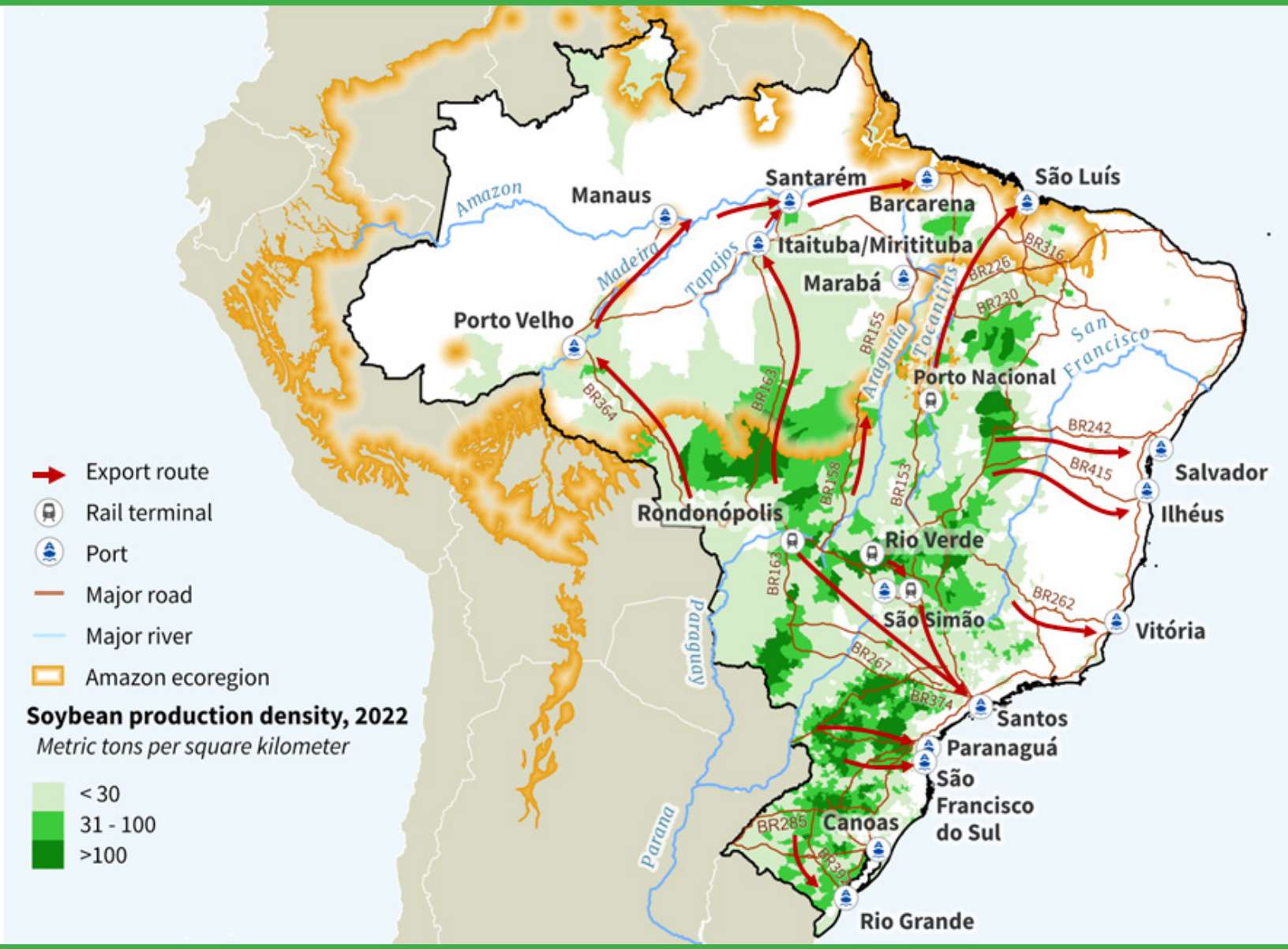
USDA Agricultural Marketing Service
U.S. DEPARTMENT OF AGRICULTURE

Soybean Transportation Guide
BRAZIL 2023



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Contents

Soybean Transportation Guide: Brazil 2023

Executive Summary

The *Soybean Transportation Guide* is a visual snapshot of Brazilian soybean transportation in 2023. 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 infrastructure developments.

As the foremost U.S. competitor in the world oilseed market, 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 mostly 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 and maintain its position as the top world soybean exporter. Although USDA forecasts Brazil will remain in that position through 2033, the United States retains a significant share of global soybean exports and continues to give Brazil substantial competition. The United States is the world's second-largest soybean exporter, followed by Paraguay, Argentina, and Canada. In 2023, Brazil's soybean exports reached a record high of nearly 102 million metric tons (mmt)—29 percent more than the country's 2022 total of 78.7 mmt. As the largest market for global soybean trade, China accounts for more than half of soybean imports worldwide.

Brazil's revamped transportation system resembles the U.S. system, leveraging all major modes (truck, barge, rail, and ocean vessel) and resembling the U.S. system. However, a number of challenges persist, including the long distances between major production regions and terminals for barge and rail, as well as limited rail and inland waterway infrastructure capacity. Most soybeans for domestic consumption are shipped long-haul distances by truck—an average of 574 miles (357 kilometers (km)) from farms to most destinations. From farms to rail and barge terminals, the average distance by truck is 440 miles (707 km). Railways haul soybeans an average distance of 651 miles.

Brazil loses some of its cost-advantage over the United States on long-distance shipments (more than 1,000 miles). From 2022 to 2023, for shipping soybeans from Sorriso, North Mato Grosso, to Shanghai, China, Brazil lost some of its transportation cost advantage over the U.S. Gulf routes and the U.S. Pacific Northwest (PNW) routes to Shanghai. That decline happened because U.S. transportation costs decreased for the period. (U.S. costs declined with a sharp drop in barge rates as a result of lower export sales.) In 2023, from Sorriso, North Mato Grosso, via barge to Barcarena, the cost per metric ton (mt) to ship soybeans to Shanghai, China, was $19.51 more than from Davenport, IA, via the U.S. Gulf. Shipments cost $28.83 per mt more from Sorriso, via Santos by rail, than from Davenport via the U.S. Gulf.

U.S. barge rates declined significantly because of lower export sales, which reduced demand for export-grain barge shipments. Plus, in 2023, the U.S. Army Corps of Engineers (USACE) minimized disruptions in the Mississippi River System by acting earlier than in 2022 to implement navigation restrictions. USACE also proactively dredged at the beginning of summer 2023, rather than waiting until mid-to-late summer, as in 2022.

From the Port of Santos, Sorriso is 1,190 miles away by truck or 1,401 miles, using a combination of truck (382 miles from the Rondonópolis rail terminal) and rail (1,019 miles). From the Port of Barcarena, Sorriso is about 1,272 miles away—600 miles by truck to the Itaituba/Miritituba barge terminal and another 600 nautical miles by barge.

Brazil's cost advantage over the United States on short-distance shipments (less than 700 miles) narrows. From 2022 to 2023, Brazil lost some of its cost advantage for short-distance shipments. In 2023, Brazil's cost advantage was notable when soybeans were shipped by rail or truck from Rio Verde, South Goiás, via Santos; Balsas, South Maranhão, via São Luís; or Cruz Alta, Northwest Rio Grande do Sul, through Rio Grande. In 2023, soybeans that were shipped by rail from Rio Verde via Santos to Shanghai, China, cost about $38-$39 per metric ton less than U.S. shipments by the PNW routes. To Shanghai, China, soybean shipments from Cruz Alta via Rio Grande, cost $32.69 per mt less than from Davenport, IA. Rio Verde is 546 miles from Santos, and Cruz Alta is 288 miles from Rio Grande.

Decline in ocean freight rates exceeds rise in inland freight rates. From 2022 to 2023, for nearly all selected routes, Brazil's soybean transportation costs fell, reflecting a significant drop in ocean rates. The drop-in ocean rates more than offset the rise in inland rates (for trucking, barge, and rail) that was driven by strong export demand, especially from April to December. The cost of shipping a metric ton (mt) of soybeans 100 miles by truck rose nearly 17 percent—from $8.15 per mt to $9.50 per mt. Although fuel prices declined from 2022 to 2023, they remained higher than in 2021. Fuel prices represent over one quarter of the Brazilian soybean-export truck index.

Ocean freight rates fell in 2023 because of slowing global trade volumes, easing of global supply chain disruptions, and rising vessel supply that boosted capacity for Brazil's soybean exports. On average, ocean rates for selected Brazilian export routes to Hamburg, Germany, fell 26-33 percent and, to Shanghai, China, fell 36-37 percent.

Farm gate prices fall sharply, even as Brazilian real appreciates. From 2022 to 2023, average Brazilian soybean export prices fell about 12 percent, from $591 per mt to $523 per mt. From record highs in 2022, Brazil's average farm gate prices for soybeans plunged 20 percent in U.S. dollars (to their lowest level since late 2020)—because of abundant local soybean supplies.

Measured in U.S. dollars, soybean farm gate prices declined from $556.38/mt to $444.09/mt—and in reais, from R$2,865.04/mt to R$2,221.45/mt. The price drop was a significant blow to farmers' revenue, despite the real's appreciation against the U.S. dollar. The Brazilian real (R$) appreciated 3 percent against the U.S. dollar, from R$5.16 per US$ in 2022 to R$4.99 in 2023.

Landed costs fall. For selected Brazilian export routes to China, total landed costs decreased as both farm prices and transportation costs declined. From Sorriso, Mato Grosso, to Shanghai through the port of Santos, 2023 transportation costs were 23-25 percent of the total landed costs. (Mato Grosso is Brazil's top soybean-producing state.) Transportation's share of landed costs in 2023 was higher than 2022; the share had not been that high since 2019 (when it was 28 percent). By comparison, transportation costs for the same route were 45 percent of landed costs in 2006 and 34 percent in 2008.

Brazilian ports ship record soybean volumes to China. In 2023, Brazil exported a record 74.5 mmt of soybeans to China, valued at $38.9 billion. That volume was up 39 percent from 2022's soybean total (53.6 mmt) and accounted for 73 percent of Brazil's total soybean exports (101.9 mmt). The next highest shares of Brazil's soybean exports (in declining order) went to Argentina, Spain, Thailand, Turkey, and Iran.

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 2023, the northeastern ports of São Luís, and Barcarena accounted for 20 percent of soybean exports to China. The eastern ports of Vitória and Salvador accounted for nearly 10 percent of soybean export to China. The Amazon River port of Manaus exported a small amount of soybeans to China. In 2023, the ocean freight spread between the Shanghai routes from the northeastern port of São Luís ($39.88/mt) and the port of Santos ($35.18/mt) was $4.70/mt.

Acknowledgments

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General Information

State and Abbreviation

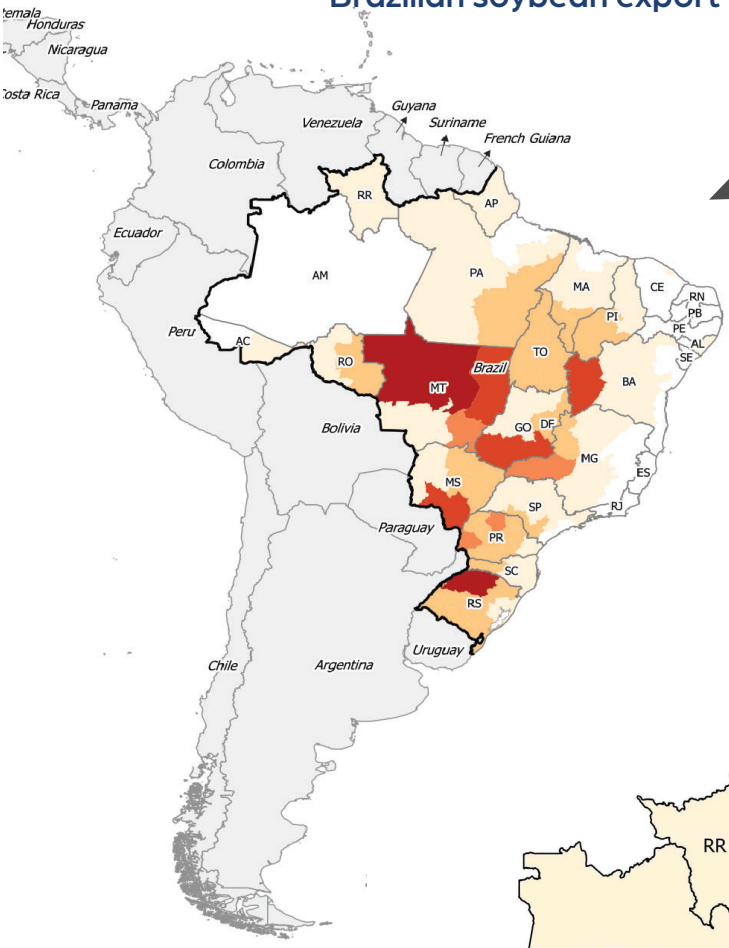
Acre (AC)	Pará (PA)
Alagoas (AL)	Paraíba (PB)
Amapá (AP)	Paraná (PR)
Amazonas (AM)	Pernambuco (PE)
Bahia (BA)	Piauí (PI)
Ceará (CE)	Rio de Janeiro (RJ)
Distrito Federal (DF)	Rio Grande do Sul (RS)
Espírito Santo (ES)	Rondônia (RO)
Goiás (GO)	Roraima (RR)
Maranhão (MA)	Santa Catarina (SC)
Mato Grosso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

Information about Brazil

Population:	205.375 million (The World Bank)
Gross Domestic Product per Capita, 2023:	$10,642 (The World Bank)
Inflation, 2023:	4.6 percent (Instituto Brasileiro de Geografia e Estatística (IBGE))
Unemployment, 4th Quarter 2023:	7.6 percent (IBGE)
Area:	8,515,770 square kilometers
Languages:	Portuguese (official), Spanish, English, and French

2023 Summary

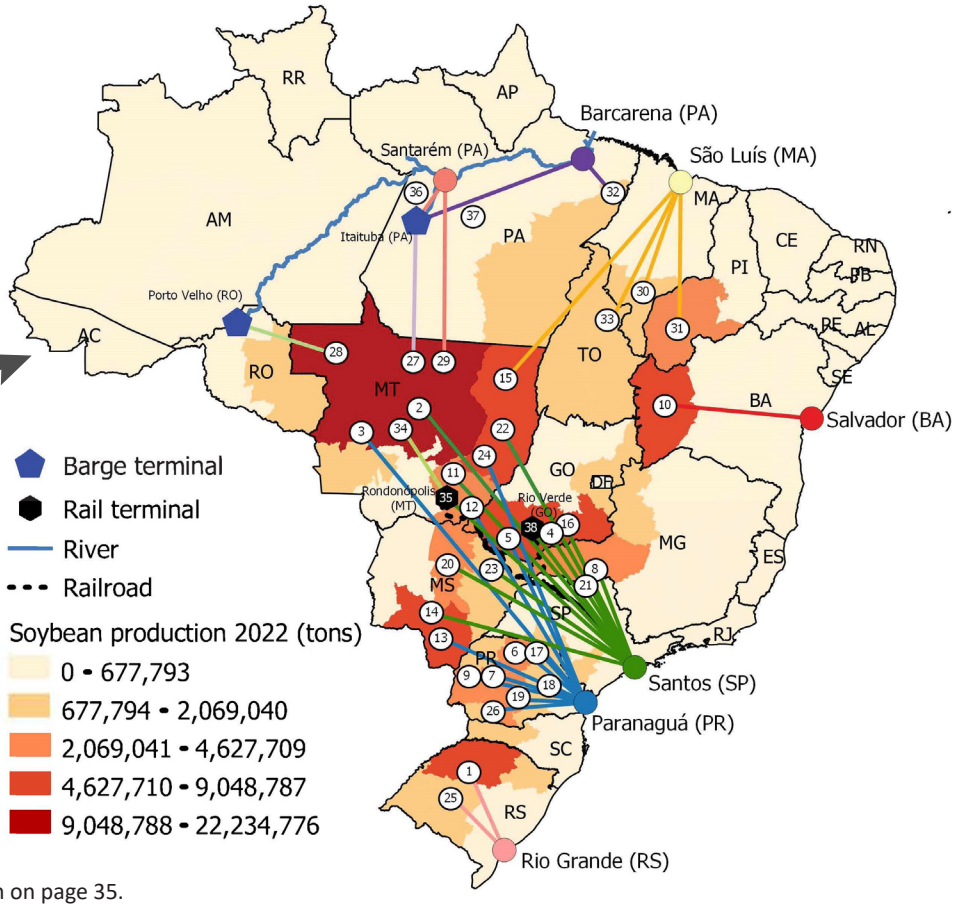
Routes[1] and regions considered in the Brazilian soybean export transportation indicator[2]



Regions considered in the Brazilian soybean export transportation indicator.

BA=Bahia
GO=Goiás
MG=Minas Gerais
MS=Mato Grosso do Sul
MT=Mato Grosso
PA=Pará
PI=Piauí
PR=Paraná
RS=Rio Grande do Sul
SP=São Paulo
TO=Tocantins

Regions (listed above) and routes.



