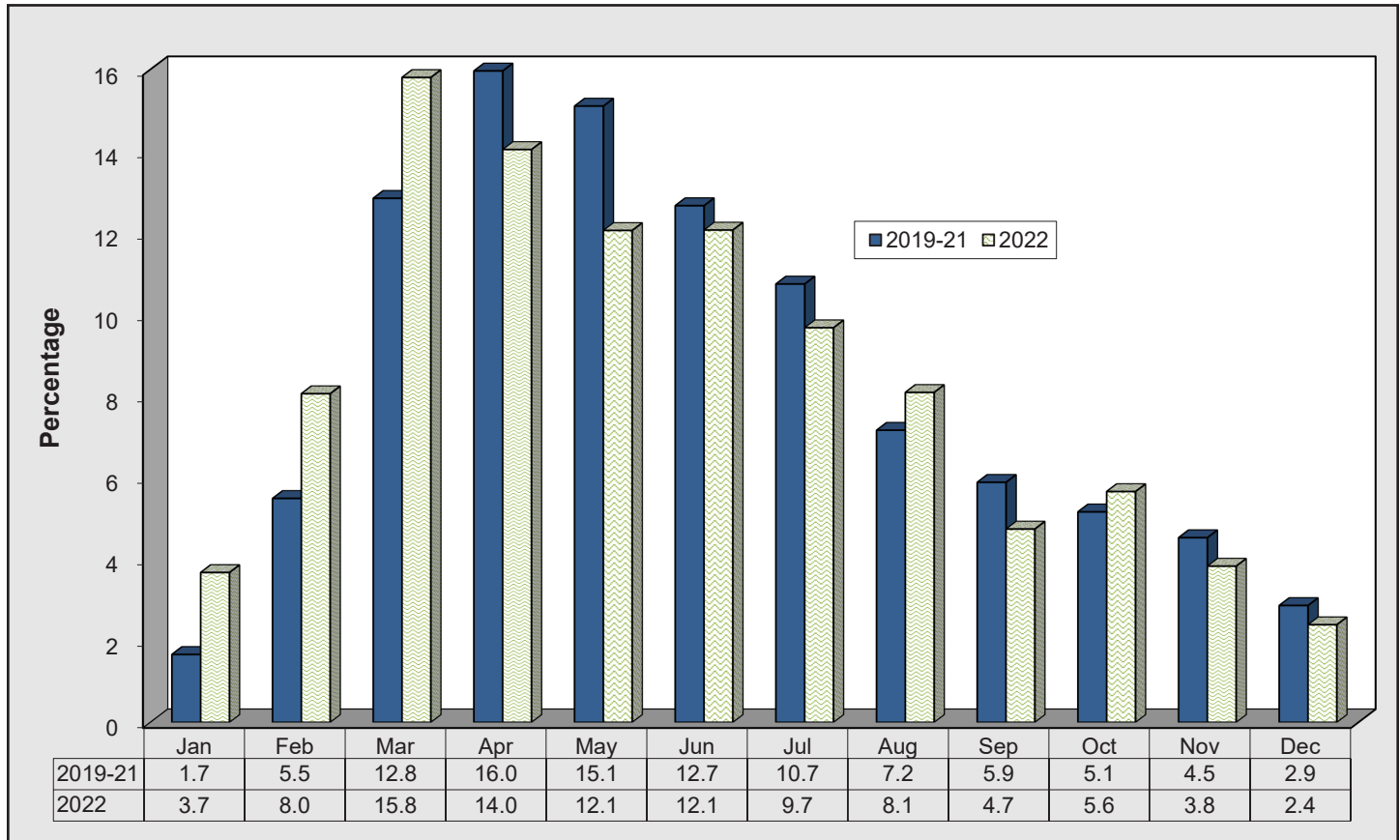
Source:USDA/Foreign Agricultural Service/Market and Trade/Reports/PSD Reports/Oilseeds.



# Exports to China

In 2022, Brazil exported 53.6 mmt of soybeans to China, valued at \$31.8 billion, 11 percent less than 2021's total (60.5 mmt), accounting for 68 percent of Brazil's total exports (78.9 mmt). Over 90 percent of Brazilian soybean exports to China in 2022 originated from Mato Grosso, Goiás, Rio Grande do Sul, Minas Gerais, Paraná, São Paulo, Bahia, Mato Grosso do Sul, Maranhão, and Tocantins.

**Brazil average monthly soybean exports to China, 2019-22**



Source: Comex Stat, Ministério do Desenvolvimento, Indústria, Comércio e Serviços.

## Top 15 Brazilian soybean exporting states to China, 2020-22

State	2020	2021	2022	Rank
	1,000 metric ton			
Mato Grosso	11,466	12,326	14,226	1
Rio Grande do Sul	6,264	6,036	8,487	2
Paraná	8,102	11,733	4,575	3
Goiás	3,545	3,704	4,628	4
Mato Grosso do Sul	12,123	8,860	4,049	5
São Paulo	3,842	4,001	3,982	6
Minas Gerais	2,801	2,776	3,367	7
Bahia	3,917	4,411	2,800	8
Tocantins	1,565	1,680	2,195	9
Maranhão	1,707	1,920	2,015	10
Santa Catarina	888	966	1,294	11
Piauí	1,776	1,258	801	12
Pará	883	552	649	13
Distrito Federal	94	83	143	14
Rondônia	30	1	51	15
Others	1,594	168	353	
<b>Brazil exports to China</b>	<b>60,596</b>	<b>60,476</b>	<b>53,616</b>	
<b>Brazil total exports</b>	<b>82,968</b>	<b>86,100</b>	<b>78,726</b>	

Source: Comex Stat, Ministério do Desenvolvimento, Indústria, Comércio e Serviços.

## Top 15 Mato Grosso soybean export destinations, 2020-22

State	2020	2021	2022	% share	Rank
	metric ton				
China	11,465,981	12,325,965	14,226,279	57.4	1
Spain	1,603,747	1,918,123	1,465,110	5.9	2
Netherlands	2,095,566	1,472,851	1,176,168	4.7	3
Turkey	1,336,095	1,276,784	826,619	3.3	4
Russia	353,948	512,512	800,869	3.2	5
Thailand	848,095	818,667	720,269	2.9	6
Algeria	205,340	271,435	648,701	2.6	7
Iran	315,435	337,003	558,501	2.3	8
Mexico	645,568	895,521	529,627	2.1	9
Italy	433,328	580,995	396,602	1.6	10
United Kingdom	362,402	169,873	345,247	1.4	11
Pakistan	341,444	511,298	325,565	1.3	12
Taiwan	164,840	241,475	301,043	1.2	13
Bangladesh	127,125	308,091	306,007	1.2	14
Saudi Arabia	189,440	215,781	268,071	1.1	15
Others	1,837,643	1,909,298	1,870,072	7.6	
<b>Mato Grosso total</b>	<b>22,325,999</b>	<b>23,765,673</b>	<b>24,764,750</b>	<b>100.0</b>	
		<b>2020</b>	<b>2021</b>	<b>2022</b>	
MT % share of Brazil exports to China		18.9	20.4	26.5	
Brazil exports to China		60,595,851	60,476,116	53,615,702	
Brazil total exports		82,968,242	86,100,404	76,726,374	
China % share of Brazil total exports		73.0	70.2	68.1	

Source: Comex Stat, Ministério do Desenvolvimento, Indústria, Comércio e Serviços.

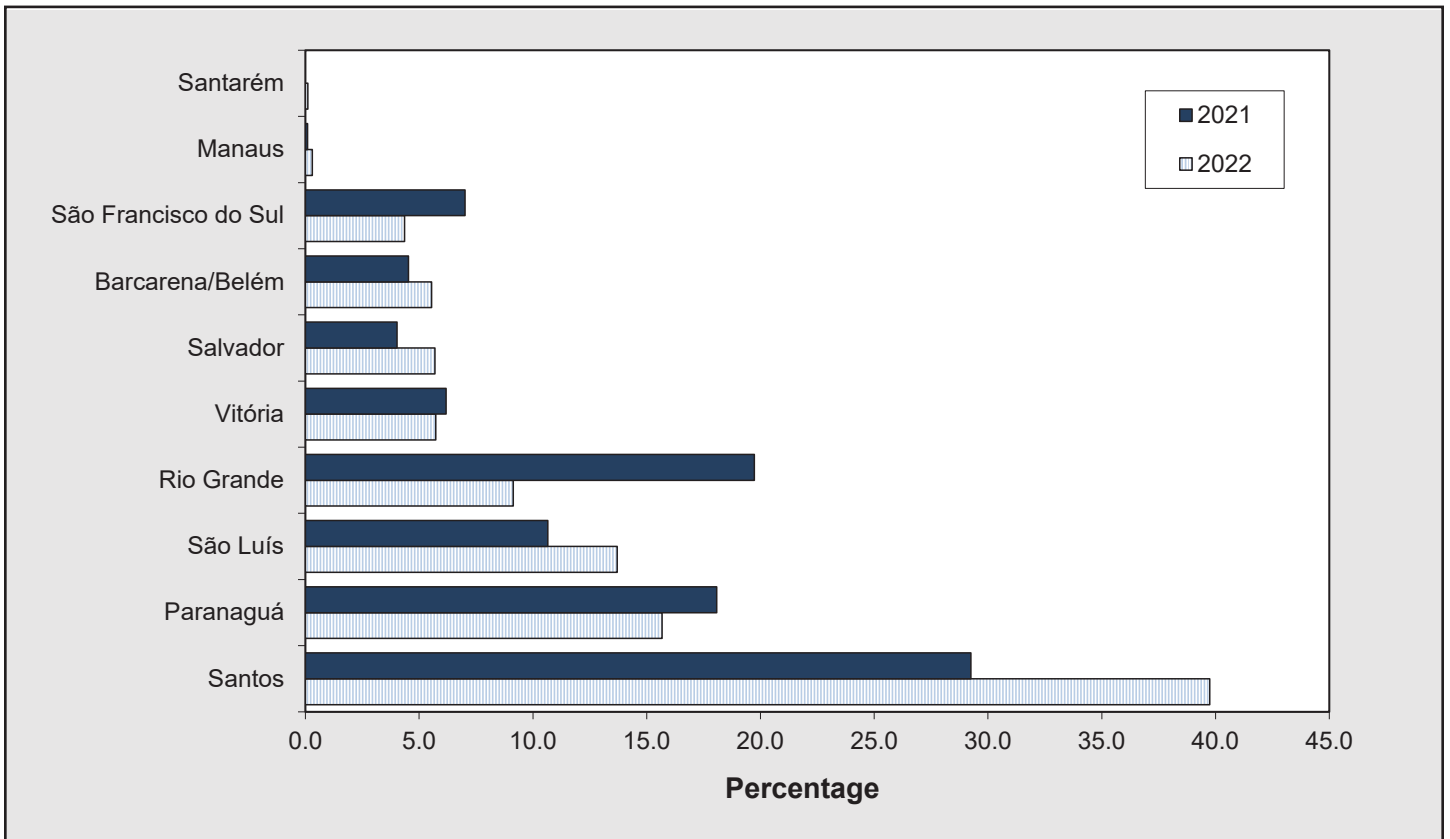
The southern ports of Santos, Rio Grande, Paranaguá, and São Francisco do Sul still dominate Brazil's soybean trade to China, accounting for 69 percent of Brazil's soybean exports to China. The northeastern ports of São Luís, Vitória, Salvador, and Barcarena accounted for 31 percent of soybean exports to China in 2022. The Amazon River ports of Manaus and Santarém accounted for a small amount of soybean exports to China in 2022.

### Total Brazilian soybean exports by port to China, 2020-22

Ports	2020	2021	2022
	metric ton		
Santos	17,392,177	17,688,345	21,310,999
Paranaguá	13,378,303	10,934,936	8,406,844
São Luís	6,239,866	6,441,382	7,350,074
Rio Grande	8,949,582	11,931,608	4,894,756
Vitória	3,658,272	3,741,690	3,072,298
<b>Subtotal</b>	<b>49,618,200</b>	<b>50,737,962</b>	<b>45,034,973</b>
Others	10,977,651	9,738,154	8,580,729
<b>Total exports to China</b>	<b>60,595,851</b>	<b>60,476,116</b>	<b>53,615,702</b>
<b>Brazil total exports</b>	<b>82,968,242</b>	<b>86,100,404</b>	<b>78,726,374</b>
Ports	2020	2021	2022
	% share of exports to China		
Santos	28.7	29.2	39.7
Paranaguá	22.1	18.1	15.7
São Luís	10.3	10.7	13.7
Rio Grande	14.8	19.7	9.1
Vitória	6.0	6.2	5.7
<b>Subtotal</b>	<b>81.9</b>	<b>83.9</b>	<b>84.0</b>
Others	18.1	16.1	16.0
<b>Total exports to China</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
Ports	2020	2021	2022
	% share of Brazil total exports		
Santos	21.0	20.5	27.1
Paranaguá	16.1	12.7	10.7
São Luís	7.5	7.5	9.3
Rio Grande	10.8	13.9	6.2
Vitória	4.4	4.3	3.9
<b>Subtotal</b>	<b>59.8</b>	<b>58.9</b>	<b>57.2</b>
Others	13.2	11.3	10.9
<b>Total exports to China</b>	<b>73.0</b>	<b>70.2</b>	<b>68.1</b>

Source: Comex Stat, Ministério do Desenvolvimento, Indústria, Comércio e Serviços.

## Brazil soybean exports to China by port, 2021-22



Source: Comex Stat, Ministério do Desenvolvimento, Indústria, Comércio e Serviços.

## Distance from selected Brazilian ports to Shanghai, China, and Hamburg, Germany

Brazilian port	Region	Route through	Destination	Nautical miles	Days at sea*
Santos, São Paulo	South	Good Hope	Shanghai, China	11,056	32.2
Santos, São Paulo	South	Direct	Hamburg, Germany	5,683	16.2
Rio Grande, Rio Grande do Sul	South	Good Hope	Shanghai, China	11,129	33.0
Rio Grande, Rio Grande do Sul	South	Panama Canal	Shanghai, China	13,564	40.1
Rio Grande, Rio Grande do Sul	South	Cape Horn	Shanghai, China	11,397	33.2
Rio Grande, Rio Grande do Sul	South	Direct	Hamburg, Germany	6,204	18.1
Paranaguá, Paraná	South	Good Hope	Shanghai, China	11,111	33.0
Paranaguá, Paraná	South	Panama Canal	Shanghai, China	13,165	39.0
Paranaguá, Paraná	South	Direct	Hamburg, Germany	5,805	17.1
São Francisco do Sul, Santa Catarina	South	Good Hope	Shanghai, China	11,111	33.4
São Francisco do Sul, Santa Catarina	South	Direct	Hamburg, Germany	5,805	17.1
Itajaí, Santa Catarina	South	Good Hope	Shanghai, China	13,158	39.2
Itajaí, Santa Catarina	South	Direct	Hamburg, Germany	7,289	21.7
Vitória, Espírito Santo	Southeast	Good Hope	Shanghai, China	10,857	32.1
Vitória, Espírito Santo	Southeast	Panama Canal	Shanghai, China	12,587	37.1
Vitória, Espírito Santo	Southeast	Direct	Hamburg, Germany	5,227	15.1
Salvador, Bahia	Northeast	Good Hope	Shanghai, China	10,997	32.2
Salvador, Bahia	Northeast	Panama Canal	Shanghai, China	12,170	36.1
Salvador, Bahia	Northeast	Direct	Hamburg, Germany	4,811	14.1
Aratu, Bahia	Northeast	Good Hope	Shanghai, China	10,997	32.2
Aratu, Bahia	Northeast	Panama Canal	Shanghai, China	12,170	36.1
Aratu, Bahia	Northeast	Direct	Hamburg, Germany	4,811	14.1
Itaquí/São Luís - Ponta de Madeira, Maranhão	Northeast	Good Hope	Shanghai, China	11,708	34.2
Itaquí/São Luís - Ponta de Madeira, Maranhão	Northeast	Panama Canal	Shanghai, China	11,087	33.0
Itaquí/São Luís - Ponta de Madeira, Maranhão	Northeast	Direct	Hamburg, Germany	4,361	13.0
Santarém, Pará** Reference point for Itaituba/Miritituba	North	Good Hope	Shanghai, China	12,305	37.8
Santarém, Pará** Reference point for Itaituba/Miritituba	North	Panama Canal	Shanghai, China	11,200	33.1
Santarém, Pará** Reference point for Itaituba/Miritituba	North	Direct	Hamburg, Germany	4,750	14.2
Manaus, Amazonas	North	Good Hope	Shanghai, China	12,880	38.0
Manaus, Amazonas	North	Panama Canal	Shanghai, China	10,926	32.1
Manaus, Amazonas	North	Direct	Hamburg, Germany	5,283	15.2
Barcarena, Pará**	North	Good Hope	Shanghai, China	11,905	35.6
Barcarena, Pará**	North	Panama Canal	Shanghai, China	10,950	32.6
Barcarena, Pará**	North	Direct	Hamburg, Germany	4,510	13.6