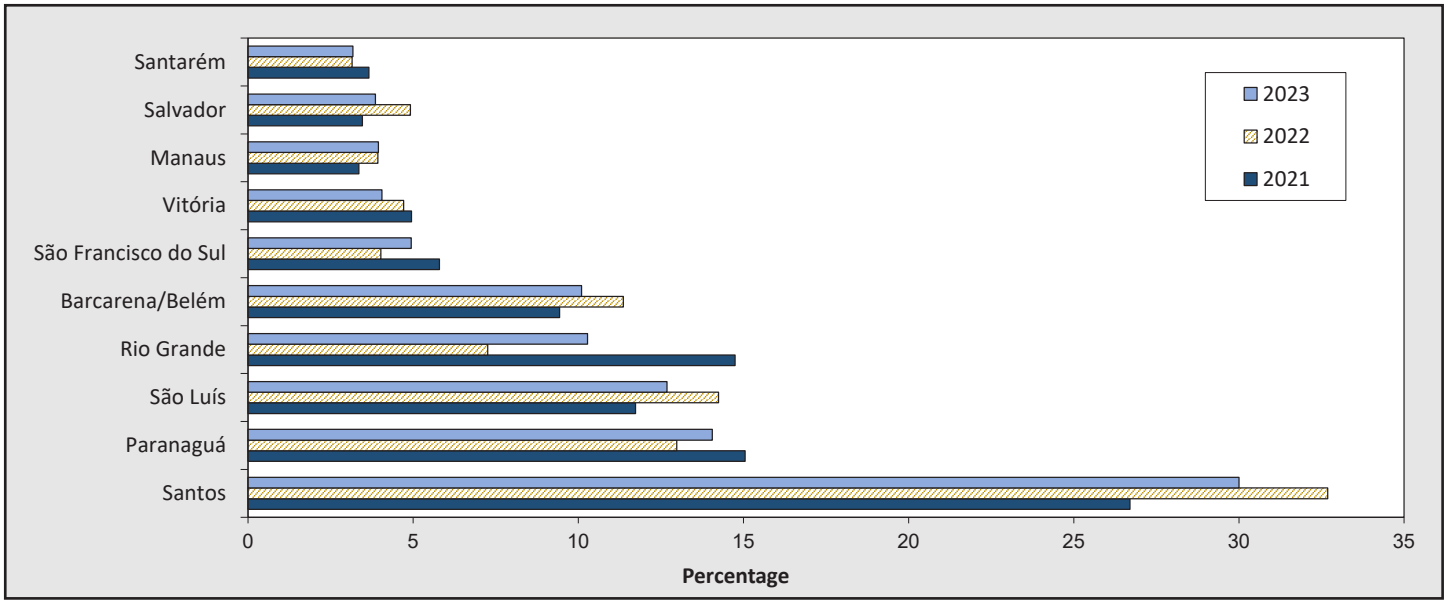
1 Table defining routes by number is shown on page 35.

2 Regions comprised about 78 percent of Brazilian soybean production in 2022 (Brazilian Institute of Geography and Statistics—Produção Agricola 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, Argentina, and Canada. In 2023, Santos was Brazil's top soybean export port, followed by Paranaguá, São Luís, Rio Grande, Barcarena/Belém, and São Francisco do Sul. Together, these six ports accounted for 82 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 69 percent of this trade in 2023. Also, in 2023, the northeastern ports of São Luís and Barcarena and the eastern ports of Vitória and Salvador accounted for nearly 20 and 10 percent of soybean exports to China, respectively. The Amazon River ports of Manaus exported a small amount of soybeans to China.

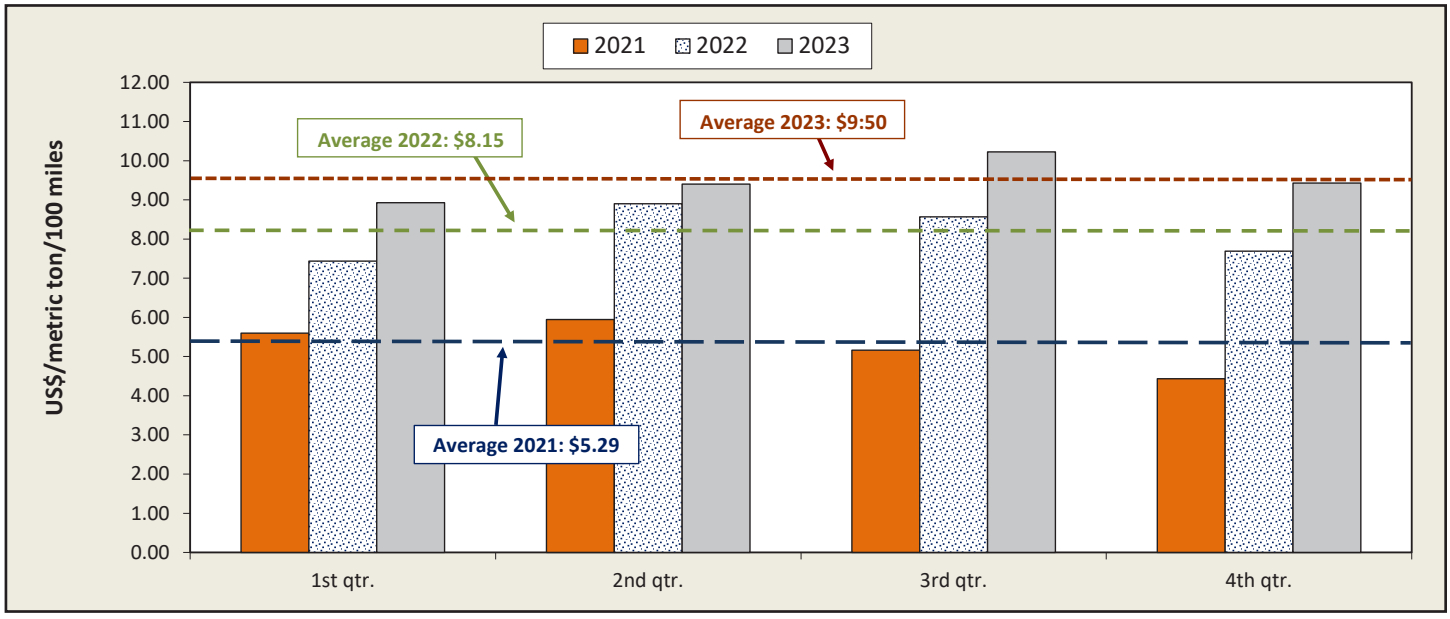
Brazilian soybean exports by port, 2021–23



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

From 2022 to 2023, the average cost in Brazil of shipping a metric ton (mt) of soybeans 100 miles by truck increased from $8.15 per mt to $9.50 per mt.

Brazilian soybean export truck cost index, 2021–23



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

From 2022 to 2023, for selected routes of shipping Brazilian soybeans to China, total landed costs decreased as both farm prices and transportation costs declined. Brazil's soybean transportation costs decreased, reflecting a significant drop in ocean rates. The drop in ocean rates more than offset the rise in inland rates (for trucking, barge, and rail) that was driven by strong export demand, especially from April to December. From Sorriso, Mato Grosso, to Shanghai through the port of Santos, 2023 transportation costs were 23-25 percent of the total landed costs. (Mato Grosso is Brazil's top soybean-producing state.) By comparison, transportation costs for the same route 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, 2018–23

	North MT[1] - Santos[2] by truck —US$/mt—							Northwest RS[1] - Rio Grande[2] —US$/mt—						
	2018	2019	2020	2021	2022	2023	% Change 2022-23	2018	2019	2020	2021	2022	2023	% Change 2022-23
Truck	91.76	79.28	60.65	59.30	93.98	103.31	9.9	29.20	25.06	19.24	18.85	29.45	34.44	17.0
Ocean	30.31	33.65	31.40	53.40	56.04	35.18	-37.2	31.06	33.94	32.90	53.94	56.99	35.93	-37.0
Total transportation	122.08	112.92	92.04	112.70	150.02	138.48	-7.7	60.27	58.99	52.13	72.78	86.43	70.37	-18.6
Farm gate price[3]	306.03	285.35	357.23	482.47	536.97	415.95	-22.5	333.21	305.56	354.57	489.39	579.79	472.57	-18.5
Landed cost	428.11	398.28	449.27	595.16	686.98	554.44	-19.3	393.48	364.56	406.70	562.17	666.23	542.93	-18.5
Transport % of landed cost	28.5	28.4	21.2	18.9	21.8	25.1	14.9	15.3	16.2	13.1	12.9	12.9	13.0	0.6
	North MT[1] - Santos[2] by rail —US$/mt—							South GO[1] - Santos[2] —US$/mt—						
	2018	2019	2020	2021	2022	2023	% Change 2022-23	2018	2019	2020	2021	2022	2023	% Change 2022-23
Truck	33.49	27.62	21.47	20.64	31.47	36.92	17.3	43.25	37.34	28.48	27.18	43.02	49.44	14.9
Rail[4]	43.29	39.98	32.13	29.69	44.31	54.79	23.6	-	-	-	-	-	-	-
Ocean	30.31	33.65	31.40	53.40	56.04	35.18	-37.2	30.31	33.65	31.40	53.40	56.04	35.18	-37.2
Total transportation	107.10	101.25	85.00	103.73	131.82	126.88	-3.7	73.56	70.98	59.88	80.58	99.06	84.81	-14.4
Farm gate price[3]	306.03	285.35	357.23	482.47	536.97	415.95	-22.5	312.31	291.46	331.01	479.82	536.05	420.54	-21.5
Landed cost	413.13	386.60	442.22	586.19	668.79	542.83	-18.8	385.88	362.45	390.88	560.39	635.11	505.35	-20.4
Transport % of landed cost	25.9	26.2	19.9	17.7	19.7	23.5	19.1	19.1	19.6	15.8	14.4	15.6	16.9	8.4

[1]Producing regions: MT= Mato Grosso, RS = Rio Grande Do Sul, and GO = Goiás.
[2]Export port.
[3]The source of the farm gate price is the Brazilian Government, Companhia Nacional de Abastecimento (CONAB).
[4]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," Brazil (ESALQ/USP) and USDA, Agricultural Marketing Service.

Costs of transporting Brazilian soybeans from the southern ports to Hamburg, Germany, 2018–23

	North MT[1] - Santos[2] by truck —US$/mt—							Northwest RS[1] - Rio Grande[2] —US$/mt—						
	2018	2019	2020	2021	2022	2023	% Change 2022-23	2018	2019	2020	2021	2022	2023	% Change 2022-23
Truck	91.76	79.28	60.65	59.30	93.98	103.31	9.9	29.20	25.06	19.24	18.85	29.45	34.44	17.0
Ocean	25.25	25.63	24.75	45.11	48.34	33.21	-31.3	26.25	25.63	25.13	46.28	49.48	34.13	-31.0
Total transportation	117.01	104.90	85.40	104.41	142.32	136.52	-4.1	55.45	50.68	44.36	65.12	78.92	68.57	-13.1
Farm gate price[3]	306.03	285.35	357.23	482.47	536.97	415.95	-22.5	333.21	305.56	354.57	489.39	579.79	472.57	-18.5
Landed cost	423.05	390.25	442.62	586.88	679.28	552.47	-18.7	388.66	356.25	398.93	554.51	658.71	541.13	-17.9
Transport % of landed cost	27.6	26.9	20.0	17.8	20.9	24.8	18.5	14.3	14.2	11.4	11.7	12.0	12.7	6.4
	North MT[1] - Santos[2] by rail —US$/mt—							South GO[1] - Santos[2] —US$/mt—						
	2018	2019	2020	2021	2022	2023	% Change 2022-23	2018	2019	2020	2021	2022	2023	% Change 2022-23
Truck	33.49	27.62	21.47	20.64	31.47	36.92	17.3	43.25	37.34	28.48	27.18	43.02	49.64	15.4
Rail[4]	43.29	39.98	32.13	29.69	44.31	54.79	23.6	-	-	-	-	-	-	-
Ocean	25.25	25.63	24.75	45.11	48.34	33.21	-31.3	25.25	25.63	24.75	45.11	48.34	33.21	-31.3
Total transportation	102.03	93.23	78.35	95.44	124.12	124.92	0.6	68.50	62.96	53.23	72.29	91.36	82.85	-9.3
Farm gate price[3]	306.03	285.35	357.23	482.47	536.97	415.95	-22.5	312.31	291.46	331.01	479.82	536.05	420.54	-21.5
Landed cost	408.07	378.58	435.58	577.90	661.09	540.87	-18.2	380.81	354.42	384.24	552.11	627.41	503.38	-19.8
Transport % of landed cost	25.0	24.6	18.7	16.5	18.8	22.0	17.0	18.0	17.8	14.3	13.1	14.5	16.5	13.8

[1]Producing regions: MT= Mato Grosso, RS = Rio Grande Do Sul, and GO = Goiás.
[2]Export port.
[3]The source of the farm gate price is the Brazilian Government, Companhia Nacional de Abastecimento (CONAB).
[4]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,” Brazil (ESALQ/USP) and USDA, Agricultural Marketing Service.

From 2022-23, transportation costs decreased for selected routes from Brazil's northern and northeastern ports to Shanghai, China.

Cost of transporting soybeans from the northern and northeastern ports to Shanghai, China, 2018–23

	North MT[1] - Santarém[2] —US$/mt—							South MA[1] - São Luís[2] —US$/mt						
	2018	2019	2020	2021	2022	2023	% Change 2022-23	2018	2019	2020	2021	2022	2023	% Change 2022-23
Truck	58.86	52.04	39.20	37.91	59.30	67.70	14.2	37.60	32.99	26.83	24.85	40.83	43.61	6.8
Ocean	34.81	35.06	33.66	57.31	61.68	39.33	-36.2	33.89	34.81	34.02	57.90	61.80	39.88	-35.5
Total transportation	93.67	87.10	72.86	95.22	120.98	107.02	-11.5	71.48	67.80	60.85	82.75	102.63	83.49	-18.7
Farm gate price[3]	306.03	285.35	357.23	482.47	536.97	415.95	-22.5	333.03	297.05	353.30	484.89	558.13	445.89	-20.1
Landed cost	399.70	372.45	430.08	577.69	657.95	522.98	-20.5	404.51	364.85	414.15	567.63	660.76	529.38	-19.9
Transport % of landed cost	23.4	23.4	17.6	16.5	18.4	20.6	11.9	17.7	18.6	15.0	14.5	15.5	15.9	2.3
	Southwest PI[1] - São Luís[2] —US$/mt—							North MT[1] - Barcarena[2] —US$/mt—						
	2018	2019	2020	2021	2022	2023	% Change 2022-23	2018	2019	2020	2021	2022	2023	% Change 2022-23
Truck	46.52	39.34	29.81	29.15	44.32	48.59	9.6	-	53.99	31.72	31.84	49.44	56.13	13.5
Barge[4]	-	-	-	-	-	-	-	-	15.99	11.94	12.63	18.32	26.38	44.0
Ocean	33.89	34.81	34.02	57.90	61.80	39.88	-35.5	-	32.25	34.96	59.55	62.73	40.06	-36.1
Total transportation	80.41	74.15	63.83	87.05	106.12	88.47	-16.6	-	102.23	78.61	104.02	130.49	122.57	-6.1
Farm gate price[3]	306.26	295.87	342.39	475.78	542.19	444.76	-18.0	-	275.38	357.23	482.47	536.97	415.95	-22.5
Landed cost	386.67	370.02	406.23	562.82	648.31	533.22	-17.8	-	377.61	435.84	586.49	667.45	538.52	-19.3
Transport % of landed cost	20.8	20.9	16.0	15.5	16.3	16.7	2.0	-	27.1	18.7	17.7	19.5	22.9	17.1

[1]Producing regions: MT= Mato Grosso, PI = Piauí, and MA = Maranhão.
[2]Export port.
[3]The source of the farm gate price is the Brazilian Government, Companhia Nacional de Abastecimento (CONAB).
[4]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: 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," Brazil (ESALQ/USP) and USDA, Agricultural Marketing Service.

Cost of transporting soybeans from the northern and northeastern ports to Hamburg, Germany, 2018–23

	North MT[1] - Santarém[2] —US$/mt—							South MA[1] - São Luís[2] —US$/mt						
	2018	2019	2020	2021	2022	2023	% Change 2022-23	2018	2019	2020	2021	2022	2023	% Change 2022-23
Truck	58.86	52.04	39.20	37.91	59.30	67.70	14.2	37.60	32.99	26.83	24.85	40.83	43.61	6.8
Ocean	23.35	23.42	20.94	42.09	46.68	31.38	-32.8	19.40	20.34	22.76	48.36	49.08	36.25	-26.1
Total transportation	82.21	75.45	60.14	80.00	105.98	99.07	-6.5	57.00	53.33	49.59	73.21	89.90	79.86	-11.2
Farm gate price[3]	306.03	285.35	357.23	482.47	536.97	415.95	-22.5	333.03	297.05	353.30	484.89	558.13	445.89	-20.1
Landed cost	388.24	360.81	417.37	562.47	642.95	515.03	-19.9	390.02	350.38	402.89	558.10	648.04	525.75	-18.9
Transport % of landed cost	21.2	20.9	15.0	14.2	16.5	19.3	17.4	14.6	15.2	12.6	13.1	13.8	15.3	10.5
	Southwest PI[1] - São Luís[2] —US$/mt—							North MT[1] - Barcarena[2] —US$/mt—						
	2018	2019	2020	2021	2022	2023	% Change 2022-23	2018	2019	2020	2021	2022	2023	% Change 2022-23
Truck	46.52	39.34	29.81	29.15	44.32	48.59	9.6	-	46.64	31.72	31.84	49.44	56.13	13.5
Barge[4]	-	-	-	-	-	-	-	-	15.33	11.94	12.63	18.32	26.38	44.0
Ocean	19.40	20.34	22.76	48.36	49.08	36.25	-26.1	-	21.16	20.31	41.00	44.43	30.85	-30.6
Total transportation	65.92	59.68	52.58	77.51	93.39	84.84	-9.2	-	83.13	63.97	85.47	112.19	113.35	1.0
Farm gate price[3]	306.26	295.87	342.39	475.78	542.19	444.76	-18.0	-	285.35	357.23	482.47	536.97	415.95	-22.5
Landed cost	372.18	355.55	394.97	553.28	635.58	529.60	-16.7	-	368.48	421.19	567.94	649.15	529.31	-18.5
Transport % of landed cost	17.7	16.8	13.6	14.0	14.6	16.1	9.9	-	22.6	15.2	15.0	17.3	21.5	24.6

[1]Producing regions: MT= Mato Grosso, PI = Piauí, and MA = Maranhão.
[2]Export port.
[3]The source of the farm gate price is the Brazilian Government, Companhia Nacional de Abastecimento (CONAB).
[4]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: 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," Brazil (ESALQ/USP) and USDA, Agricultural Marketing Service.