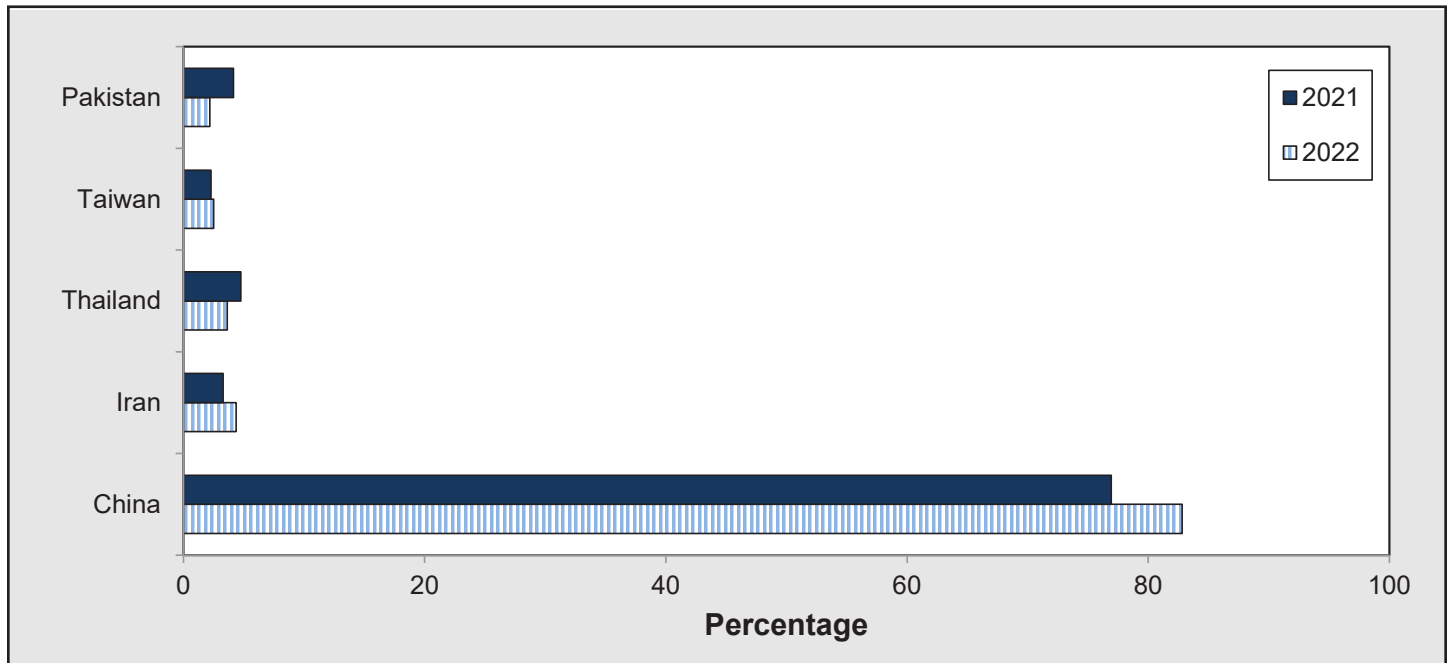
\*Vessel speed: 14 knots.

\*\*Barcarena is located 49 nautical miles from Belém; Itaituba is located 140 nautical miles from Santarém.

Sources: <http://sea-distances.com/> and [Ports.com](http://Ports.com).

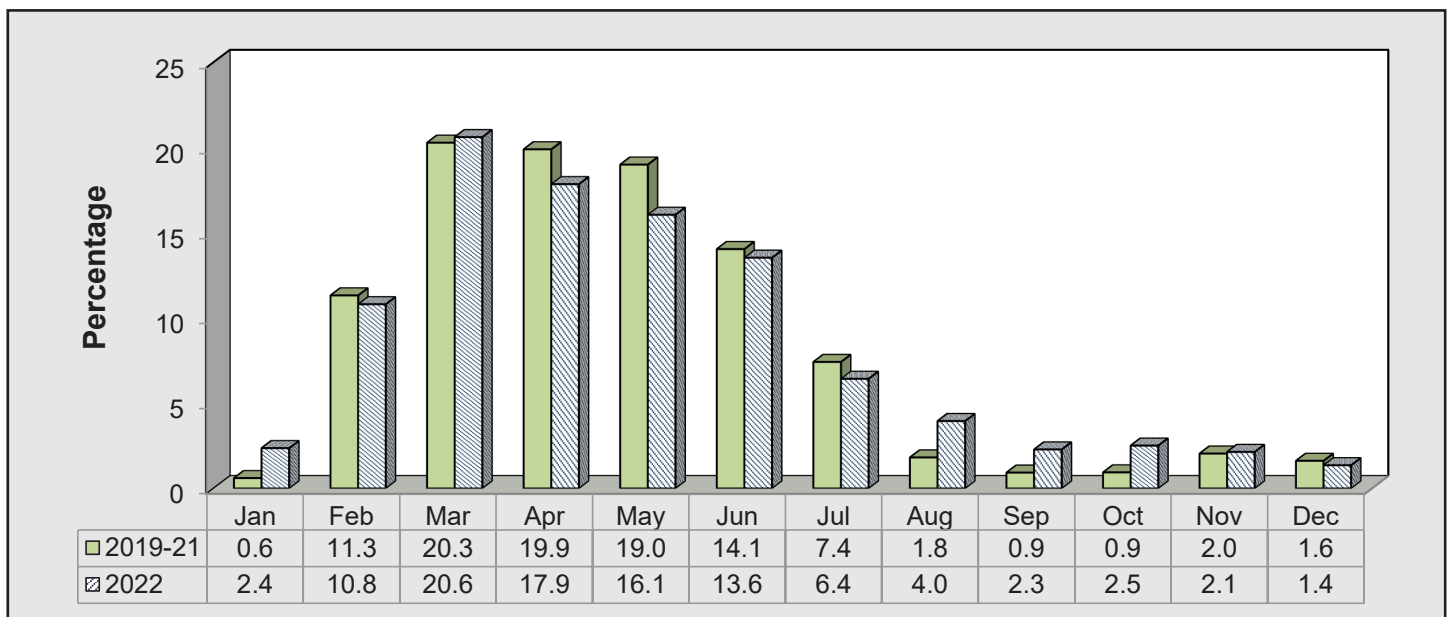
In 2022, China was the major destination for Brazilian soybeans through the port of Santos, Brazil's largest soybean-exporting port. The next-largest destinations (in descending order) were Iran, Thailand, Taiwan, and Pakistan. The peak of soybean shipments to China from Santos usually occurs from March to May. Nearly 44 percent of the soybean exports through Santos originated from Mato Grosso, followed (in descending order) by the origins of Goiás, Minas Gerais, São Paulo, and Mato Grosso do Sul.

### Port of Santos soybean exports by country, 2021-22



Source: Comex Stat, Ministério do Desenvolvimento, Indústria, Comércio e Serviços.

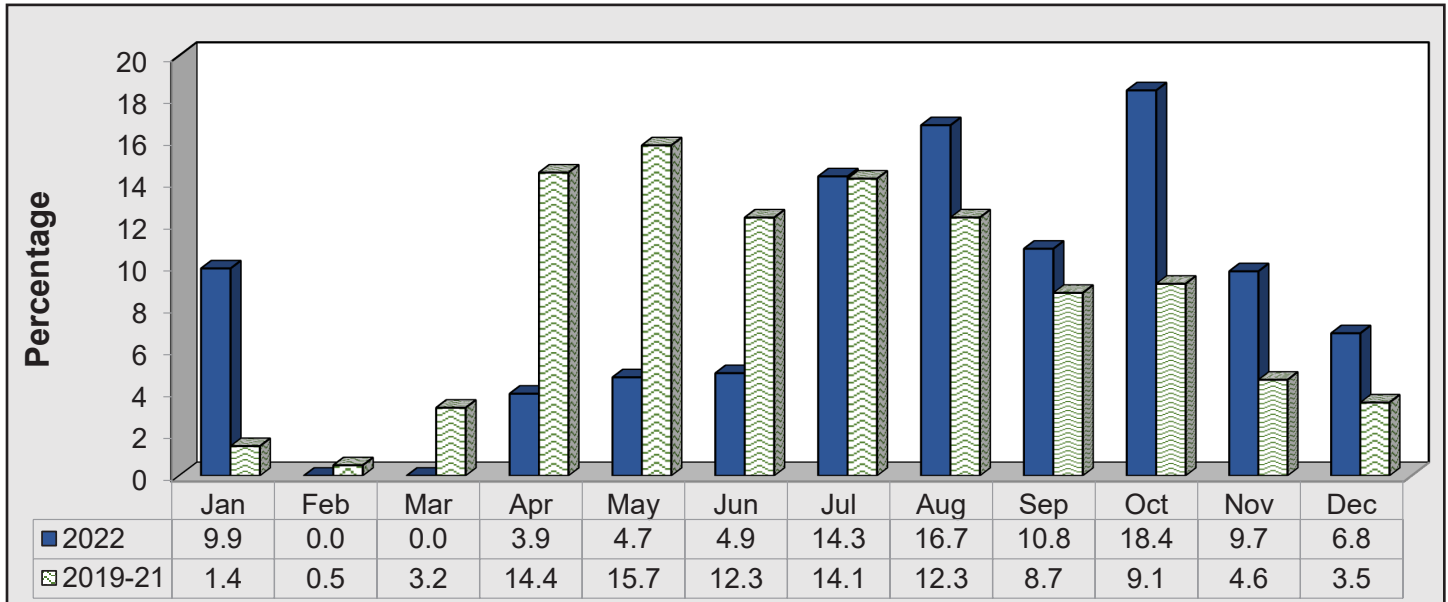
### Port of Santos average monthly soybean exports to China, 2019-22



Source: Comex Stat, Ministério do Desenvolvimento, Indústria, Comércio e Serviços.

China was the major destination for Brazilian soybeans via the port of Rio Grande, accounting for 86 percent, followed by Iran, Vietnam, Thailand, and Taiwan. Typically, soybean shipments to China through the port of Rio Grande peak from April to July. About 94 percent of the soybean exports through the Port of Rio Grande originated from Rio Grande do Sul. The next-highest levels of exports originated (in descending order) from the following ports: Mato Grosso do Sul, Paraná, Goiás, and Santa Catarina.

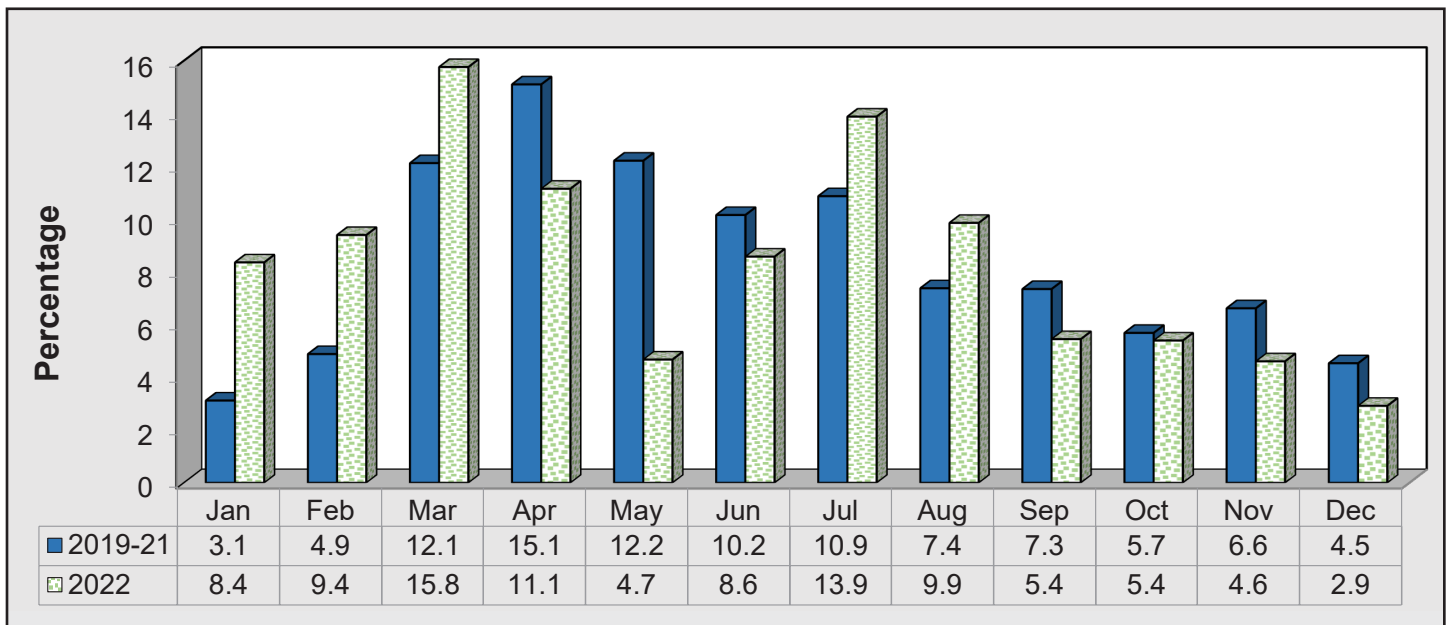
### Port of Rio Grande average monthly soybean exports to China, 2019-22



Source: Comex Stat, Ministério do Desenvolvimento, Indústria, Comércio e Serviços.

China was the top Brazilian soybean export destination through the Port of Paranaguá. The next-largest export destinations (in descending order) were South Korea, Iran, Thailand, and Pakistan. Typically, soybean shipments to China from Paranaguá peak from March to May. Thirty-eight percent of Paranaguá exports originated from Paraná. The next-highest levels of Paranaguá exports (in descending order) originated from Mato Grosso do Sul, Goiás, São Paulo, and Mato Grosso.

### Port of Paranaguá average monthly soybean exports to China, 2019-22

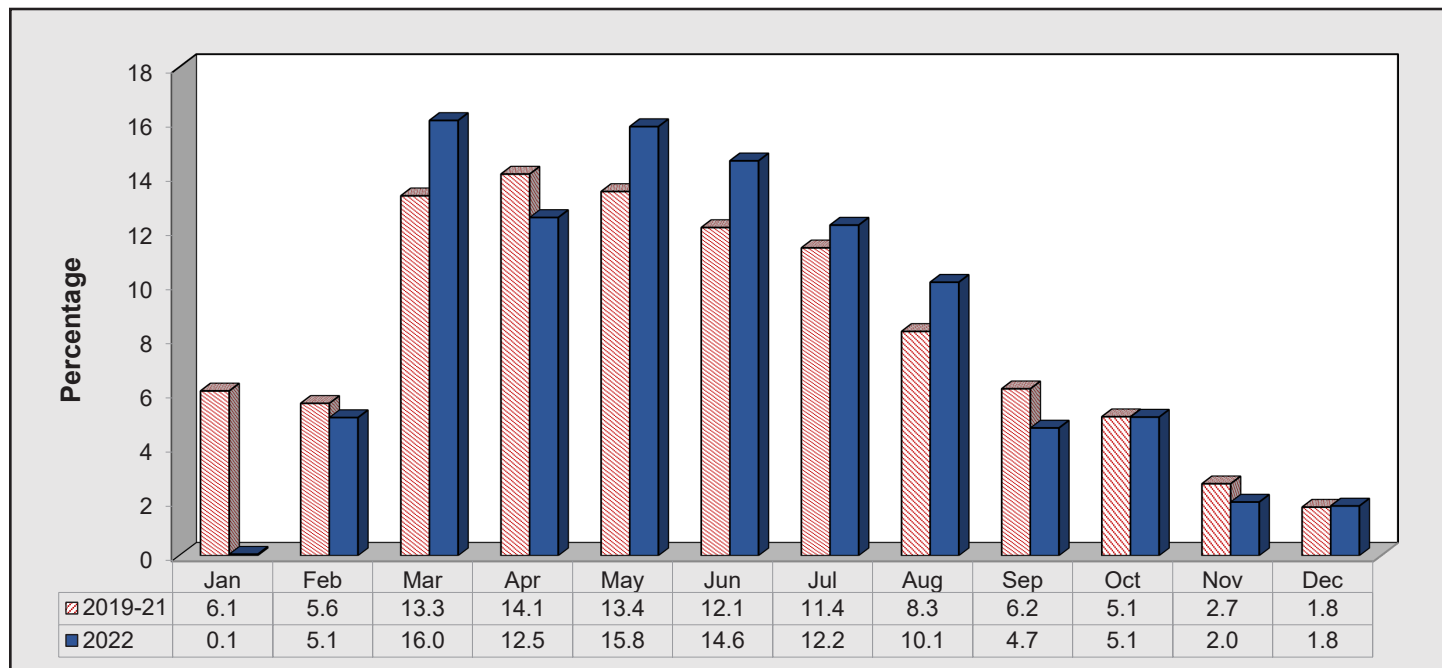


Source: Comex Stat, Ministério do Desenvolvimento, Indústria, Comércio e Serviços.



China was top Brazilian soybean export destination through the Port of São Luís, accounting for nearly 66 percent. The next-largest export destinations (in descending order) were Spain, Turkey, Thailand, and Bangladesh. Typically, soybean shipments to China from the Port of São Luís peak from March to July. About 58 percent of exports of the port of São Luís originated from Tocantins and Maranhão. The next-highest levels of São Luís exports (in descending order) originated from Mato Grosso, Piauí, Bahia, and Pará.

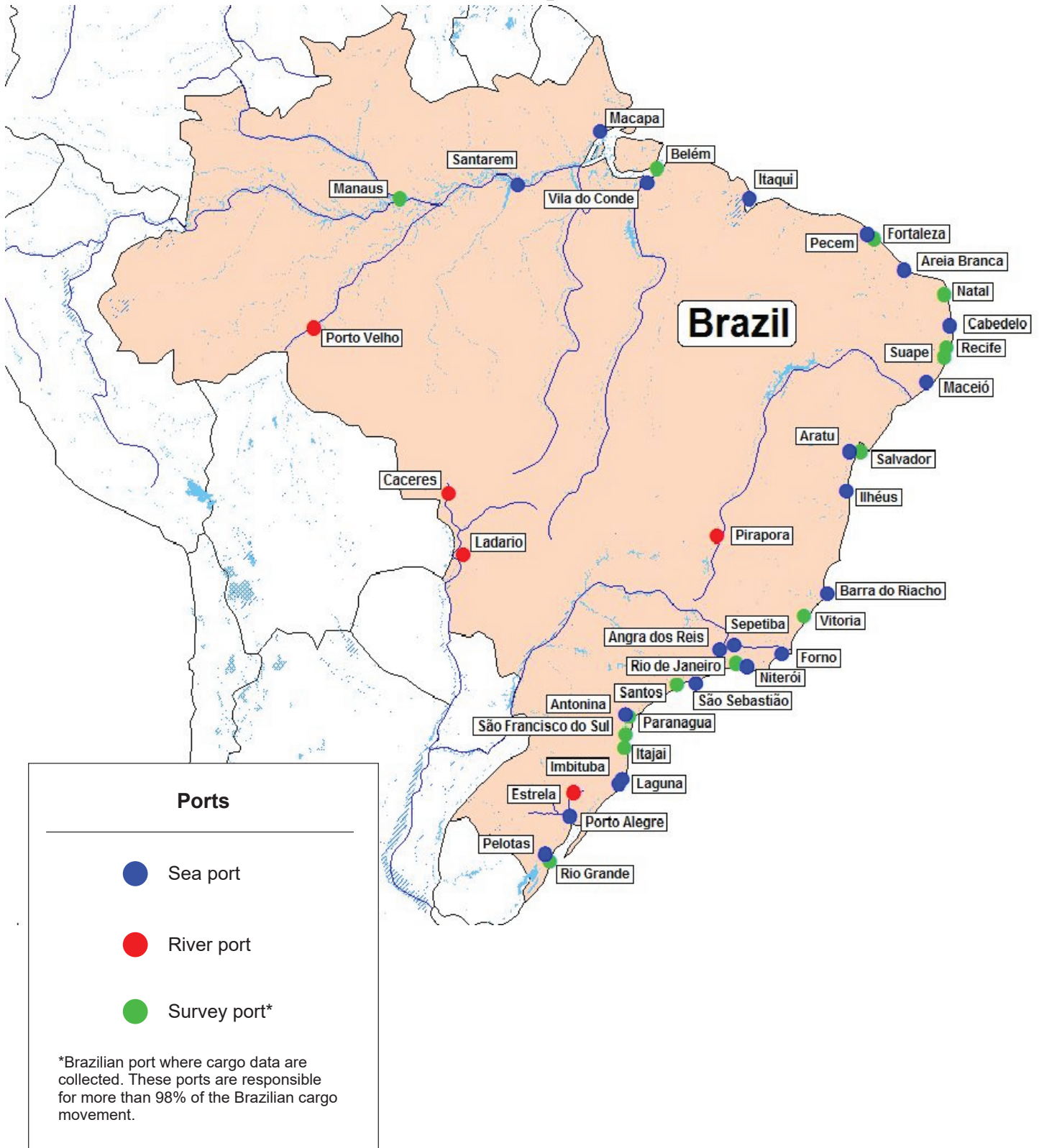
### Port of São Luís average monthly soybean exports to China, 2019-22