In response to lower transportation costs and farm prices, total landed costs of U.S. soybeans decreased via the U.S. Gulf to Germany and China. From 2022 to 2023, barge rates declined significantly because of lower export sales, which reduced demand for export-grain barge shipments. In 2023, the U.S. Army Corps of Engineers (USACE) dredged at the beginning of summer in 2023, rather than waiting until mid-to-late summer as it had in 2022. Plus, fewer barges were grounded because USACE also acted earlier than it had in 2022 to implement restrictions. As a result, navigational disruptions were minimized (*Grain Transportation Report (GTR)*, March 14, 2024). According to USDA's *Modal Share Analysis*, 55 percent of soybean exports were shipped via barge to the Gulf.

Average costs of transporting U.S. soybeans via U.S. Gulf to Hamburg, Germany, and Shanghai, China, 2019–23

	2019	2020	2021	2022	2023	% Change 2022-23	2019	2020	2021	2022	2023	% Change 2022-23
	To Hamburg, Germany											
	Minneapolis, Minnesota —US$/mt—						Davenport, Iowa —US$/mt—					
Truck	10.10	11.04	13.58	18.86	15.11	-19.9	10.10	11.04	13.58	18.86	15.11	-19.9
Rail[1]	23.98	9.18	9.10	9.51	10.67	12.2	16.06	8.26	8.33	8.70	9.48	9.0
Barge[2]	21.99	26.14	27.48	53.62	31.50	-41.3	20.43	20.05	23.09	44.80	26.10	-41.8
Ocean[3]	18.15	16.61	25.31	30.12	27.37	-9.1	18.15	16.61	25.31	30.12	27.37	-9.1
Total transportation[4]	74.22	62.97	75.47	112.11	84.64	-24.5	64.73	55.96	70.32	102.49	78.06	-23.8
Farm price[5]	305.65	321.45	481.65	539.52	509.62	-5.5	307.27	330.02	482.26	541.97	516.56	-4.7
Landed cost[6]	379.86	384.42	557.12	651.63	594.26	-8.8	372.00	385.98	552.58	644.46	594.61	-7.7
Transport % of landed cost	19.4	16.4	13.6	17.2	14.2	-17.5	17.4	14.4	12.8	15.9	13.1	-17.8
	2019	2020	2021	2022	2023	% Change 2022-23	2019	2020	2021	2022	2023	% Change 2022-23
	To Shanghai, China											
	Minneapolis, Minnesota —US$/mt—						Davenport, Iowa —US$/mt—					
Truck	10.10	11.04	13.58	18.86	15.11	-19.9	10.10	11.04	13.58	18.86	15.11	-19.9
Rail[1]	23.98	9.18	9.10	9.51	10.67	12.2	16.06	8.26	8.33	8.70	9.48	9.0
Barge[2]	21.99	26.14	27.48	53.62	31.50	-41.3	20.43	20.05	23.09	44.80	26.10	-41.8
Ocean[3]	44.55	40.08	68.58	67.25	52.37	-22.1	44.55	40.08	68.58	67.25	52.37	-22.1
Total transportation[4]	100.62	86.44	118.74	149.24	109.64	-26.5	91.14	79.43	113.58	139.62	103.05	-26.2
Farm price[5]	305.65	321.45	481.65	539.52	507.37	-6.0	307.27	330.02	482.26	541.97	516.56	-4.7
Landed cost[6]	406.27	407.89	600.39	688.76	617.01	-10.4	398.41	409.45	595.85	681.59	619.61	-9.1
Transport % of landed cost	24.7	21.2	19.8	21.7	17.8	-18.1	22.9	19.4	19.1	20.5	16.6	-19.0

[1]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.

[2]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.

[3]Source for ocean rates: The Baltic Exchange and O'Neil Commodity Consulting; excludes handling charges.

[4]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.

[5]Source for the U.S. farm prices: USDA, National Agricultural Statistics Service.

[6]Landed cost is transportation cost plus farm price.

Note: mt=metric ton; "0.00" means that rail transportation was not applicable.

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 1-2 percent from 2021 to 2022 in response to higher soybean prices.

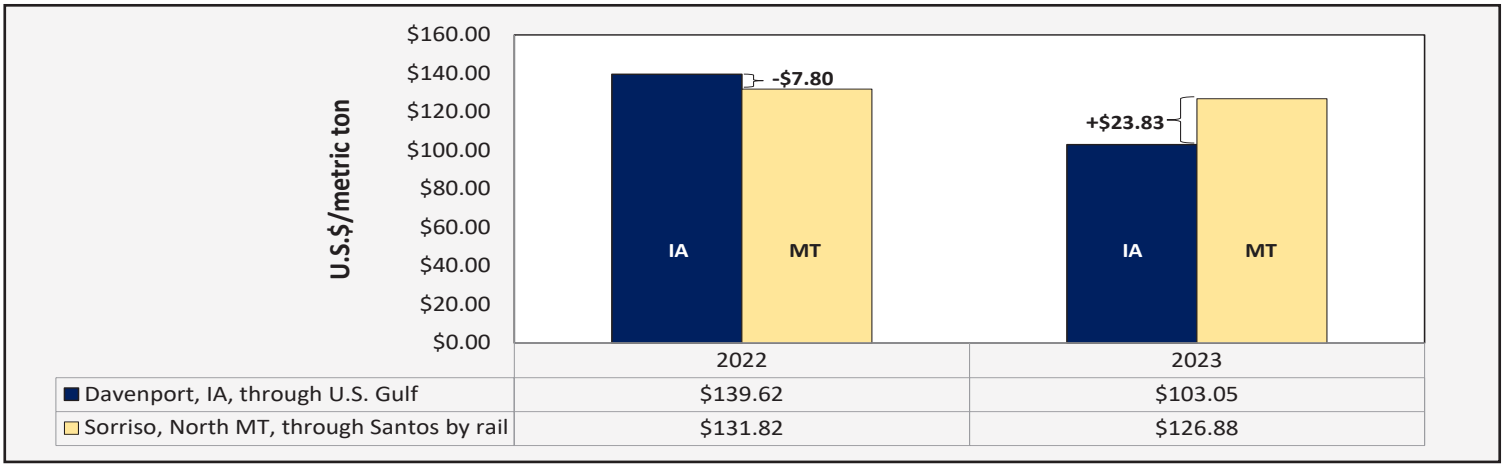
Average costs of transporting U.S. soybeans via Pacific Northwest to Shanghai, China, 2019–23

	2019	2020	2021	2022	2023	% Change 2022-23	2019	2020	2021	2022	2023	% Change 2022-23
	To Shanghai, China											
	Fargo, North Dakota —US$/mt—						Sioux Falls, South Dakota —US$/mt—					
Truck	10.10	11.04	13.58	18.86	15.11	-19.9	10.10	11.04	13.58	18.86	15.11	-19.9
Rail[1]	56.36	57.10	57.76	64.04	66.59	4.0	57.35	58.09	58.76	65.52	68.11	4.0
Ocean[2]	24.59	21.38	38.05	38.32	28.26	-26.2	24.59	21.38	38.05	38.32	28.26	-26.2
Total transportation	91.05	89.52	109.39	121.22	109.96	-9.3	92.04	90.51	110.39	122.70	111.48	-9.1
Farm price[3]	285.65	306.11	465.42	528.50	486.24	-8.0	293.98	315.51	474.61	541.61	507.06	-6.4
Landed cost[4]	376.70	395.62	574.81	649.72	596.20	-8.2	386.02	406.01	584.99	664.31	618.55	-6.9
Transport % of landed cost	24.2	22.7	19.1	18.7	18.4	-1.2	23.8	22.4	18.9	18.5	18.1	-2.2

[1]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.
[2]Source for the U.S. ocean freight rates: O'Neil Commodity Consulting.
[3]Source for the U.S. farm prices: USDA, National Agricultural Statistics Service.
[4]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 2023, shipping soybeans to Shanghai, China, cost $23.83 per metric ton (mt) more from Sorriso, North Mato Grosso, via Santos by rail, than from Davenport, IA, via the U.S. Gulf. From 2022 to 2023, Brazil's cost advantage disappeared because transportation costs from Iowa fell more than they did in Brazil. In 2023, Brazil's soybean exports reached a record high of nearly 102 million metric tons (mmt)— 29 percent more than 2022's total of 78.7 mmt. 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 the 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.

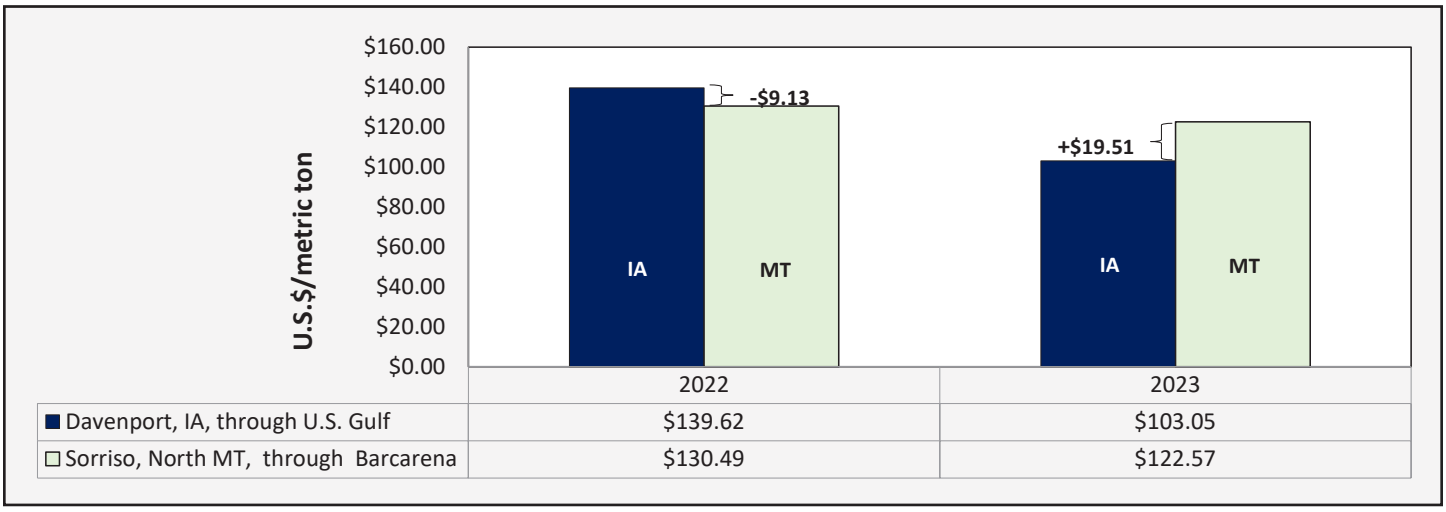
Transportation costs to Shanghai, China, for routes from Mato Grosso (MT) (via rail) and Iowa (IA) (via U.S. Gulf), 2022–23



Note: MT = Mato Grosso and IA = Iowa.
Source: USDA, Agricultural Marketing Service.

In 2023, shipping soybeans to Shanghai, China cost $19.51 per mt more from Sorriso, North Mato Grosso, via Barcarena by barge than from Davenport, IA, via U.S. Gulf. From 2022 to 2023, the U.S. cost advantage widened. 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 2023, Barcarena had become the fifth-largest Brazilian port for exporting soybeans (after Santos, Paranaguá, São Luís, and Rio Grande). In 2023, Barcarena accounted for 10 mmt of total Brazilian soybean exports (101.9 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), 2022–23

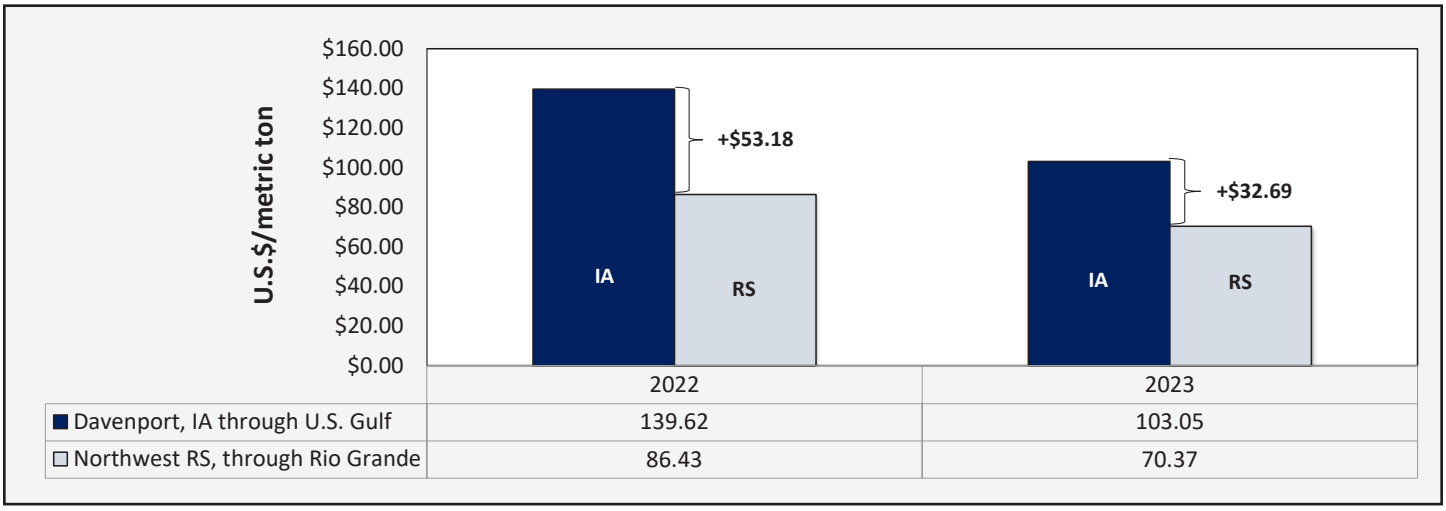


	2022	2023
Davenport, IA, through U.S. Gulf	$139.62	$103.05
Sorriso, North MT, through Barcarena	$130.49	$122.57

Note: MT = Mato Grosso and IA = Iowa.
Source: USDA, Agricultural Marketing Service.

In 2023, shipping soybeans to Shanghai, China, from Cruz Alta, Northwest Rio Grande do Sul, cost $32.69 per mt less than from Davenport, IA. From 2022 to 2023, Brazil's cost advantage narrowed, because transportation costs from Iowa fell more than they did in Brazil. 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), 2022–23

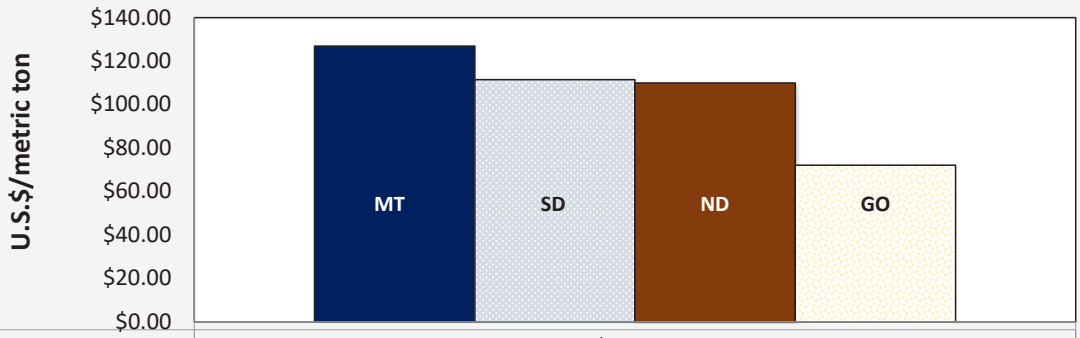


	2022	2023
Davenport, IA through U.S. Gulf	139.62	103.05
Northwest RS, through Rio Grande	86.43	70.37

Note: RS = Rio Grande do Sul and IA = Iowa.
Source: USDA, Agricultural Marketing Service.

During 2023, shipping soybeans to Shanghai, China, from Rio Verde, South Goiás, via Santos by rail cost about $38-39 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 PNW are 1,493 and 1,441 miles, respectively.

Transportation costs to Shanghai, China, for selected U.S. and Brazilian rail–inclusive routes, 2023

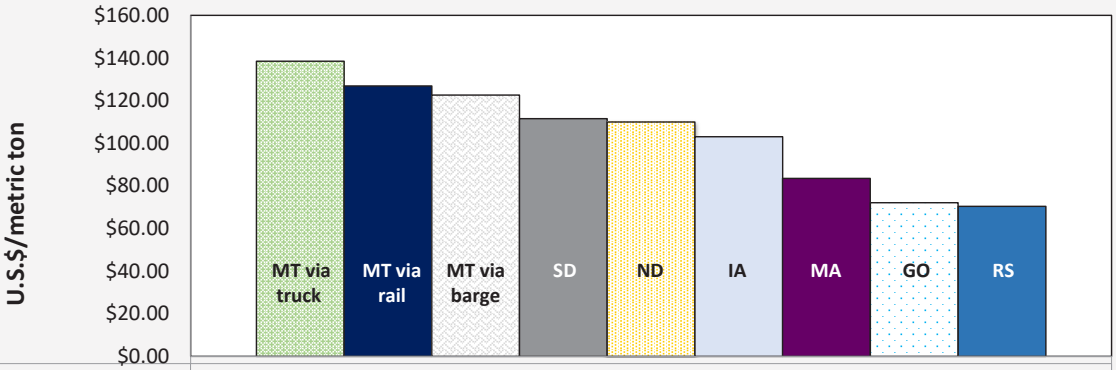


Sorriso, North MT, through Santos	$126.88
Sioux Falls, SD, through Pacific Northwest	$111.48
Fargo, ND, through Pacific Northwest	$109.96
Rio Verde, South GO, through Santos	$72.09

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

During 2023, to ship soybeans to Shanghai, China, North Mato Grosso's transportation cost advantage over the U.S Gulf and U.S. PNW routes decreased. However, Brazil's cost advantage widened when soybeans were shipped by rail from Rio Verde, South Goiás, via Santos; Balsas, South Maranhão, via São Luís; or Cruz Alta, Northwest Rio Grande do Sul, through Rio Grande.