Source: Comex Stat, Ministério do Desenvolvimento, Indústria, Comércio e Serviços.

# Transportation Modes

## Brazilian ports



Sources: Companhia Nacional de Abastecimento (CONAB) and Ministério dos Transportes, Brazil.

## Major rivers of the Amazonian Basin



Source: National Agency for Waterway Transportation (ANTAQ).

Brazil's waterways encompass 22, 567 nautical miles, but only 10,531 are commercially navigated.

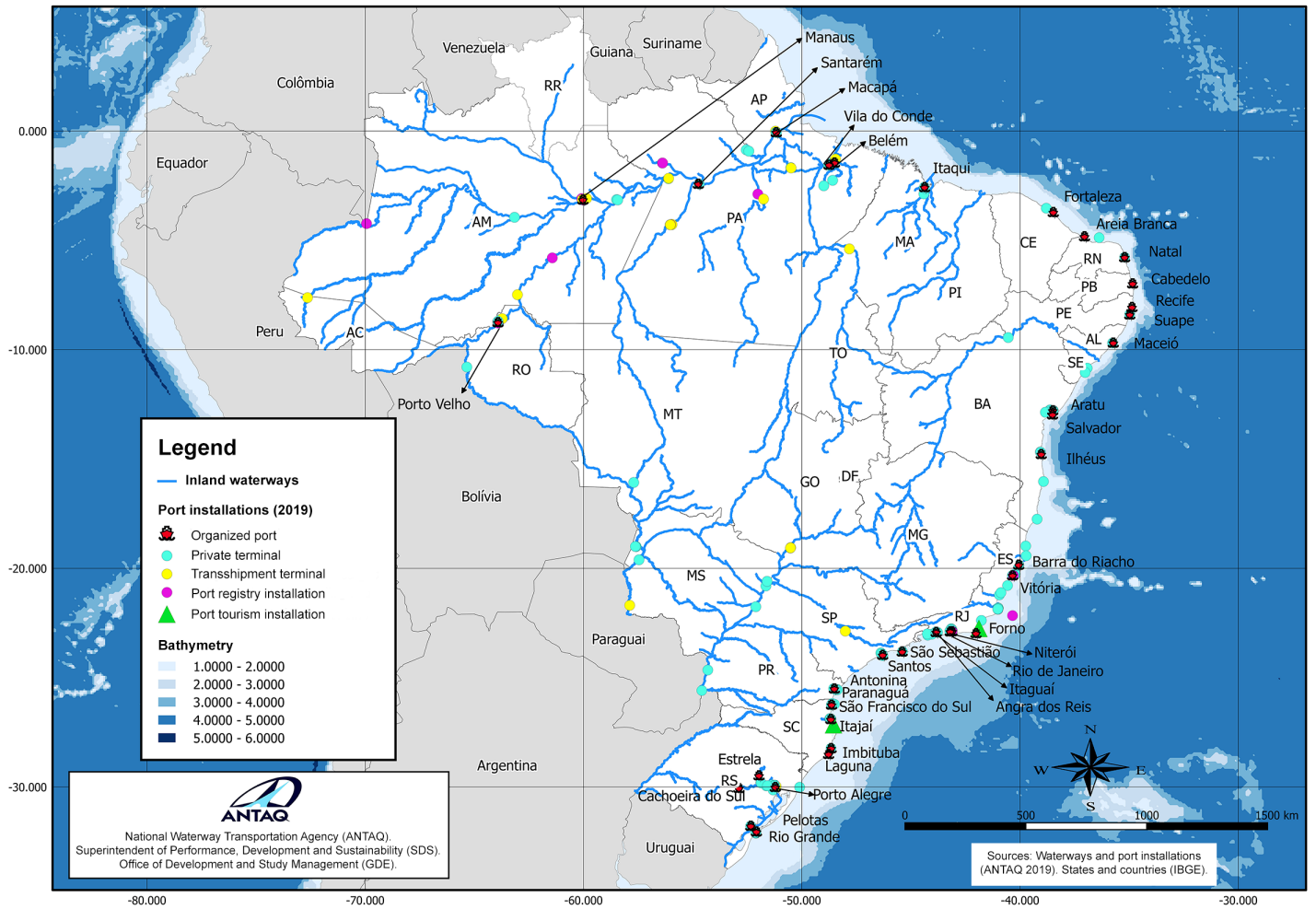
### Brazil waterway system

Extension	Nautical miles
Waterways	22,567
Commercial navigations	10,531

Source: Confederação Nacional do Transporte.

## Brazilian port installations

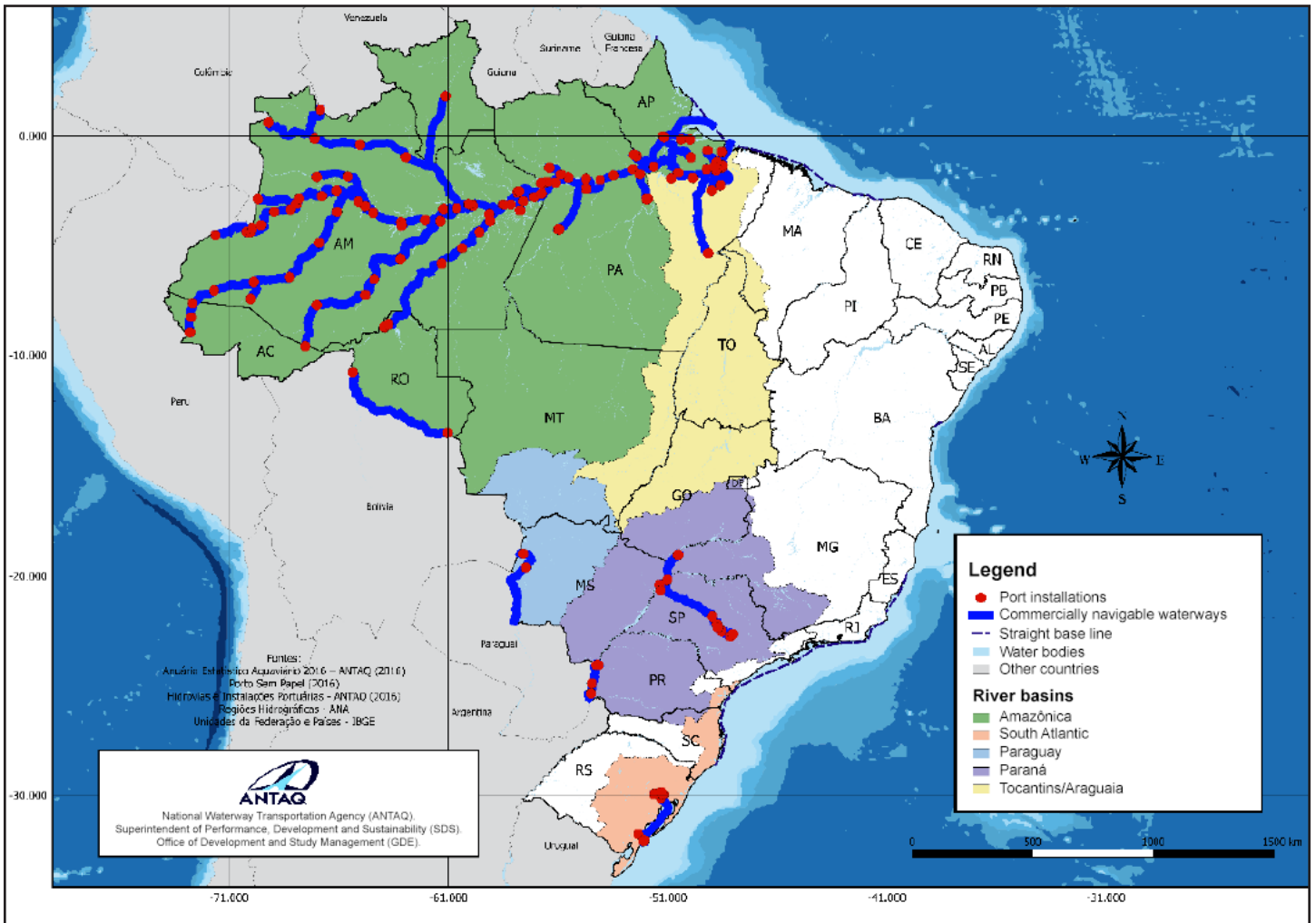
The Port of Manaus access channel is 1,640 ft wide and 114.8 ft deep. Porto Velho's access channel depth varies from 8.2 to 57.4 ft. The Port of Santarém's access channel is 5,904 ft wide and 49.2 ft deep.