Transportation costs to Shanghai, China, for selected U.S. and Brazilian routes, 2023



Sorriso, North MT, through Santos via truck	$138.48
Sorriso, North MT, through Santos via rail	$126.88
Sorriso, North MT, through Barcarena	$122.57
Sioux Falls, SD, through Pacific Northwest	$111.48
Fargo, ND, through Pacific Northwest	$109.96
Davenport, IA, through U.S. Gulf	$103.05
Balsas, South MA, through São Luís	$83.49
Rio Verde, South GO, through Santos via rail	$72.09
Cruz Alta, Northwest RS, through Rio Grande	$70.37

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 2023, in both U.S. dollars and Brazilian reais, truck costs increased. However, selected Brazilian export truck routes, measured in reais (R$), had proportionally lower cost increases than those estimated in U.S. dollars. Brazil's higher costs were driven by strong export demand and a weak Brazilian real (R$) against the U.S. dollar, despite appreciating 3 percent against the U.S. dollar from 2022 to 2023.

Truck rates for selected Brazilian soybean export routes, 2018–23

Route #	Origin[1] (reference city)	Destination	Distance[2] (miles)	2018	2019	2020	2021	2022	2023	Percent change 2022-23
				Freight price, US$/metric ton[3]						
1	Northwest RS[4] (Cruz Alta)	Rio Grande	288	29.20	25.06	19.24	18.85	29.45	34.44	17.0
2	North MT (Sorriso)	Santos	1,190	91.76	79.28	60.65	59.30	93.98	103.31	9.9
3	North MT (Sorriso)	Paranaguá	1,262	90.20	75.78	59.87	58.62	93.11	102.07	9.6
4	South GO (Rio Verde)	Santos	587	43.25	37.34	28.48	27.18	43.02	49.64	15.4
6	North Central PR (Londrina)	Paranaguá	268	27.22	22.64	18.13	17.20	26.76	32.69	22.1
11	Southeast MT (Primavera do Leste)	Santos	901	62.16	53.56	41.57	40.89	64.24	73.74	14.8
27	North MT (Sorriso)	Itaituba	672	56.27	46.64	31.72	31.84	49.44	56.13	13.5
29	North MT (Sorriso)	Santarém	876	58.86	52.04	39.20	37.91	59.30	67.70	14.2
30	South MA (Balsas)	São Luís	482	37.60	32.99	26.83	24.85	40.83	43.61	6.8
31	Southwest PI (Bom Jesus)	São Luís	606	46.52	39.34	29.81	29.15	44.32	48.59	9.6
32	Southeast PA (Paragominas)	Barcarena	249	22.39	20.12	15.20	14.42	22.51	26.46	17.6
33	East TO (Campos Lindos)	São Luís	842	56.94	50.55	37.72	36.02	56.69	62.97	11.1
34	North MT (Sorriso)	Rondonópolis (Rail terminal)	382	33.49	27.62	21.47	20.64	31.47	36.92	17.3
35	Rondonópolis MT (Rail terminal)[5]	Santos	1,019	43.29	39.98	32.13	29.69	44.31	54.79	23.6
36	Itaituba PA (Barge terminal)[6]	Santarém	153	--na--	9.16	5.72	6.18	8.12	9.26	14.0
37	Itaituba PA (Barge terminal)[6]	Barcarena	600	--na--	18.85	14.68	15.53	22.52	26.38	17.1
38	South Rio Verde GO (Rail terminal)[5]	Santos	546	--na--	--na--	--na--	--na--	31.71	36.91	16.4

[1]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 35.

[2]Distance from the main city of the considered region to the mentioned ports.

[3]Average monthly exchange rate from "Banco Central do Brasil" was used to convert Brazilian reais to U.S. dollars.

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

[5]In Brazil, there are no public/official 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.

[6]In Brazil, there are no public/official 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. The distance is in nautical miles.

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

Truck rates for selected Brazilian soybean export routes, 2018–23

Route #	Origin[1] (reference city)	Destination	Distance[2] (miles)	2018	2019	2020	2021	2022	2023	Percent change 2022-23
				Freight price, reais/metric ton[3]						
1	Northwest RS[4] (Cruz Alta)	Rio Grande	288	106.15	98.63	98.34	101.66	151.46	171.90	13.5
2	North MT (Sorriso)	Santos	1,190	334.43	312.20	310.69	319.76	484.03	515.21	6.4
3	North MT (Sorriso)	Paranaguá	1,262	328.71	298.83	306.56	316.02	479.55	509.10	6.2
4	South GO (Rio Verde)	Santos	587	157.35	146.75	145.87	146.61	221.39	247.53	11.8
6	North Central PR (Londrina)	Paranaguá	268	98.87	89.07	92.75	92.80	137.68	163.08	18.4
11	Southeast MT (Primavera do Leste)	Santos	901	226.32	210.83	212.84	220.44	330.69	367.57	11.2
27	North MT (Sorriso)	Itaituba	672	204.53	183.26	162.06	171.70	254.60	279.97	10.0
29	North MT (Sorriso)	Santarém	876	214.29	204.53	200.87	204.50	305.34	337.58	10.6
30	South MA (Balsas)	São Luís	482	137.16	129.69	138.13	133.96	209.80	217.52	3.7
31	Southwest PI (Bom Jesus)	São Luís	606	169.77	154.46	153.25	157.30	227.92	242.58	6.4
32	Southeast PA (Paragominas)	Barcarena	249	81.19	78.95	77.84	77.83	115.73	132.16	14.2
33	East TO (Campos Lindos)	São Luís	842	207.55	198.95	193.24	194.31	291.88	314.16	7.6
34	North MT (Sorriso)	Rondonópolis (Rail terminal)	382	121.48	108.61	109.95	111.36	161.94	184.12	13.7
35	Rondonópolis MT (Rail terminal)[5]	Santos	1,019	157.64	157.62	164.24	160.22	228.32	273.13	19.6
36	Itaituba PA (Barge terminal)[6]	Santarém	153	--na--	25.78	21.19	24.12	30.07	41.10	36.7
37	Itaituba PA (Barge terminal)[6]	Barcarena	600	--na--	74.14	75.24	83.88	115.92	137.66	18.7
38	South Rio Verde GO (Rail terminal)5	Santos	546	--na--	--na--	--na--	--na--	163.08	184.02	12.8

[1]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 35.

[2]Distance from the main city of the considered region to the mentioned ports.

[3]Average monthly exchange rate from "Banco Central do Brasil" was used to convert Brazilian reais to U.S. dollars.

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

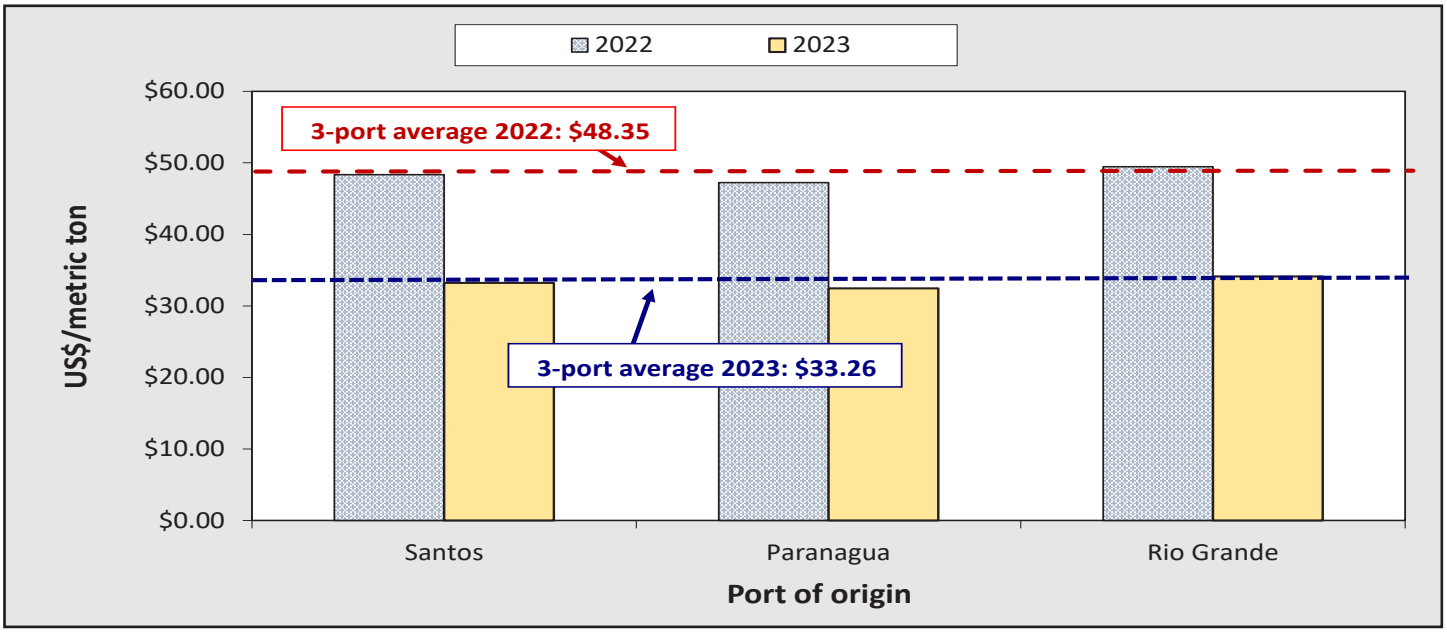
[5]In Brazil, there are no public/official rail tariff rates. Rail rates can be up to 30 percent lower than truck rates, depending on the volumes hauled and the terms of contracts signed between the railroad company and shippers.

[6]In Brazil, there are no public/official 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. The distance is in nautical miles.

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

On average, the cost to ship 1 mt of soybeans from Brazil to Hamburg, Germany, by oceangoing vessel decreased from $48.35/mt in 2022 to $33.26/mt in 2023.

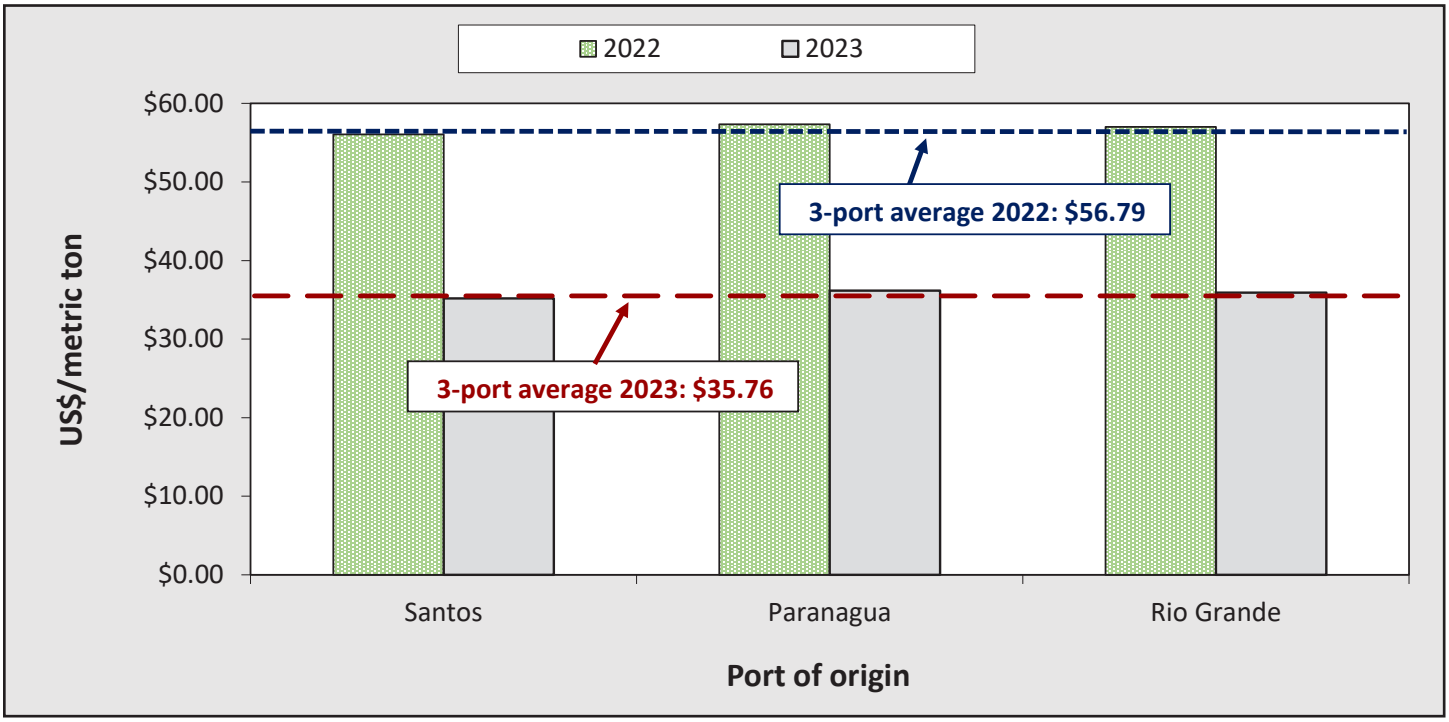
Ocean rates from selected Brazilian southern ports to Hamburg, Germany, decreased in 2023



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

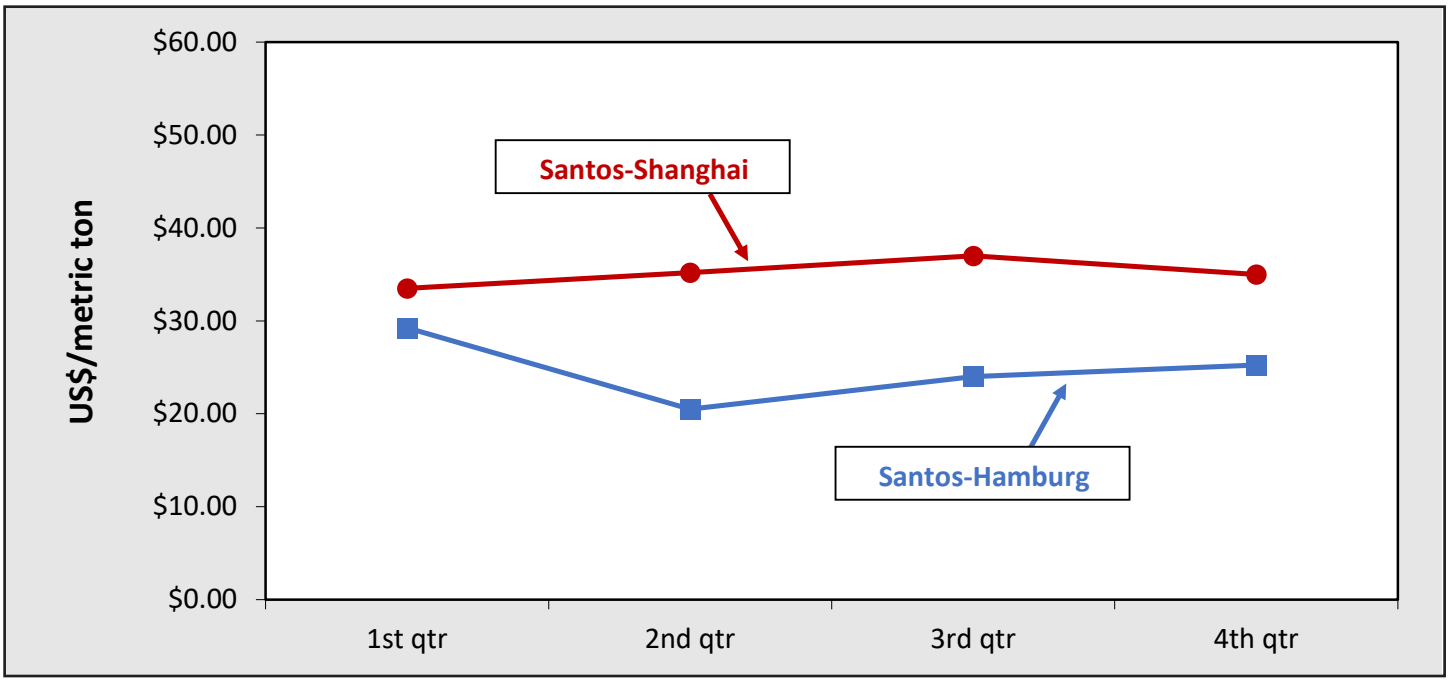
On average, the cost to ship 1 mt of soybeans from Brazil to Shanghai by ocean vessel decreased from $56.79/mt in 2022 to $35.76/mt in 2023.