Source: Agência Nacional de Transportes Aquaviários (ANTAQ).



# Brazilian commercial inland waterways



Source: Agência Nacional de Transportes Aquavários.

# Major Brazilian highways



Source: Confederação Nacional do Transporte.

The Brazilian highway system extends 969,432 miles (1,563,600 kilometers), with nearly 14 percent paved. The U.S. highway system consists of 4,194,252 miles (6,749,978 kilometers).

### Brazil highway system, 2022

	Miles	% Paved	% Unpaved
Federal	46,113	89	11
State and county	923,319	10	90
<b>Total (federal + state and county)</b>	<b>969,432</b>		
<b>All roads</b>		<b>14</b>	<b>86</b>

Source: Confederação Nacional do Transporte (CNT).

### U.S. highway system, 2021

	Extension <sup>1</sup> (in miles)	% Share
Rural	2,939,099	70
Urban	1,255,154	30
<b>Total</b>	<b>4,194,252</b>	

<sup>1</sup>Includes the 50 States, Puerto Rico (data may be incomplete), and the District of Columbia. Please note that due to data review and production issues with the 2021 Highway Performance Monitoring System Field Manual (HPMS) data, some anomalous and/or missing data may exist.

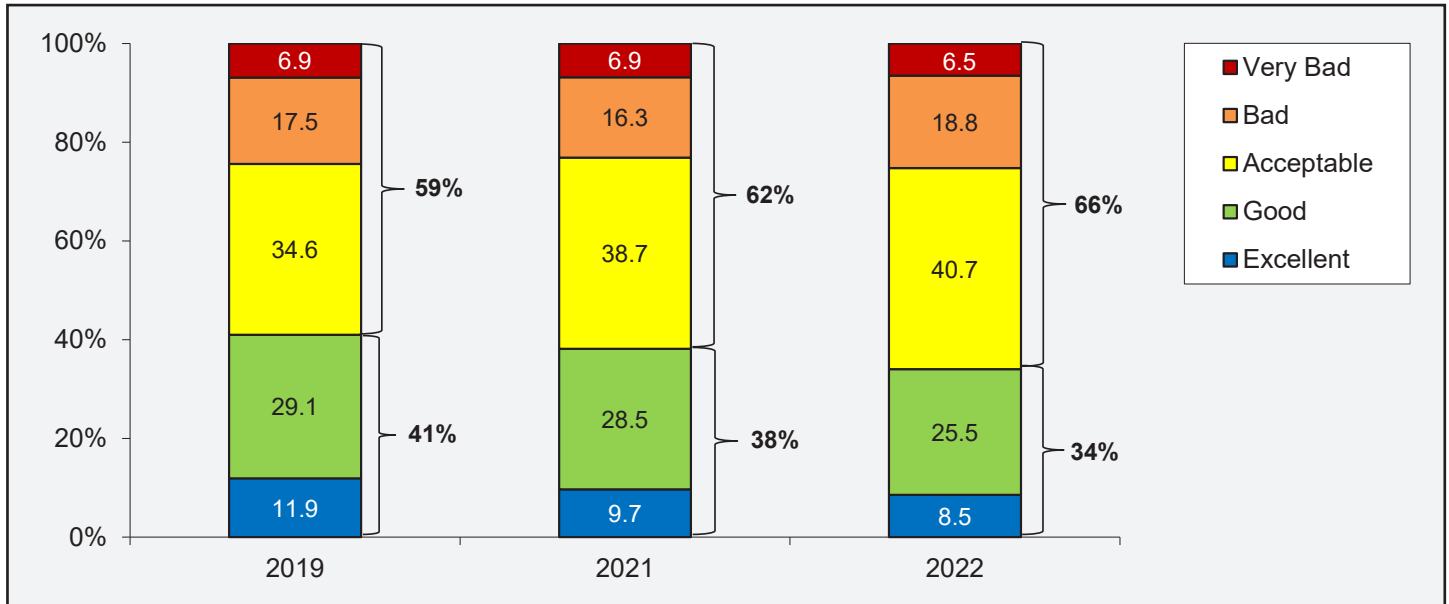
Source: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: Annual Issues); *Highway Statistics, 2021*.



## Brazilian highways

According to the 2022 Confederação Nacional do Transporte (CNT) survey of the overall highway conditions in Brazil, 34 percent of the roads ranged from good to excellent in 2022 (versus 38 percent in that range in 2021). The remaining 66 percent ranged from acceptable to very bad. Also, in 2022, 44 percent of the paved roads were in good to excellent condition; 39 percent of traffic road signs had problems; and 85 percent of the paved roads had only two lanes. The survey sample of paved roads increased by 1 percent from 67,644 miles in 2021 to 68,406 miles in 2022.

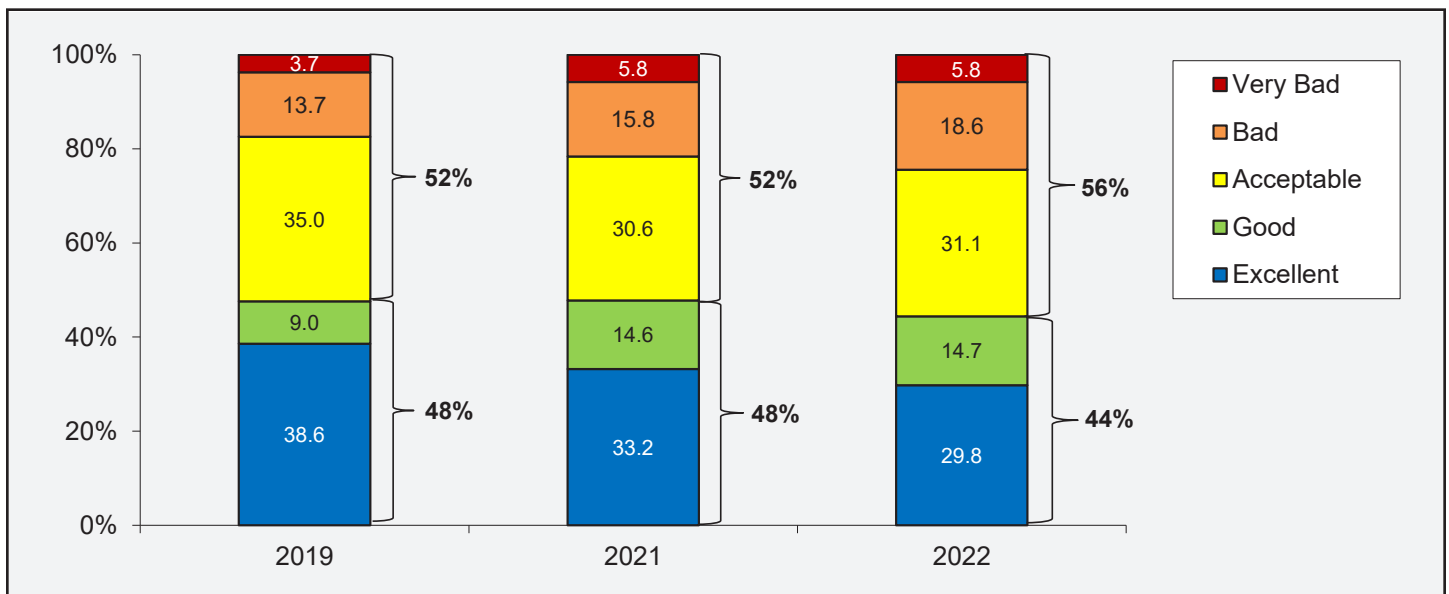
### Brazilian highway conditions, 2019-22



Note: Data for 2020 are not available.

Source: Confederação Nacional do Transporte (CNT).