Ocean rates from selected Brazilian southern ports to Shanghai, China, decreased in 2023



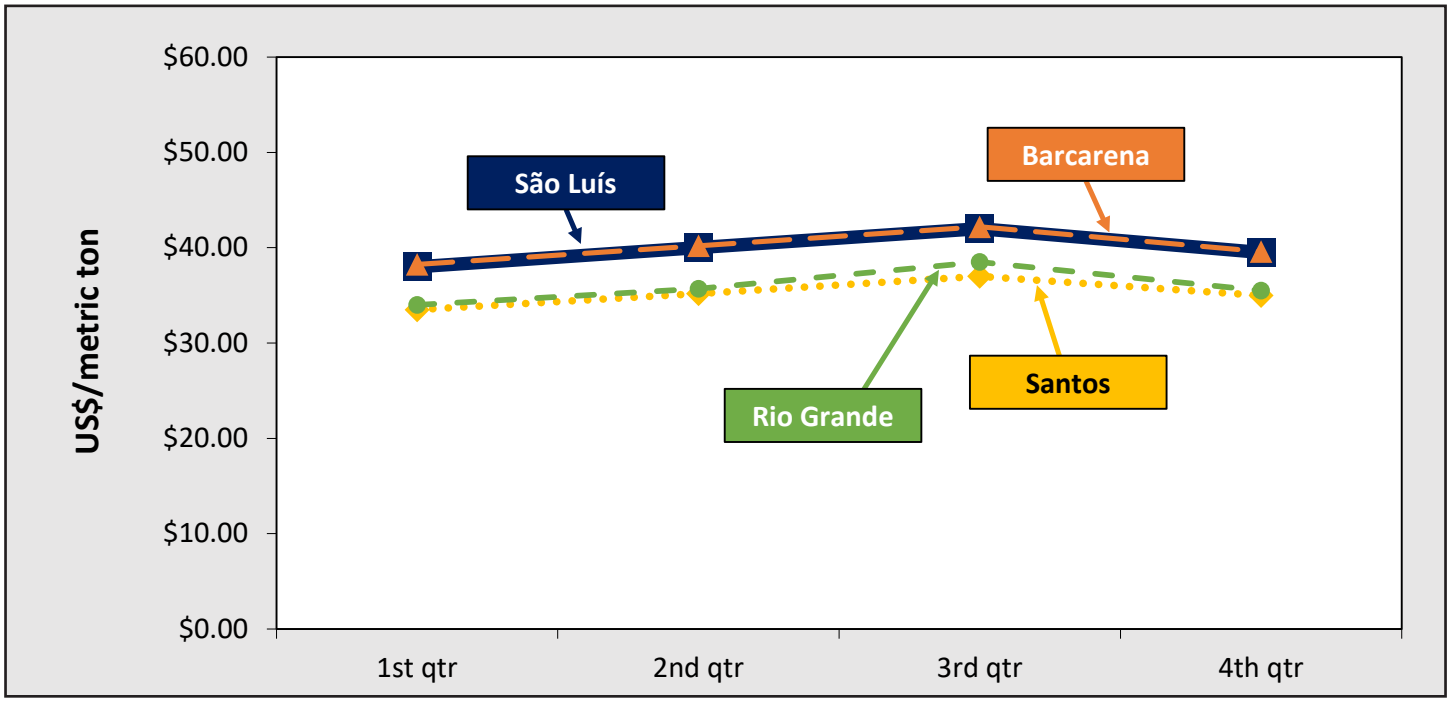
Source: University of São Paulo, Escola Superior de Agricultura "Luiz de Queiroz," Brazil (ESALQ/USP) and USDA, Agricultural Marketing Service.

Ocean rates for shipping soybeans from Santos to Shanghai, China, and Hamburg, Germany, 2023



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

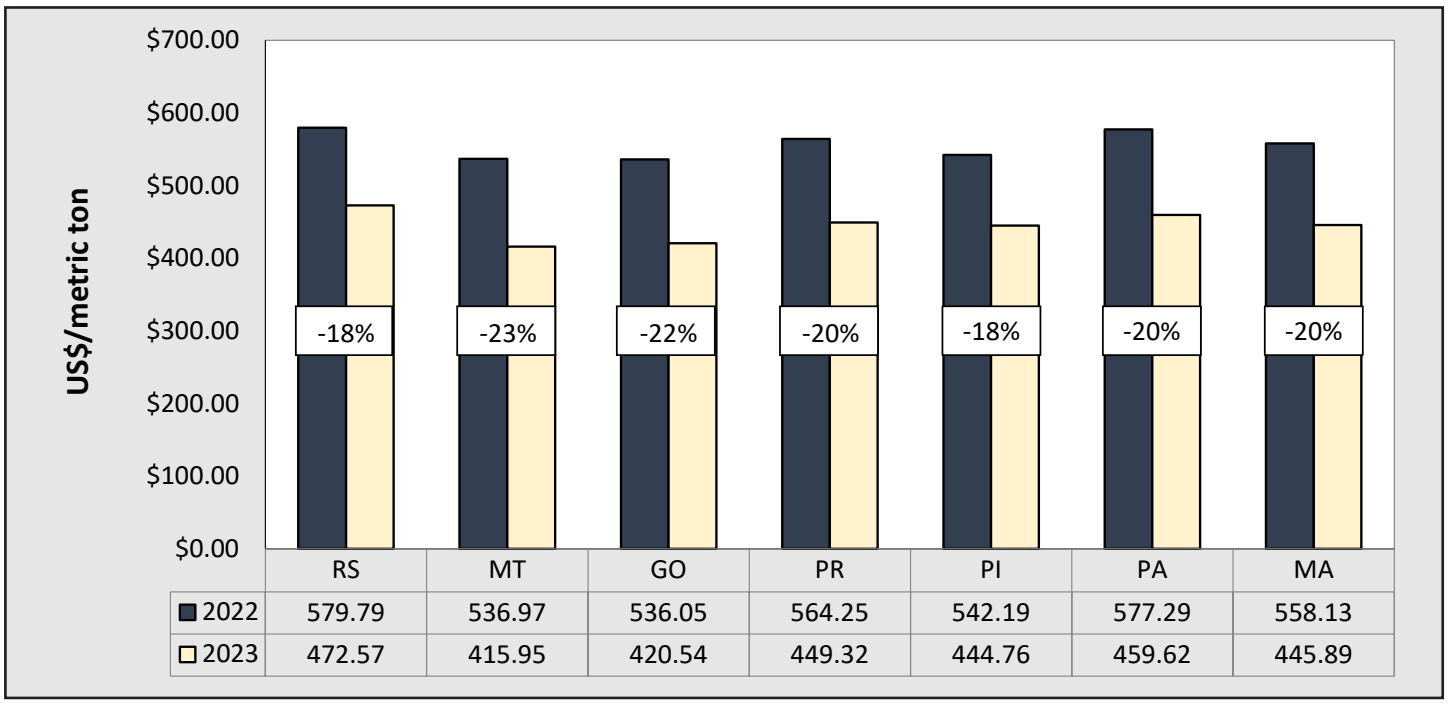
Ocean rates for shipping soybeans from selected Brazilian ports to Shanghai, China, 2023



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

From record highs in 2022, Brazil's 2023 average farm gate prices for soybeans plunged 20 percent in U.S. dollars (to the lowest levels since late 2020)—because of abundant local soybean supplies. Measured in U.S. dollars, average soybean farm gate prices declined from $556.38/mt to $444.09/mt—and in reais, from R$2,865.04/mt to R$2,221.45/mt. The price drop was a significant blow to farmers' revenue, despite the real's appreciation against the U.S. dollar. Exported soybeans are priced in U.S. dollars, but producers are paid in reais. The Brazilian real (R$) appreciated 3 percent against the U.S. dollar, from R$5.16 per US$ in 2022 to R$4.99 in 2023.

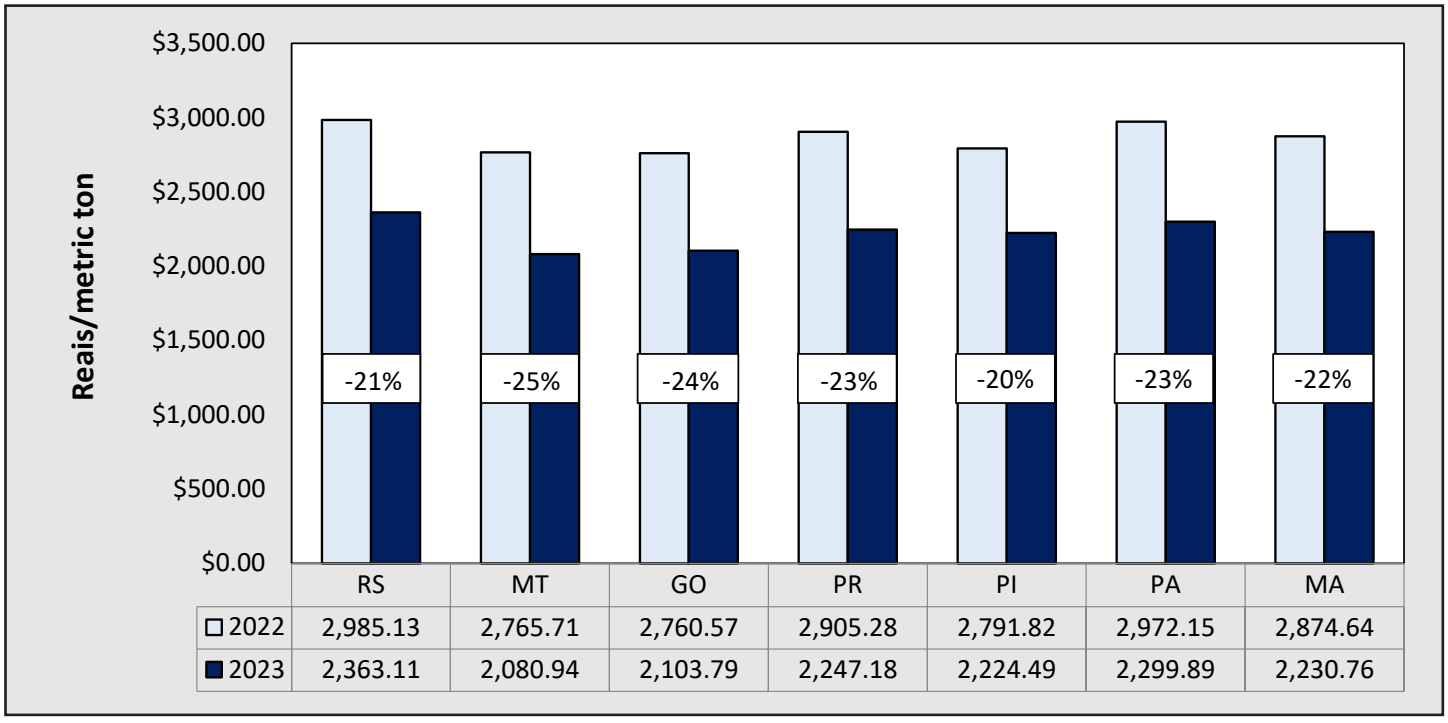
Selected Brazilian farm prices, US$/metric ton, 2022–23



	RS	MT	GO	PR	PI	PA	MA
2022	579.79	536.97	536.05	564.25	542.19	577.29	558.13
2023	472.57	415.95	420.54	449.32	444.76	459.62	445.89

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, 2022–23

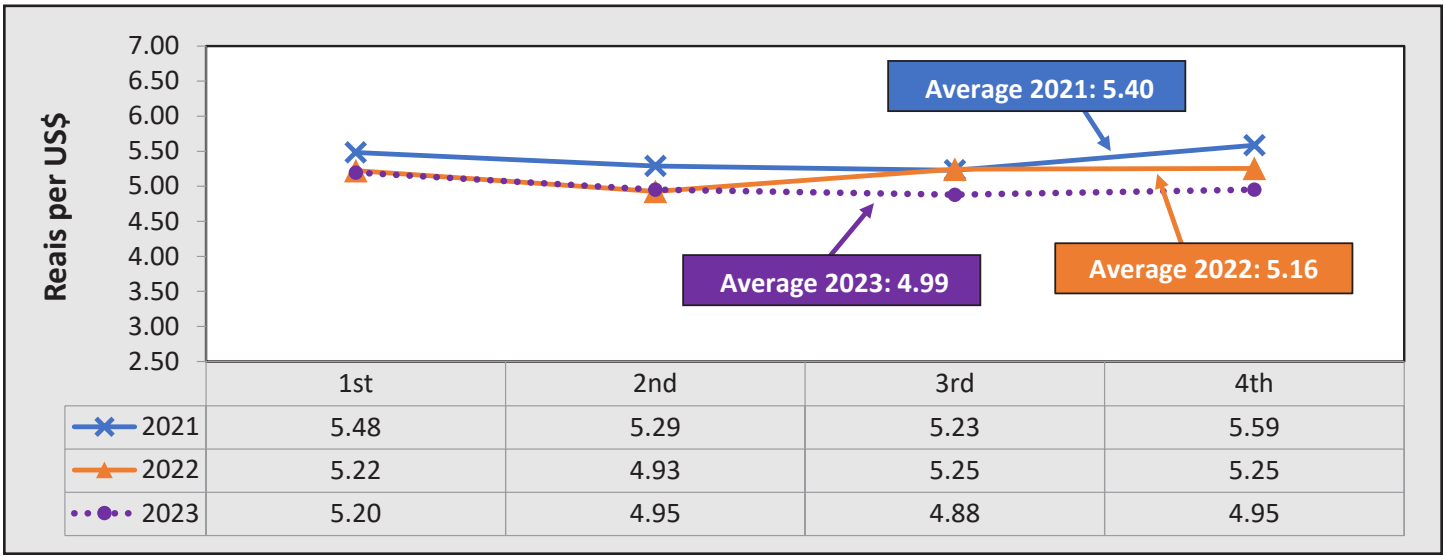


	RS	MT	GO	PR	PI	PA	MA
2022	2,985.13	2,765.71	2,760.57	2,905.28	2,791.82	2,972.15	2,874.64
2023	2,363.11	2,080.94	2,103.79	2,247.18	2,224.49	2,299.89	2,230.76

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 2022 to 2023, the Brazilian real appreciated by 3 percent against the U.S. dollar, from R$5.16 per U.S. dollar to R$4.99 per U.S. dollar.

Average quarterly exchange rate, real per U.S. dollar, 2021–23



	1st	2nd	3rd	4th
2021	5.48	5.29	5.23	5.59
2022	5.22	4.93	5.25	5.25
2023	5.20	4.95	4.88	4.95

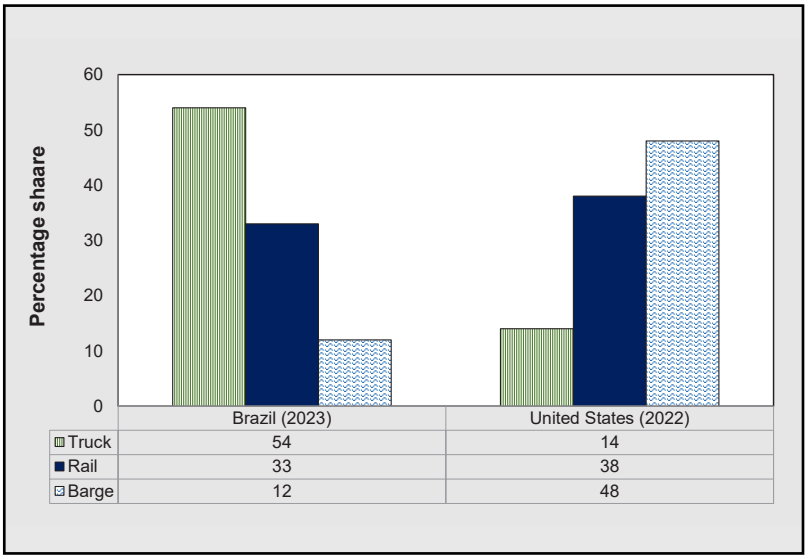
Source: Banco Central do Brasil

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 388 miles (625 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 soybean modal shares

Mode	Brazil (2023)	United States (2022)
Total		
Truck	69	51
Rail	22	25
Barge	9	24
Exports		
Truck	54	14
Rail	33	38
Barge	12	48
Domestic		
Truck	97	84
Rail	0	14
Barge	3	2

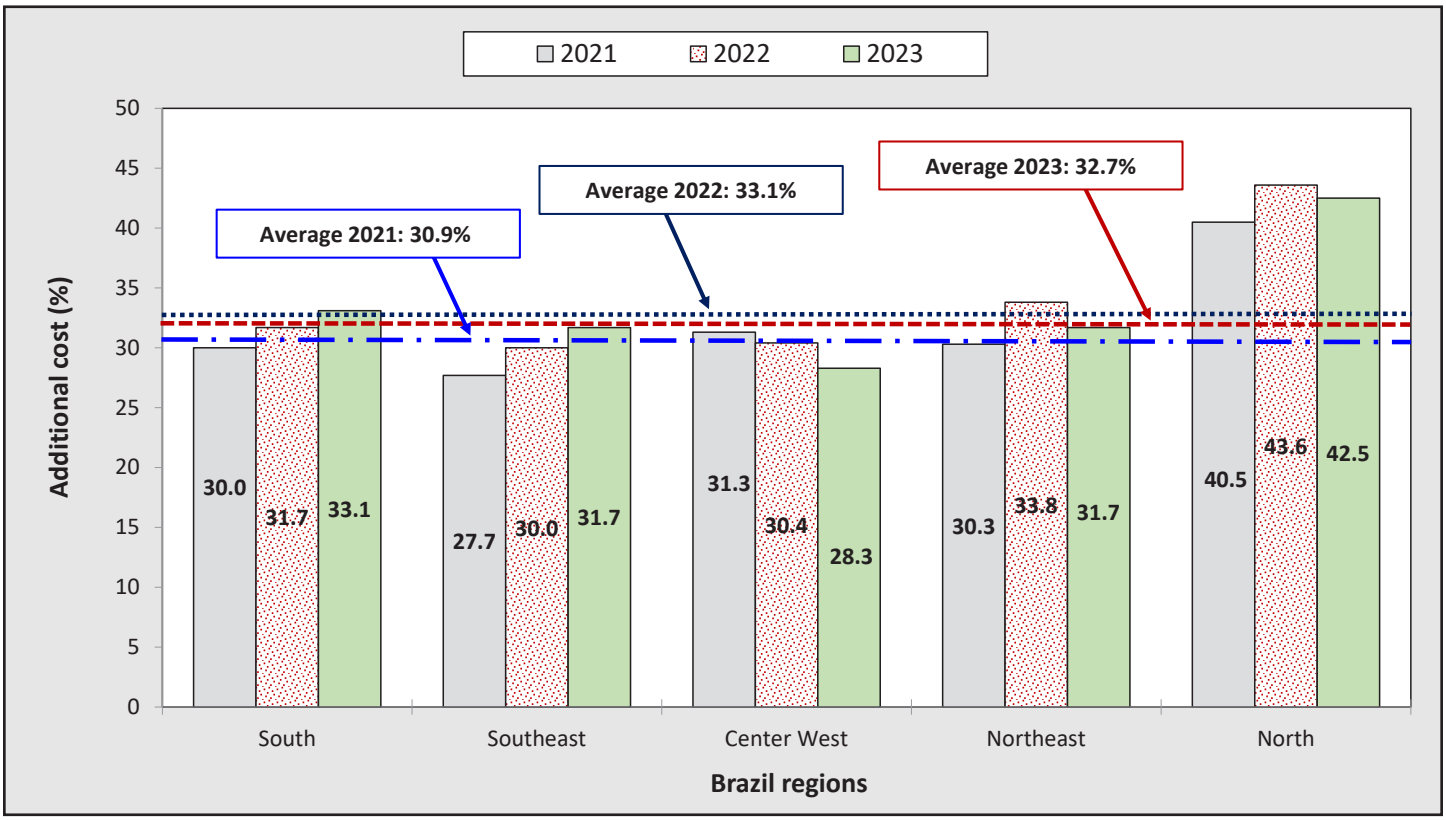
US–Brazil soybean modal shares for exports



Note: Brazil data compiled from the National Land Transport Agency (ANTT); National Water Transport Agency (ANTAQ), Comex-Vis, Ministry of Economy, and National Supply Company (CONAB). U.S. 2022 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," Brazil (ESALQ/USP) and USDA, Agricultural Marketing Service.

According to estimates based on the 2023 Confederação Nacional do Transporte (CNT) survey of overall highway conditions in Brazil, the 2023 marginal operational cost of cargo trucks was nearly 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 decreased slightly, from 33.1 percent in 2022 to 32.7 percent in 2023. For example, according to CNT, the actual cost in 2023 of shipping a metric ton of soybeans from Sorriso, North MT, to Santos was $100 per metric ton (mt), but the optimal cost was $67.30/mt.

Cost increases because of poor road pavement conditions, 2021–23



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. The main changes to the guidelines are as follows:

1. Shippers are obligated to pay backhaul freight rates for the return of empty containers. Shippers must also pay backhaul freight rates for trucks that cannot legally carry backhaul cargo—for example, trucks that carry fuel or gases 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 reduce the wait time for trucks and drivers.
5. The table's itemized costs (e.g., for 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 September 2024, a new date for the hearings had not yet been set. Until the Supreme Court rules on the current law, it will remain in force. The Brazilian Government created a provisional measure that changes the freight table's automatic parameters. In July 2024, ANTT's adjustments to the minimum freight rates resulted in an average increase of 1.28-1.59 percent.

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 railway 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 $17.4 billion (R$94.2 billion) in the railway sector between 2023 and 2026.[3] 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)).

3 Exchange rate of 5.41 real per U.S. dollar, June 18, 2024.

2. **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, this section is expected to be available for use. The Brazilian mining company Bahia Mineraçao S.A. (Bamin) financed the $277 million (1.5 billion reais (R$)) 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).

3. **Center-West Integration (FICO) Railroad (EF-354):** Mara Rosa, Goiás – Água Boa, Mato Grosso (MT) – Lucas do Rio Verde (MT) – Vilhnea, 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), Itaqui (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.

   Current Status: In 2023, FICO 1 construction started. Vale S.A. is building the railroad at an estimated cost of $505 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.

4. **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 $4.7 billion (R$ 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.

5. **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 began working on the highway, 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 $295.8 million (R$1.6 billion) within the next 2 years (Canalrural).

6. **The 663-mile (1,067 km) stretch of BR-163 from Sorriso, North Mato Grosso to Miritituba:** 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*).

7. **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. BR 158 crosses the States of Pará, Goiás, Mato Grosso, Mato Grosso do Sul, Paraná, and Rio Grande do Sul. Since the highway traverses 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 $25 million (R$136.6 million) in the extension of the BR 158 (CanalRural). Under study.

8. **Port Santos:** Several new projects to modernize and expand capacity of Port Santos are soon to be underway:

   - **New solid bulk terminal:** In 2022, COFCO International Brasil SA won the auction to build a new agricultural solid bulk terminal (STS 11), as well as a 25-year concession to run it. 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.

     Current Status: On August 8, 2023, the construction started in the Valongo park area, at the Port of Santos (DatamarNews).

   - **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 the first half of 2025 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: Under public consultation. The ministry of Ports and Airports will also hold in-person public hearings in the municipalities of Santos and Guarujá. 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 $998 million (R$5.4 billion) in Federal resources, of which $462 million (R$2.5 billion) are already available for the Port Authority of Santos (CNNBrasil).

- **Deepening the port's access channel:** A project to increase the port's access channel from the current depth of 15 meters to 17 meters.

  Current status: By the end of 2024, the Santos Port Authority (APS) intends to launch two public-private partnerships (PPPs): one for the deepening of the access channel and the other for a tunnel connecting the cities of Santos and Guarujá (globo.com).

- **New Port Terminal:** Brazil's largest private freight railroad operator Rumo has signed an agreement with global supply chain and logistics company DP World to build a new port terminal for grains, oilseeds, and fertilizer. The new project will increase Santos' handling capacity by up to 12.5 mmt/year, comprising 9 mmt of grains and 3.5 mmt of fertilizers.

  Current status: The project is subject to regulatory approval. The terminal will be built at DP World's private use terminal on the port's left bank and is expected to take 30 months to construct (world-grain.com).

9. **Dredging in the Amazon:** A total of $92.4 million (R$500 million) will be invested to mitigate drought effects in the region (DatamarNews) through dredging.

   Current status: On June 19, 2024, the Brazilian Ministry of Ports and Airports made a service call to hire dredging services in four different stretches of the Amazon and Solimões Rivers.

10. **The North-South (EF-151) Railroad (FSN):** Porto National, 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 Itaquí-Sâo 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 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 September 2024 (Soybean & Corn Advisor and ESALQ-LOG personal communication). 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 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.

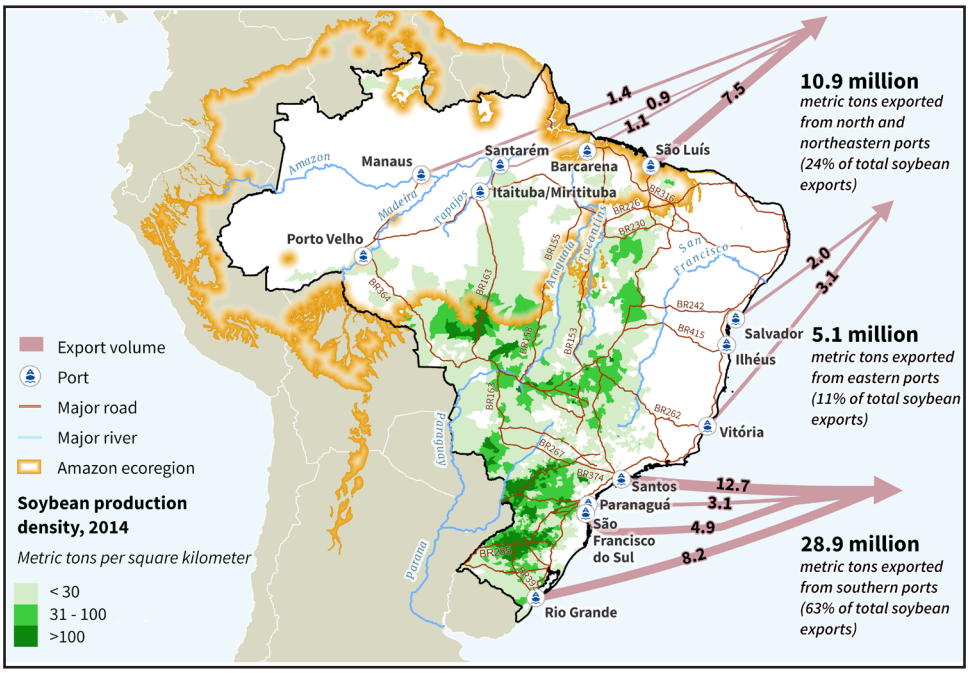
According to the Planning and Logistics Company (EPL), a public company linked to the Federal Government, cabotage accounts for only 11 percent of cargo transport in Brazil. Most freight is carried by truck (65 percent). EPL estimates that the BR do Mar program could reduce cabotage costs by more than 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.

Current status: The Brazilian port sector is still awaiting the enactment of the cabotage project. The Federal Government is working on defining the details of the new rules (DatamarNews).

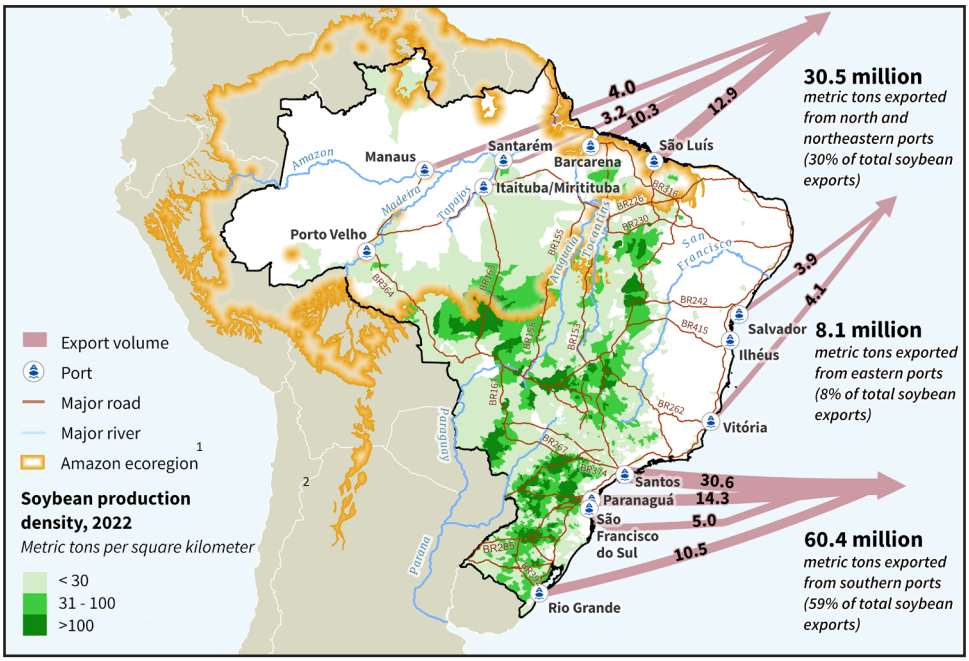
Since 2013, Brazil's total exports have more than doubled. The expansion is the result of a comprehensive infrastructure improvement plan between the Brazilian Government and the private sector that started in 2007.

Brazilian soybean exports capacity expansion by port, 2013–23

Brazil soybean exports: 2014



Brazil soybean exports: 2023



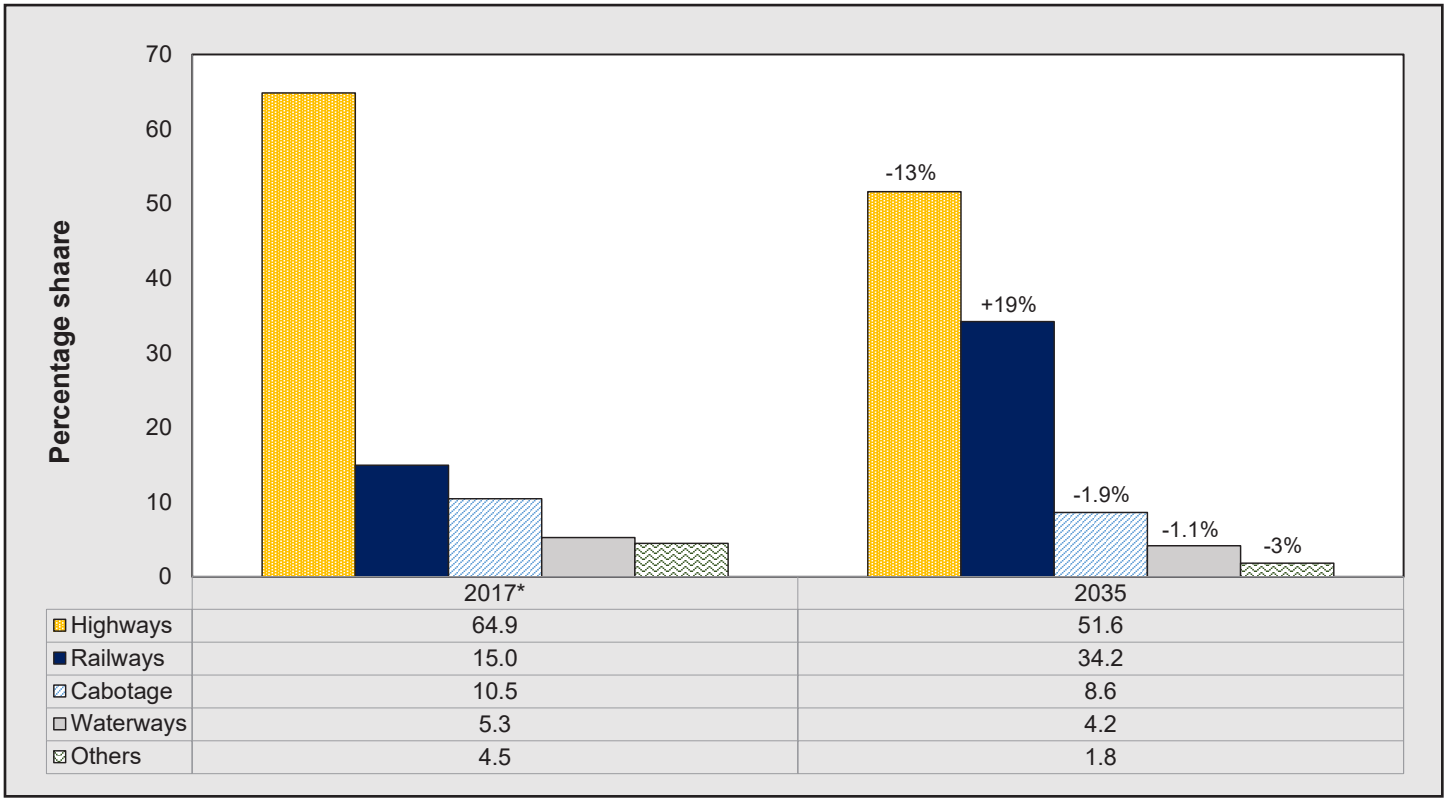
Ports	Million metric tons		
	2013	2014	2023
Santos	12.9	12.7	30.6
Paranaguá	3.0	3.1	14.3
São Luís	7.7	7.5	12.9
Rio Grande	8.2	8.2	10.5
Barcarena/ Belém	-	1.1	10.3
São Francisco do Sul	4.0	4.9	5.0
Vitória	2.8	3.1	4.1
Manaus	1.3	1.4	4.0
Salvador	1.8	2.0	3.9
Santarém	1.0	0.9	3.2
Others	0.1	0.7	3.0
Total	42.8	45.7	101.9

1 World Wildlife Fund.
2 Brazilian Institute of Geography and Statistics—Produção Agricola Municipal.
Note: A hyphen in an otherwise empty cell denotes that the data are not available. The table totals for 2013, 2014, and 2023 differ from the map totals, because the table totals include an "other ports" category (not included in the map).
Source: Comex Stat, Ministério da Indústria, Comércio Exterior e Serviços (MDIC) and USDA, Foreign Agricultural Service.

Brazilian Soybean-Export Modal Shares

In 2021, through a joint effort 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. By 2035, the plan (which began in 2017) aims to reduce truck shipments by 13 percentage points, from 65 to nearly 52 percent—and to raise railway participation by 19 percentage points, from 15 to 34 percent. As a result, cabotage will decrease about 2 percent while waterway use slightly decreases. Already, 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.

Brazilian modal shares for general cargo, 2017–35



	2017*	2035
Highways	64.9	51.6
Railways	15.0	34.2
Cabotage	10.5	8.6
Waterways	5.3	4.2
Others	4.5	1.8

*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, 2010–23

Total							
Year	Truck		Short-haul truck				Total soybeans
			Rail		Barge		
	1,000 tons	Percent	1,000 tons	Percent	1,000 tons	Percent	1,000 tons
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
2020	84,356	67.6	28,301	22.7	12,188	9.7	124,845
2021	95,016	68.2	32,628	23.4	11,741	8.4	139,385
2022	85,800	68.3	29,717	23.7	10,033	8.0	125,550
2023	106,398	68.8	34,256	22.2	13,956	9.0	154,610
Export							
Year	Truck		Short-haul truck				Total soybeans
			Rail		Barge		
	1,000 tons	Percent	1,000 tons	Percent	1,000 tons	Percent	1,000 tons
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	68,155
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
2020	43,446	52.4	28,092	33.9	11,435	13.7	82,973
2021	43,161	50.1	32,376	37.6	10,573	12.3	86,110
2022	39,569	50.3	29,589	37.6	9,572	12.1	78,730
2023	55,254	54.2	34,037	33.4	12,579	12.4	101,870

(continued on page 31)

Domestic							
Year	Truck		Short-haul truck				Total soybeans
			Rail		Barge		
	1,000 tons	Percent	1,000 tons	Percent	1,000 tons	Percent	1,000 tons
2010	38,239	96.7	232	0.5	1,145	2.8	39,616
2011	40,972	96.9	208	0.4	1,168	2.7	42,348
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	38,704
2014	39,799	98.4	190	0.4	492	1.2	40,481
2015	42,535	99.5	234	0.5	0	0.0	42,769
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	46,872
2018	38,416	96.2	276	0.6	1,310	3.2	40,002
2019	44,332	97.2	342	0.7	972	2.1	45,646
2020	40,910	97.7	209	0.5	753	1.8	41,872
2021	51,855	97.3	252	0.5	1,168	2.2	53,275
2022	46,231	98.7	128	0.3	461	1.0	46,820
2023	51,144	97.0	219	0.4	1,377	2.6	52,740

Note: Data compiled from the National Land Transport Agency (ANTT); National Land Transport Agency (ANTAQ), Comex-Vis, Ministry of Economy, and National Supply Company (CONAB).

*Short-haul truck shipments refer to the average distance of 388 miles (625 kilometers (km)) 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," Brazil (ESALQ/USP) and USDA, Agricultural Marketing Service.