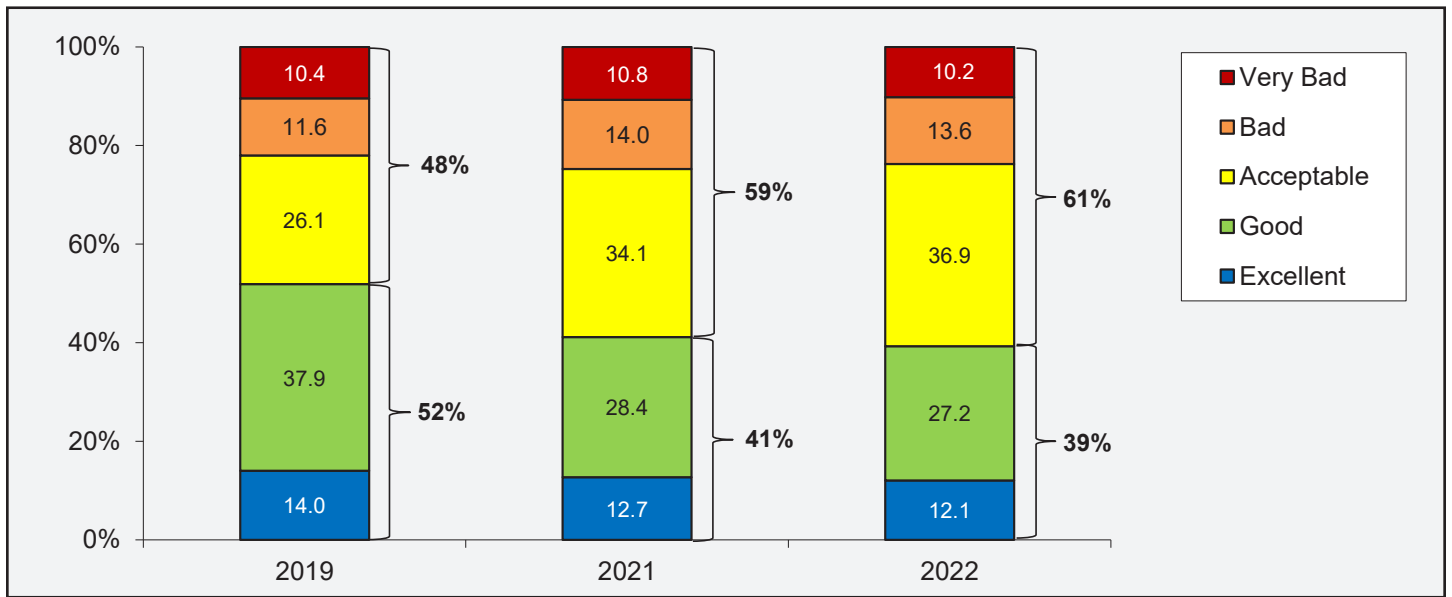
### Brazilian paved highway conditions, 2019-22



Note: Data for 2020 are not available.

Source: Confederação Nacional do Transporte (CNT).

## Brazilian road sign conditions, 2019-22

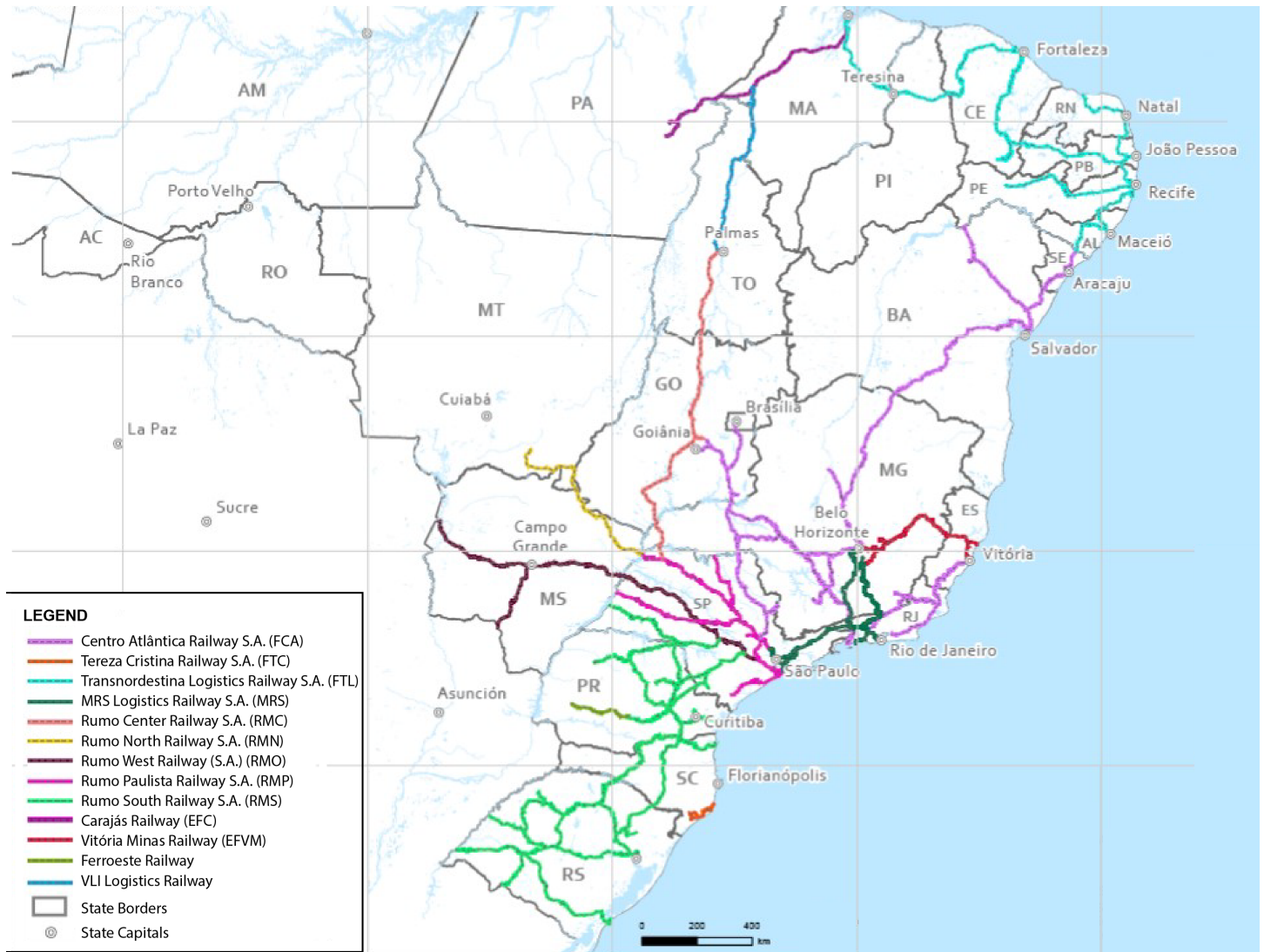


Note: Data for 2020 are not available.

Source: Confederação Nacional do Transporte (CNT).

## Brazilian railway expansion: ongoing projects

The Brazilian railroad system consists of 13 railroads, with an extension of 19,047 miles (30,653 km), mostly concentrated in the South, Southeast, and Northeast.



Source: Agência Nacional de Transportes Terrestres (ANTT).

## Brazilian rail system: gauge sizes

The gauge system (distance between two rails) varies by region, creating difficulties in integrating the system in regions like North America, which uses a standard gauge. There are three types of gauges: metric (39"), broad (63"), and mixed (39" - 63"). The metric gauge accounts for 76 percent of total Brazilian rail miles and predominates in the Southern region. The broad gauge accounts for 22 percent of total railroads and prevails in the Southeast region, leaving about 2 percent as mixed gauge.



Source: Grupo de Pesquisa e Extensão em Logística Agroindustrial (ESALQ-LOG)/University of São Paulo, Brazil, based on data from the Ministry of Infrastructure 2023.

# Reference Material

## Quarterly costs of transporting U.S. soybeans to Hamburg, Germany, via U.S. Gulf, 2022

	Minneapolis, Minnesota (US\$/mt)				
	2022 1st qtr.	2022 2nd qtr.	2022 3rd qtr.	2022 4th qtr.	2022 Average
Truck	16.67	23.40	19.07	16.31	18.86
Rail <sup>1</sup>	38.04	-	-	-	38.04
Barge <sup>2</sup>	29.07	44.56	46.33	94.50	53.62
Ocean <sup>3</sup>	25.88	33.35	32.08	29.17	30.12
Total transportation	109.66	101.31	97.48	139.98	112.11
Farm price <sup>4</sup>	527.88	589.12	531.56	509.51	539.52
Landed cost <sup>5</sup>	637.54	690.43	629.04	649.49	651.63
Transport % of landed cost	17.2	14.7	15.5	21.6	17.2
	Davenport, Iowa (US\$/mt)				
	2022 1st qtr.	2022 2nd qtr.	2022 3rd qtr.	2022 4th qtr.	2022 Average
Truck	16.67	23.40	19.07	16.31	18.86
Rail <sup>1</sup>	34.81	-	-	-	34.81
Barge <sup>2</sup>	29.07	34.72	36.95	78.46	44.80
Ocean <sup>3</sup>	25.88	33.35	32.08	29.17	30.12
Total transportation	106.43	91.47	88.10	123.94	102.49
Farm price <sup>4</sup>	519.31	581.78	551.16	515.64	541.97
Landed cost <sup>5</sup>	625.74	673.25	639.26	639.58	644.46
Transport % of landed cost	17.0	13.6	13.8	19.4	15.9

<sup>1</sup>Rail rates include fuel surcharges, but do not include the cost of purchasing empty rail cars in the secondary rail markets, which could exceed the rail tariff rate plus fuel surcharge shown in the table.

<sup>2</sup>The Mississippi River closes from Minneapolis to just north of St. Louis during mid-December to late March.

<sup>3</sup>Source for the U.S. ocean freight rates: O'Neil Commodity Consulting.

<sup>4</sup>Source for the U.S. farm prices: USDA, National Agricultural Statistics Service.

<sup>5</sup>Landed cost is transportation cost plus farm price.

Note: qtr.=quarter; yr.=year; mt=metric ton; total may not add exactly due to rounding.