Transportation Indicators

Quarterly costs of transporting Brazilian soybeans from the southern ports to Shanghai, China, 2023

	1st qtr	2nd qtr	3rd qtr	4th qtr	Avg	1st qtr	2nd qtr	3rd qtr	4th qtr	Avg
	North MT[1] - Santos[2] by truck —US$/mt—					North MT[1] - Paranaguá[2] —US$/mt—				
Truck	96.25	100.36	113.56	103.06	103.31	95.66	98.90	112.54	101.19	102.07
Ocean	33.50	35.20	37.00	35.00	35.18	35.00	36.70	37.50	35.50	36.18
Total transportation	129.75	135.56	150.56	138.06	138.48	130.66	135.60	150.04	136.69	138.25
Farm gate price[3]	472.04	384.93	399.94	406.91	415.95	472.04	384.93	399.94	406.91	415.95
Landed cost	601.78	520.49	550.51	544.97	554.44	602.70	520.53	549.99	543.60	554.20
Transport % of landed cost	21.6	26.0	27.4	25.3	25.1	21.7	26.1	27.3	25.1	25.0
	North MT[1] - Santos[2] by rail —US$/mt—					Northwest RS[1] - Rio Grande[2] —US$/mt—				
Truck	34.85	35.89	40.22	36.72	36.92	33.02	33.70	35.89	35.16	34.44
Rail[4]	49.62	54.47	58.44	56.61	54.78	-	-	-	-	-
Ocean	33.50	35.20	37.00	35.00	35.18	34.00	35.70	38.50	35.50	35.93
Total transportation	117.97	125.56	135.66	128.33	126.88	67.02	69.40	74.39	70.66	70.37
Farm gate price[3]	472.04	384.93	399.94	406.91	415.95	525.80	437.80	469.48	457.20	472.57
Landed cost	590.00	510.49	535.60	535.24	542.83	592.81	507.20	543.87	527.85	542.93
Transport % of landed cost	20.0	24.6	25.3	24.0	23.5	11.3	13.7	13.7	13.4	13.0

[1]Producing regions: RS=Rio Grande do Sul and MT=Mato Grosso.

[2]Export port.

[3]The source of the farm gate price is the Brazilian Government, Companhia Nacional de Abastecimento (CONAB).

[4]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, 2023

	1st qtr	2nd qtr	3rd qtr	4th qtr	Avg	1st qtr	2nd qtr	3rd qtr	4th qtr	Avg
	North MT[1] - Santos[2] by truck —US$/mt—					North MT[1] - Paranaguá[2] —US$/mt—				
Truck	96.25	100.36	113.56	103.06	103.31	95.66	98.90	112.54	101.19	102.07
Ocean	31.65	33.20	35.00	33.00	33.21	31.00	32.50	34.20	32.10	32.45
Total transportation	127.90	133.56	148.56	136.06	136.52	126.66	131.40	146.74	133.29	134.52
Farm gate price[3]	472.04	384.93	399.94	406.91	415.95	472.04	384.93	399.94	406.91	415.95
Landed cost	599.93	518.49	548.51	542.97	552.47	598.70	516.33	546.69	540.20	550.48
Transport % of landed cost	21.3	25.8	27.1	25.1	24.8	21.2	21.6	26.8	24.7	23.6
	1st qtr	2nd qtr	3rd qtr	4th qtr	Avg	1st qtr	2nd qtr	3rd qtr	4th qtr	Avg
	North MT[1] - Santos[2] by rail —US$/mt—					Northwest RS[1] - Rio Grande[2] —US$/mt—				
Truck	34.85	35.89	40.22	36.72	36.92	33.02	33.70	35.89	35.16	34.44
Rail[4]	49.62	54.47	58.44	56.61	54.78	-	-	-	-	-
Ocean	31.65	33.20	35.00	33.00	33.21	32.50	34.20	36.00	33.80	34.13
Total transportation	116.12	123.56	133.66	126.33	124.92	65.52	67.90	71.89	68.96	68.57
Farm gate price[3]	472.04	384.93	399.94	406.91	415.95	525.80	437.80	469.48	457.20	472.57
Landed cost	588.15	508.49	533.60	533.24	540.87	591.31	505.70	541.37	526.15	541.13
Transport % of landed cost	19.7	19.4	25.0	23.7	22.0	11.1	13.4	13.3	13.1	12.7

[1]Producing regions: RS=Rio Grande do Sul and MT=Mato Grosso.

[2]Export port.

[3]The source of the farm gate price is the Brazilian Government, Companhia Nacional de Abastecimento (CONAB).

[4]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, 2023

	1st qtr	2nd qtr	3rd qtr	4th qtr	Avg	1st qtr	2nd qtr	3rd qtr	4th qtr	Avg
	North MT[1] - Santarém[2] —US$/mt—					South MA[1] - São Luís[2] —US$/mt—				
Truck	62.23	68.56	73.96	66.05	67.70	41.03	41.07	48.72	43.63	43.61
Ocean	37.50	39.40	41.40	39.00	39.33	38.00	40.00	42.00	39.50	39.88
Total transportation	99.73	107.96	115.36	105.05	107.02	79.03	81.07	90.72	83.13	83.49
Farm gate price[3]	472.04	384.93	399.94	406.91	415.95	508.13	420.39	428.33	426.71	445.89
Landed cost	571.76	492.89	515.30	511.96	522.98	587.16	501.46	519.05	509.84	529.38
Transport % of landed cost	17.4	21.9	22.4	20.5	20.6	13.5	16.2	17.5	16.3	15.9
	1st qtr	2nd qtr	3rd qtr	4th qtr	Avg	1st qtr	2nd qtr	3rd qtr	4th qtr	Avg
	Southwest PI[1] - São Luís[2] —US$/mt—					North MT[1] - Barcarena[2] —US$/mt—				
Truck	46.93	46.41	52.28	48.74	48.59	53.34	58.45	61.36	51.36	56.13
Barge[4]	-	-	-	-	-	21.24	27.47	30.47	26.33	26.38
Ocean	38.00	40.00	42.00	39.50	39.88	38.25	40.20	42.20	39.60	40.06
Total transportation	84.93	86.41	94.28	88.24	88.47	112.83	126.12	134.03	117.29	122.57
Farm gate price[3]	499.05	406.67	432.42	440.89	444.76	472.04	384.93	399.94	406.91	415.95
Landed cost	583.97	493.08	526.70	529.13	533.22	584.86	511.05	533.97	524.19	538.52
Transport % of landed cost	14.5	17.5	17.9	16.7	16.7	19.3	24.7	25.1	22.4	22.9

[1]Producing regions: MT=Mato Grosso, PI=Piauí, and MA=Maranhão.

[2]Export port.

[3]The source of the farm gate price is the Brazilian Government, Companhia Nacional de Abastecimento (CONAB).

[4]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, 2023

	1st qtr	2nd qtr	3rd qtr	4th qtr	Avg	1st qtr	2nd qtr	3rd qtr	4th qtr	Avg
	North MT[1] - Santarém[2] —US$/mt—					South MA[1] - São Luís[2] —US$/mt—				
Truck	62.23	68.56	73.96	66.05	67.70	41.03	41.07	48.72	43.63	43.61
Ocean	30.00	31.50	33.00	31.00	31.38	34.50	36.30	38.20	36.00	36.25
Total transportation	92.23	100.06	106.96	97.05	99.07	75.53	77.37	86.92	79.63	79.86
Farm gate price[3]	472.04	384.93	399.94	406.91	415.95	508.13	420.39	428.33	426.71	445.89
Landed cost	564.26	484.99	506.90	503.96	515.03	583.66	497.76	515.25	506.34	525.75
Transport % of landed cost	16.3	20.6	21.1	19.3	19.3	12.9	15.5	16.9	15.7	15.3
	1st qtr	2nd qtr	3rd qtr	4th qtr	Avg	1st qtr	2nd qtr	3rd qtr	4th qtr	Avg
	Southwest PI[1] - São Luís[2] —US$/mt—					North MT[1] - Barcarena[2] —US$/mt—				
Truck	46.93	46.41	52.28	48.74	48.59	53.34	58.45	61.36	51.36	56.13
Barge[4]	-	-	-	-	-	21.24	27.47	30.47	26.33	26.38
Ocean	34.50	36.30	38.20	36.00	36.25	29.40	31.00	32.50	30.50	30.85
Total transportation	81.43	82.71	90.48	84.74	84.84	103.98	116.92	124.33	108.19	113.35
Farm gate price[3]	499.05	406.67	432.42	440.89	444.76	472.04	384.93	399.94	406.91	415.95
Landed cost	580.47	489.38	522.90	525.63	529.60	576.01	501.85	524.27	515.09	529.31
Transport % of landed cost	14.0	16.9	17.3	16.1	16.1	18.1	23.3	23.7	21.0	21.5

[1]Producing regions: MT=Mato Grosso, PI=Piauí, and MA=Maranhão.

[2]Export port.

[3]The source of the farm gate price is the Brazilian Government, Companhia Nacional de Abastecimento (CONAB).

[4]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.

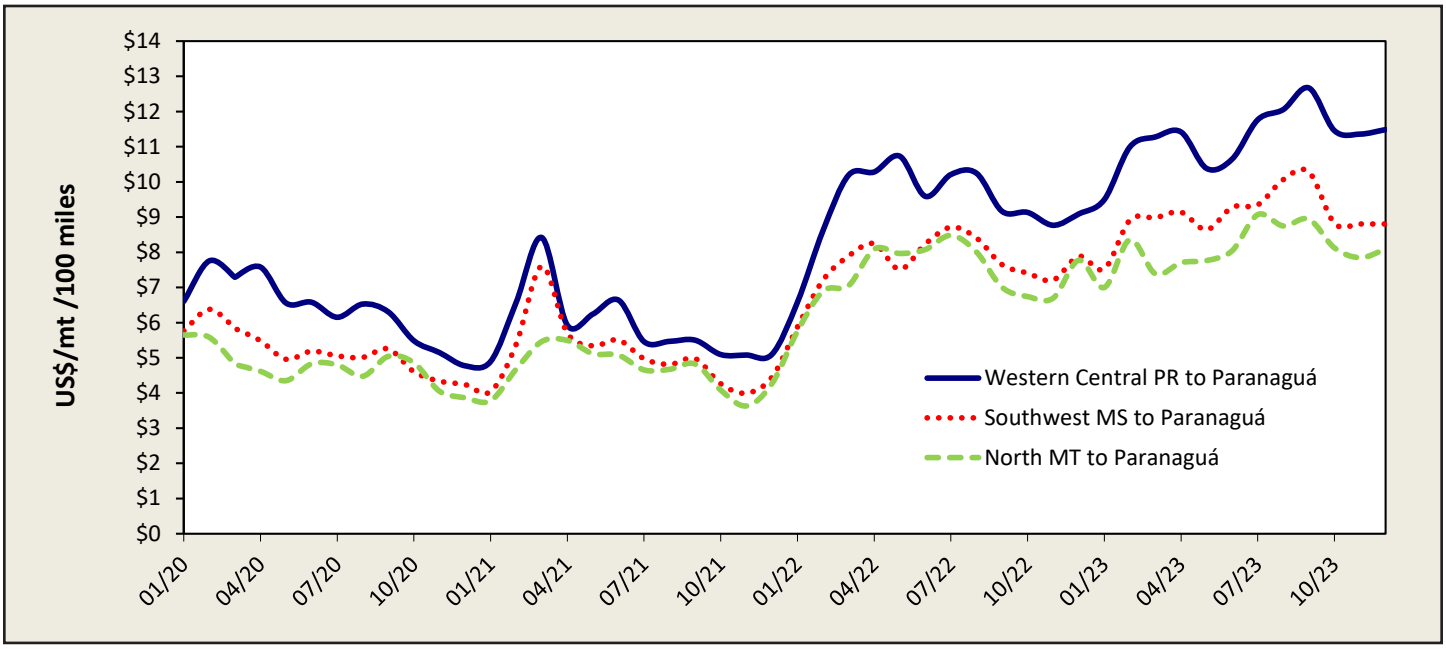
Source: University of São Paulo, Escola Superior de Agricultura "Luiz de Queiroz," Brazil (ESALQ/USP) and USDA, Agricultural Marketing Service.

Quarterly truck rates for selected Brazilian soybean export transportation routes, 2023

Route #	Origin[1] (reference city)	Destination	Distance (miles)[2]	Share (%)[3]	Freight price (US$/mt/100miles) [4]				
					1st qtr	2nd qtr	3rd qtr	4th qtr	Avg
1	Northwest RS[5] (Cruz Alta)	Rio Grande	288	10.2	11.46	11.70	12.46	12.21	11.96
2	North MT (Sorriso)	Santos	1,190	2.9	8.09	8.43	9.54	8.66	8.68
3	North MT (Sorriso)	Paranaguá	1,262	2.7	7.58	7.84	8.92	8.02	8.09
4	South GO (Rio Verde)	Santos	587	5.0	7.77	8.38	9.25	8.42	8.46
5	South GO (Rio Verde)	Paranaguá	726	4.0	7.96	8.19	9.32	8.48	8.49
6	North Central PR (Londrina)	Paranaguá	268	2.8	11.40	11.96	13.09	12.33	12.20
7	Western Central PR (Mamborê)	Paranaguá	311	2.2	10.59	10.82	12.16	11.43	11.25
8	Triangle MG (Uberaba)	Santos	339	3.3	10.77	11.57	12.66	11.63	11.66
9	West PR (Assis Chateaubriand)	Paranaguá	377	3.1	9.50	9.73	10.93	10.21	10.09
10	West Extreme BA (São Desidério)	Salvador	535	6.4	8.61	9.39	9.99	9.34	9.33
11	Southeast MT (Primavera do Leste)	Santos	901	2.4	7.37	7.92	8.98	8.46	8.18
12	Southeast MT (Primavera do Leste)	Paranaguá	975	2.2	7.17	7.52	8.51	7.74	7.74
13	Southwest MS (Maracaju)	Paranaguá	612	3.7	8.47	9.02	9.90	8.81	9.05
14	Southwest MS (Maracaju)	Santos	652	3.5	8.46	9.16	9.39	8.98	9.00
15	West PR (Assis Chateaubriand)	Santos	550	2.0	6.96	7.31	8.37	7.39	7.51
16	East GO (Cristalina)	Santos	585	2.0	8.98	9.58	10.54	9.64	9.68
17	North PR (Cornélio Procópio)	Paranaguá	306	1.7	9.28	9.68	10.58	10.05	9.90
18	Eastern Central PR (Castro)	Paranaguá	130	1.8	14.81	16.09	16.53	16.56	16.00
19	South Central PR (Guarapuava)	Paranaguá	204	2.2	13.16	14.28	15.61	14.91	14.49
20	North Central MS (São Gabriel do Oeste)	Santos	720	2.7	7.26	8.02	8.80	8.03	8.03
21	Ribeirão Preto SP (Guairá)	Santos	314	0.4	9.15	9.43	10.34	9.82	9.68
22	Northeast MT (Canarana)	Santos	950	2.4	7.87	8.46	9.02	8.12	8.37
23	East MS (Chapadão do Sul)	Santos	607	1.4	7.23	7.76	8.62	7.81	7.85
24	Northeast MT (Canarana)	Paranaguá	1,075	2.1	7.41	7.78	8.75	7.80	7.93
25	Western Central RS (Tupanciretã)	Rio Grande	273	2.7	10.01	10.58	10.81	11.14	10.63
26	Southwest PR (Chopinzinho)	Paranaguá	291	1.6	10.33	10.98	11.94	11.36	11.15
27	North MT (Sorriso)	Itaituba	672	5.2	7.94	8.70	9.13	7.65	8.36
28	North MT (Sorriso)	Porto Velho	632	5.5	7.46	7.75	8.47	7.69	7.84
29	North MT (Sorriso)	Santarém	876	4.0	7.10	7.82	8.44	7.54	7.73
30	South MA (Balsas)	São Luís	482	2.0	8.52	8.53	10.12	9.06	9.06
31	Southwest PI (Bom Jesus)	São Luís	606	2.5	7.75	7.66	8.63	8.05	8.02
32	Southeast PA (Paragominas)	Barcarena	249	1.6	10.50	10.16	9.56	12.36	10.64
33	East TO (Campos Lindos)	São Luís	842	1.8	7.06	7.26	8.13	7.46	7.48
	Weighted average		**587**	**100.0**	**8.92**	**9.41**	**10.23**	**9.43**	**9.50**
34	North MT (Sorriso)	Rondonópolis (Rail terminal)	382		9.12	9.39	10.53	9.61	9.67
35	Rondonópolis MT (Rail terminal)[6]	Santos	1,019		4.87	5.35	5.73	5.56	5.38
36	Itaituba PA (Barge terminal)[7]	Santarém	153		7.93	5.39	5.46	5.43	6.05
37	Itaituba PA (Barge terminal)[7]	Barcarena	600		3.54	4.58	5.08	4.39	4.40
38	South GO (Rio Verde)(Rail terminal)[6]	Santos	546		5.96	6.72	7.39	6.97	6.76