Source: Compiled by the USDA, Agricultural Marketing Service.

## Quarterly costs of transporting U.S. soybeans to Shanghai, China, via U.S. Gulf, 2022

	Minneapolis, Minnesota (US\$/mt)				
	2022 1st qtr.	2022 2nd qtr.	2022 3rd qtr.	2022 4th qtr.	2022 Average
Truck	16.67	23.40	19.07	16.31	18.86
Rail <sup>1</sup>	38.04	-	-	-	38.04
Barge <sup>2</sup>	29.07	44.56	46.33	94.50	53.62
Ocean <sup>3</sup>	68.22	78.81	63.87	58.11	67.25
Total transportation	152.00	146.77	129.27	168.92	149.24
Farm price <sup>4</sup>	527.88	589.12	531.56	509.51	539.52
Landed cost <sup>5</sup>	679.88	735.89	660.83	678.43	688.76
Transport % of landed cost	22.4	19.9	19.6	24.9	21.7
	Davenport, Iowa (US\$/mt)				
	2022 1st qtr.	2022 2nd qtr.	2022 3rd qtr.	2022 4th qtr.	2022 Average
Truck	16.67	23.40	19.07	16.31	18.86
Rail <sup>1</sup>	34.81	-	-	-	34.81
Barge <sup>2</sup>	29.07	34.72	36.95	78.46	44.80
Ocean <sup>3</sup>	68.22	78.81	63.87	58.11	67.25
Total transportation	148.77	136.93	119.89	152.88	139.62
Farm price <sup>4</sup>	519.31	581.78	551.16	515.64	541.97
Landed cost <sup>5</sup>	668.08	718.71	671.05	668.52	681.59
Transport % of landed cost	22.3	19.1	17.9	22.9	20.5

<sup>1</sup>Rail rates include fuel surcharges, but do not include the cost of purchasing empty rail cars in the secondary rail markets, which could exceed the rail tariff rate plus fuel surcharge shown in the table.

<sup>2</sup>The Mississippi River closes from Minneapolis to just north of St. Louis during mid-December to late March.

<sup>3</sup>Source for the U.S. ocean freight rates: O'Neil Commodity Consulting.

<sup>4</sup>Source for the U.S. farm prices: USDA, National Agricultural Statistics Service.

<sup>5</sup>Landed cost is transportation cost plus farm price.

Note: qtr.=quarter; yr.=year; mt=metric ton; total may not add exactly due to rounding.

Source: Compiled by the USDA, Agricultural Marketing Service.

## Quarterly costs of transporting U.S. soybeans to Shanghai, China, via PNW, 2022

	Fargo, North Dakota (US\$/mt)				
	2022 1st qtr.	2022 2nd qtr.	2022 3rd qtr.	2022 4th qtr.	2022 Average
Truck	16.67	23.40	19.07	16.31	18.86
Rail <sup>1</sup>	59.09	59.09	68.96	69.00	64.04
Ocean <sup>2</sup>	37.68	44.65	37.41	33.53	38.32
Total transportation	113.44	127.14	125.44	118.84	121.22
Farm price <sup>3</sup>	516.88	574.43	521.76	500.94	528.50
Landed cost <sup>4</sup>	630.32	701.57	647.20	619.78	649.72
Transport % of landed cost	18.0	18.1	19.4	19.2	18.7
	Sioux Falls, South Dakota (US\$/mt)				
	2022 1st qtr.	2022 2nd qtr.	2022 3rd qtr.	2022 4th qtr.	2022 Average
Truck	16.67	23.40	19.07	16.31	18.86
Rail <sup>1</sup>	60.08	60.08	71.06	70.86	65.52
Ocean <sup>2</sup>	37.68	44.65	37.41	33.53	38.32
Total transportation	114.43	128.13	127.54	120.70	122.70
Farm price <sup>3</sup>	531.36	580.55	537.68	516.86	541.61
Landed cost <sup>4</sup>	645.79	708.68	665.22	637.56	664.31
Transport % of landed cost	17.7	18.1	19.2	18.9	18.5

<sup>1</sup>Rail rates include fuel surcharges, but do not include the cost of purchasing empty rail cars in the secondary rail markets, which could exceed the rail tariff rate plus fuel surcharge shown in the table.

<sup>2</sup>Source for the U.S. ocean freight rates: O'Neil Commodity Consulting.

<sup>3</sup>Source for the U.S. farm prices: USDA, National Agricultural Statistics Service.

<sup>4</sup>Landed cost is transportation cost plus farm price.

Note: qtr.=quarter; yr.=year; mt=metric ton; total may not add exactly due to rounding.

Source: Compiled by the USDA, Agricultural Marketing Service.

## Average quarterly exchange rate, 2015-22

Quarter	Real per US\$	Quarter	Real per US\$
1st	2.8637	1st	3.7684
2nd	3.0722	2nd	3.9221
3rd	3.5480	3rd	3.9736
4th	3.8426	4th	4.1144
<b>2015 Average</b>	<b>3.3316</b>	<b>2019 Average</b>	<b>3.9446</b>
1st	3.8999	1st	4.4651
2nd	3.5076	2nd	5.3848
3rd	3.2912	3rd	5.3766
4th	3.2953	4th	5.3915
<b>2016 Average</b>	<b>3.4985</b>	<b>2020 Average</b>	<b>5.1545</b>
1st	3.1429	1st	5.4827
2nd	3.2137	2nd	5.2901
3rd	3.1639	3rd	5.2280
4th	3.2506	4th	5.5853
<b>2017 Average</b>	<b>3.1928</b>	<b>2021 Average</b>	<b>5.3965</b>
1st	3.2425	1st	5.2234
2nd	3.7732	2nd	4.9260
3rd	3.9505	3rd	5.2456
4th	3.8084	4th	5.2548
<b>2018 Average</b>	<b>3.6936</b>	<b>2022 Average</b>	<b>5.1624</b>

Source: Banco Central do Brasil



## Selected quarterly Brazilian farm prices, 2017-22 (US\$/metric ton)

Quarter	Rio Grande do Sul	Mato Grosso	Goiás	Paraná	Piauí	Pará	Maranhão
1st	347.99	314.10	332.40	344.08	210.49	362.30	356.01
2nd	302.06	275.60	281.73	304.50	304.16	313.78	327.17
3rd	317.17	288.62	291.58	313.53	306.34	324.84	340.58
4th	321.99	296.10	302.26	324.03	311.19	339.05	349.81
<b>2017 Avg</b>	<b>322.30</b>	<b>293.60</b>	<b>301.99</b>	<b>321.54</b>	<b>283.05</b>	<b>334.99</b>	<b>343.39</b>
1st	334.43	305.85	318.87	338.61	321.69	344.84	357.97
2nd	343.90	323.46	313.65	347.41	320.70	343.23	342.78
3rd	326.13	301.39	302.33	330.85	290.62	323.15	305.07
4th	328.39	293.43	314.40	319.39	292.04	344.82	326.30
<b>2018 Avg</b>	<b>333.21</b>	<b>306.03</b>	<b>312.31</b>	<b>334.06</b>	<b>306.26</b>	<b>339.01</b>	<b>333.03</b>
1st	308.52	275.38	296.01	304.16	292.96	317.97	298.43
2nd	294.72	271.70	281.40	292.33	285.28	294.15	278.70
3rd	304.20	286.87	286.67	300.23	288.35	303.50	300.20
4th	314.81	307.47	301.77	313.72	316.88	316.00	310.87
<b>2019 Avg</b>	<b>305.56</b>	<b>285.35</b>	<b>291.46</b>	<b>302.61</b>	<b>295.87</b>	<b>307.90</b>	<b>297.05</b>
1st	300.04	282.59	285.74	301.23	302.03	302.01	300.23
2nd	297.17	287.53	262.95	285.62	286.59	283.28	294.95
3rd	367.58	367.89	333.43	343.91	344.92	346.83	359.63
4th	453.49	490.89	441.91	442.13	436.03	444.28	458.37
<b>2020 Avg</b>	<b>354.57</b>	<b>357.23</b>	<b>331.01</b>	<b>343.22</b>	<b>342.39</b>	<b>344.10</b>	<b>353.30</b>
1st	475.64	463.10	466.39	472.61	484.07	483.48	466.73
2nd	505.86	495.57	500.77	492.31	489.79	525.44	503.18
3rd	497.59	513.31	495.90	496.46	483.65	503.71	501.47
4th	478.45	457.88	456.20	471.40	445.58	488.97	468.17
<b>2021 Avg</b>	<b>489.39</b>	<b>482.47</b>	<b>479.82</b>	<b>483.19</b>	<b>475.78</b>	<b>500.40</b>	<b>484.89</b>
1st	604.37	550.71	553.47	584.53	543.56	587.96	558.85
2nd	617.87	566.29	565.92	598.83	585.80	615.15	591.24
3rd	552.66	514.98	513.50	539.82	529.04	557.88	545.43
4th	544.28	515.89	511.31	533.81	510.35	548.17	537.00
<b>2022 Avg</b>	<b>579.79</b>	<b>536.97</b>	<b>536.05</b>	<b>564.25</b>	<b>542.19</b>	<b>577.29</b>	<b>558.13</b>

Source: Companhia Nacional de Abastecimento (CONAB) [www.conab.gov.br](http://www.conab.gov.br)

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- 5) ESALQ-log