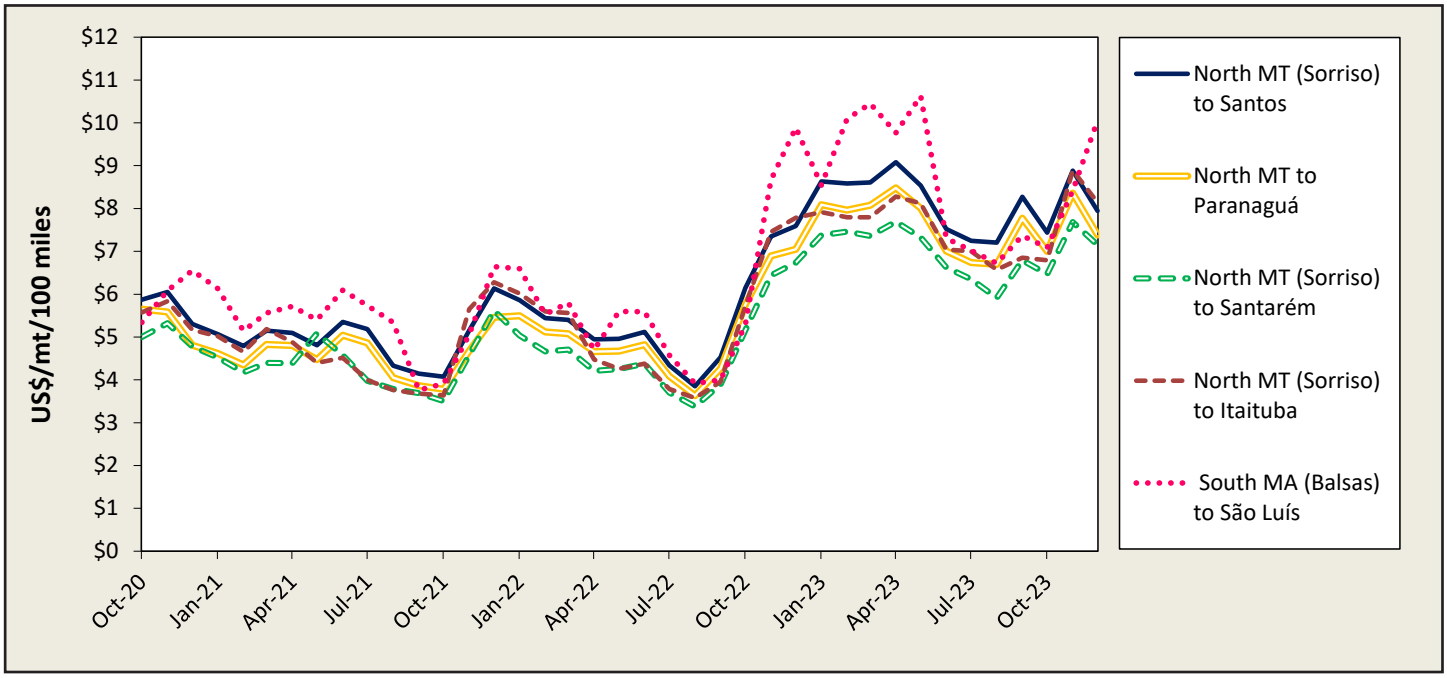
[1]The main city in the region is considered as a reference to establish the freight price.
[2]Distance from the main city of the considered region to the mentioned ports.
[3]Share of exports in total production (percentage).
[4]Average monthly exchange rate from "Banco Central do Brasil" was used to convert Brazilian reais to U.S. dollars.
[5]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.
[6]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).
[7]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.
[8]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.
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, 2020–23



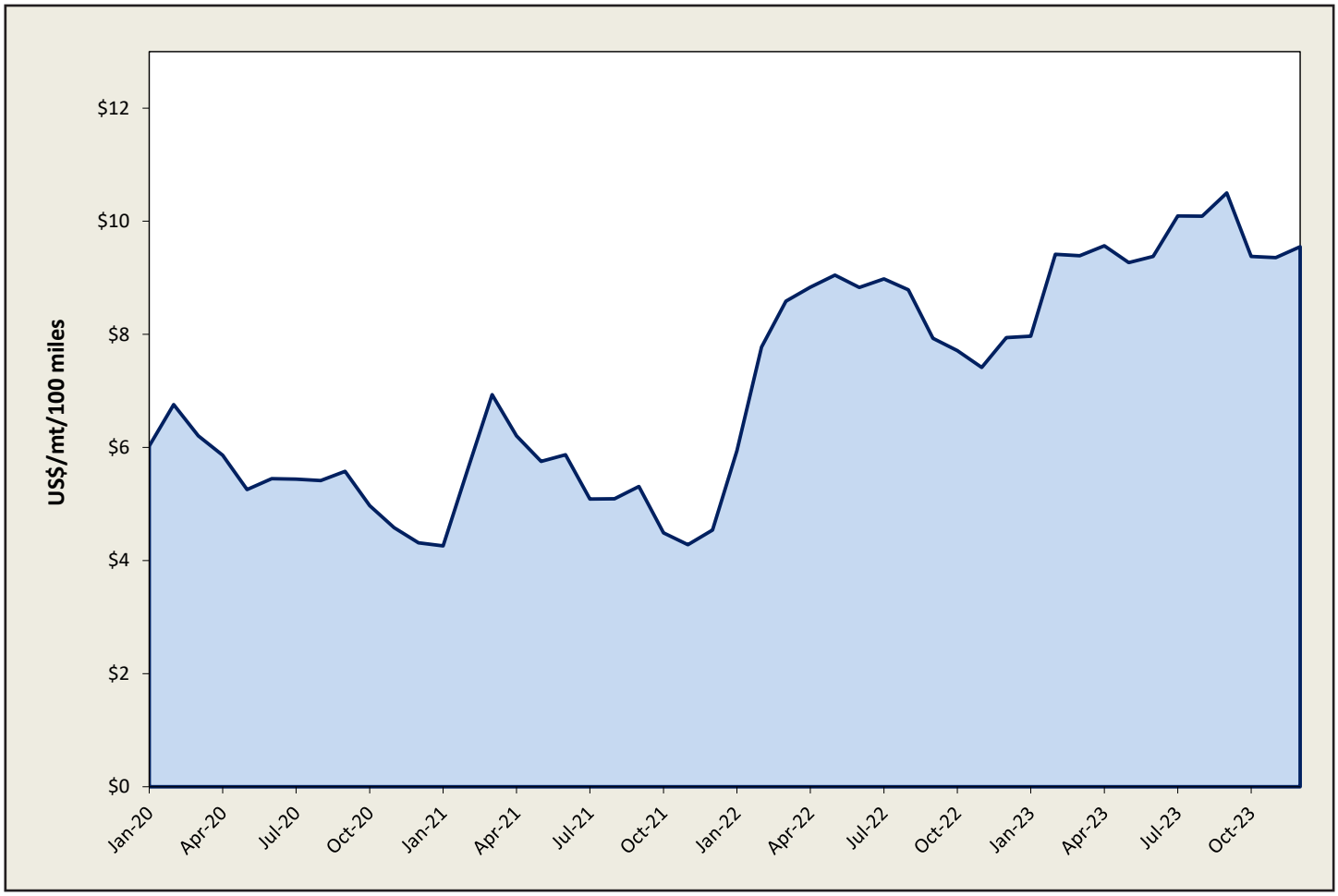
Note: mt=metric ton. PR=Paraná, MT=Mato Grosso, and MS=Mato Grosso do Sul.
Source: University of São Paulo, Escola Superior de Agricultura "Luiz de Queiroz," Brazil (ESALQ/USP) and USDA, Agricultural Marketing Service.

Truck rates for selected north, south, and northeastern Brazilian soybean export transportation routes, 2020–23



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, 2020–23



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, 2016–23

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-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
Jan-19	7.72	7.5	133.13	Jan-23	7.97	0.4	137.38
Feb-19	8.19	6.0	141.15	Feb-23	9.41	18.1	162.28
Mar-19	7.34	-10.3	126.61	Mar-23	9.39	-0.3	161.87
Apr-19	7.16	-2.6	123.35	Apr-23	9.57	1.9	164.91
May-19	6.73	-5.9	116.02	May-23	9.27	-3.1	159.82
Jun-19	6.94	3.1	119.56	Jun-23	9.38	1.1	161.64
Jul-19	8.33	20.1	143.60	Jul-23	10.09	7.6	173.97
Aug-19	7.85	-5.8	135.23	Aug-23	10.09	0.0	173.94
Sep-19	7.09	-9.7	122.17	Sep-23	10.50	4.1	181.01
Oct-19	6.57	-7.4	113.19	Oct-23	9.38	-10.7	161.66
Nov-19	6.41	-2.3	110.54	Nov-23	9.36	-0.2	161.31
Dec-19	5.93	-7.5	102.21	Dec-23	9.55	2.0	164.60

*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" (ESALQ/USP), Brazil, and USDA, Agricultural Marketing Service.

Quarterly ocean freight rates for shipping soybeans from selected Brazilian ports to Shanghai, China, 2017–23 (US$/metric ton)*

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	31.50	31.06
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	34.25	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
Port	**1st qtr 2023**	**2nd qtr 2023**	**3rd qtr 2023**	**4th qtr 2023**	**2023 Average**
Santos	33.50	35.20	37.00	35.00	35.18
Paranaguá	35.00	36.70	37.50	35.50	36.18
Rio Grande	34.00	35.70	38.50	35.50	35.93
Santarém	37.50	39.40	41.40	39.00	39.33
São Luís	38.00	40.00	42.00	39.50	39.88
Barcarena	38.25	40.20	42.20	39.60	40.06

*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, 2017–23 (US$/metric ton)*

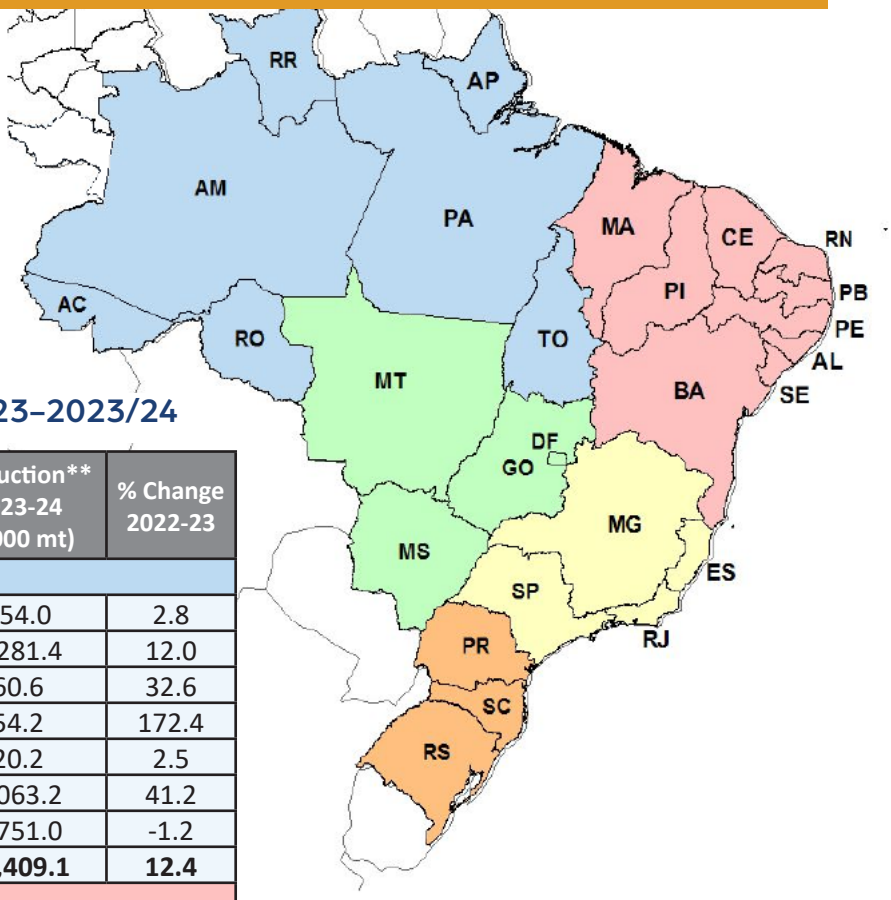
Port	1st qtr 2017	2nd qtr 2017	3rd qtr 2017	4th qtr 2017	2017 Average
Santos	21.00	24.00	26.00	27.00	24.50
Paranaguá	22.00	25.00	27.00	28.00	25.50
Rio Grande	22.00	25.00	27.00	28.00	25.50
Santarém	21.00	23.60	25.00	26.00	23.90
São Luís	17.60	20.00	21.20	22.00	20.20
Barcarena	18.00	20.60	21.80	22.70	20.78
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
Port	**1st qtr 2023**	**2nd qtr 2023**	**3rd qtr 2023**	**4th qtr 2023**	**2023 Average**
Santos	31.65	33.20	35.00	33.00	33.21
Paranaguá	31.00	32.50	34.20	32.10	32.45
Rio Grande	32.50	34.20	36.00	33.80	34.13
Santarém	30.00	31.50	33.00	31.00	31.38
São Luís	34.50	36.30	38.20	36.00	36.25
Barcarena	29.40	31.00	32.50	30.50	30.85

*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, 2022/23–2023/24

Region/State	Production* 2022-23 (1,000 mt)	Production** 2023-24 (1,000 mt)	% Change 2022-23
NORTH			
Roraima (RR)	344.4	354.0	2.8
Rondônia (RO)	2,036.7	2,281.4	12.0
Acre (AC)	45.7	60.6	32.6
Amazonas (AM)	19.9	54.2	172.4
Amapá (AP)	19.7	20.2	2.5
Pará (PA)	2,877.7	4,063.2	41.2
Tocantins (TO)	4,809.3	4,751.0	-1.2
Total	**10,153.4**	**11,409.1**	**12.4**
NORTHEAST			
Maranhão (MA)	3,910.0	4,404.0	12.6
Piauí (PI)	3,549.0	3,848.0	8.4
Ceará (CE)	17.9	13.5	-24.6
Alagoas (AL)	19.1	19.2	0.5
Bahia (BA)	7,717.2	7,481.4	-3.1
Total	**15,213.2**	**15,766.1**	**3.6**
CENTER-WEST			
Mato Grosso (MT)	45,600.50	39,343.60	-13.7
Mato Grosso do Sul (MS)	14,054.3	11,315.0	-19.5
Goiás (GO)	17,734.9	16,822.0	-5.1
Distrito Federal (DF)	318.5	308.7	-3.1
Total	**77,708.2**	**67,789.3**	**-12.8**
SOUTHEAST			
Minas Gerais (MG)	8,346.5	7,790.5	-6.7
São Paulo (SP)	4,911.4	3,653.2	-25.6
Total	**13,257.9**	**11,443.7**	**-13.7**
SOUTH			
Paraná (PR)	22,384.9	18,351.4	-18.0
Santa Catarina (SC)	2,873.5	2,970.4	3.4
Rio Grande do Sul (RS)	13,018.4	19,652.0	51.0
Total	**38,276.8**	**40,973.8**	**7.0**
TOTAL PRODUCTION	**154,609.5**	**147,382.0**	**-4.7**

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

* = estimated and ** = forecast, September 2024

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							
2011/12	25,000	13,044	66,500	268	79,812	32,906	36,434	38,834	8,072
2012/13	27,700	8,072	82,000	282	90,354	42,796	36,237	38,612	8,946
2013/14	30,100	8,946	86,200	579	95,725	45,692	37,622	40,172	9,861
2014/15	32,100	9,861	97,100	324	107,285	54,324	40,556	43,206	9,755
2015/16	33,300	9,755	95,700	382	105,837	51,582	39,531	42,206	12,049
2016/17	33,900	12,049	114,900	254	127,203	68,155	41,837	44,737	14,311
2017/18	35,150	14,311	123,400	187	137,898	83,258	43,556	46,756	7,884
2018/19	35,900	7,884	120,500	144	128,528	74,073	43,454	46,369	8,086
2019/20	36,900	8,086	128,500	822	137,408	82,973	46,845	49,995	4,440
2020/21	39,500	4,440	139,500	864	144,804	86,110	47,781	51,081	7,613
2021/22	41,500	7,613	130,500	419	138,532	78,730	50,932	54,177	5,625
2022/23	44,600	5,625	162,000	181	167,806	101,870	54,165	57,965	7,971
2023/24	45,800	7,971	153,000	925	161,896	98,000	54,000	57,750	6,146
2024/25**	47,300	6,146	169,000	150	175,296	109,000	54,500	58,500	7,796

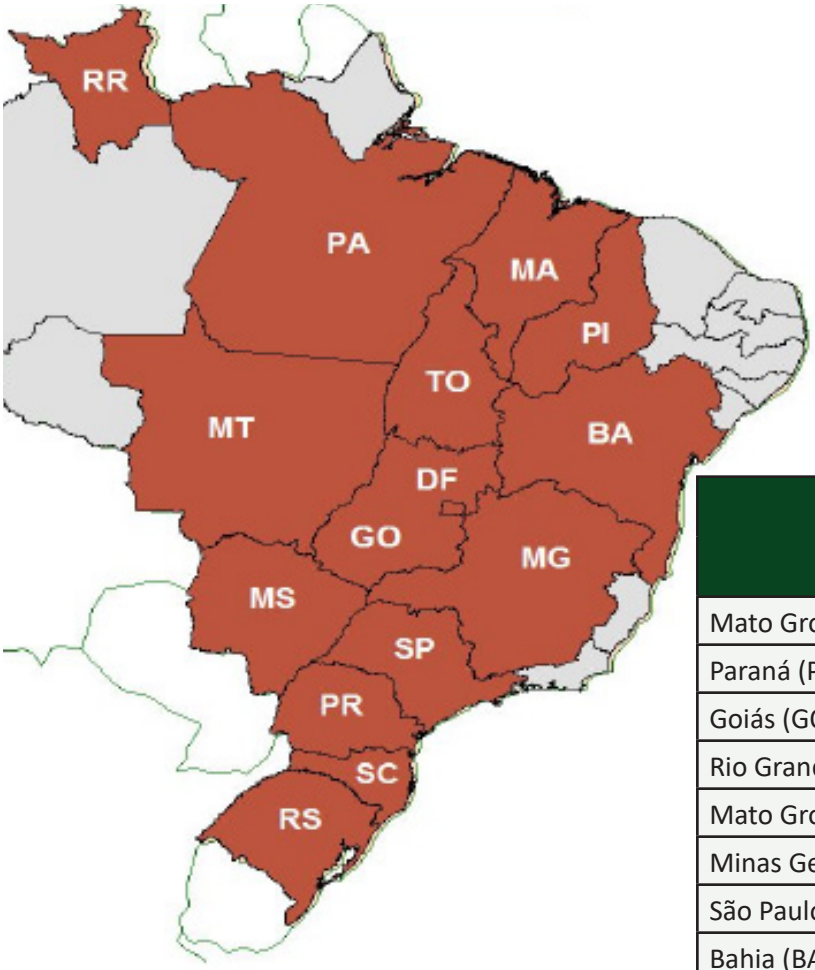
*Data based on Brazil's local January/December Marketing Year (MY). Where January-December 2025 is the 2024/25 MY.

**Forecast, September 12, 2024.

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

Exports

In 2023, Mato Grosso was Brazil's largest soybean-exporting state, accounting for 28 percent of Brazil's total exports. The next-largest exporting states (in descending order) were Paraná, Goiás, Rio Grande do Sul, Mato Grosso do Sul, and Minas Gerais. Over 93 percent of Mato Grosso's total soybean exports were shipped through the Port of Santos, Barcarena/Belém, Manaus, Santarém, São Luís, and Paranaguá.

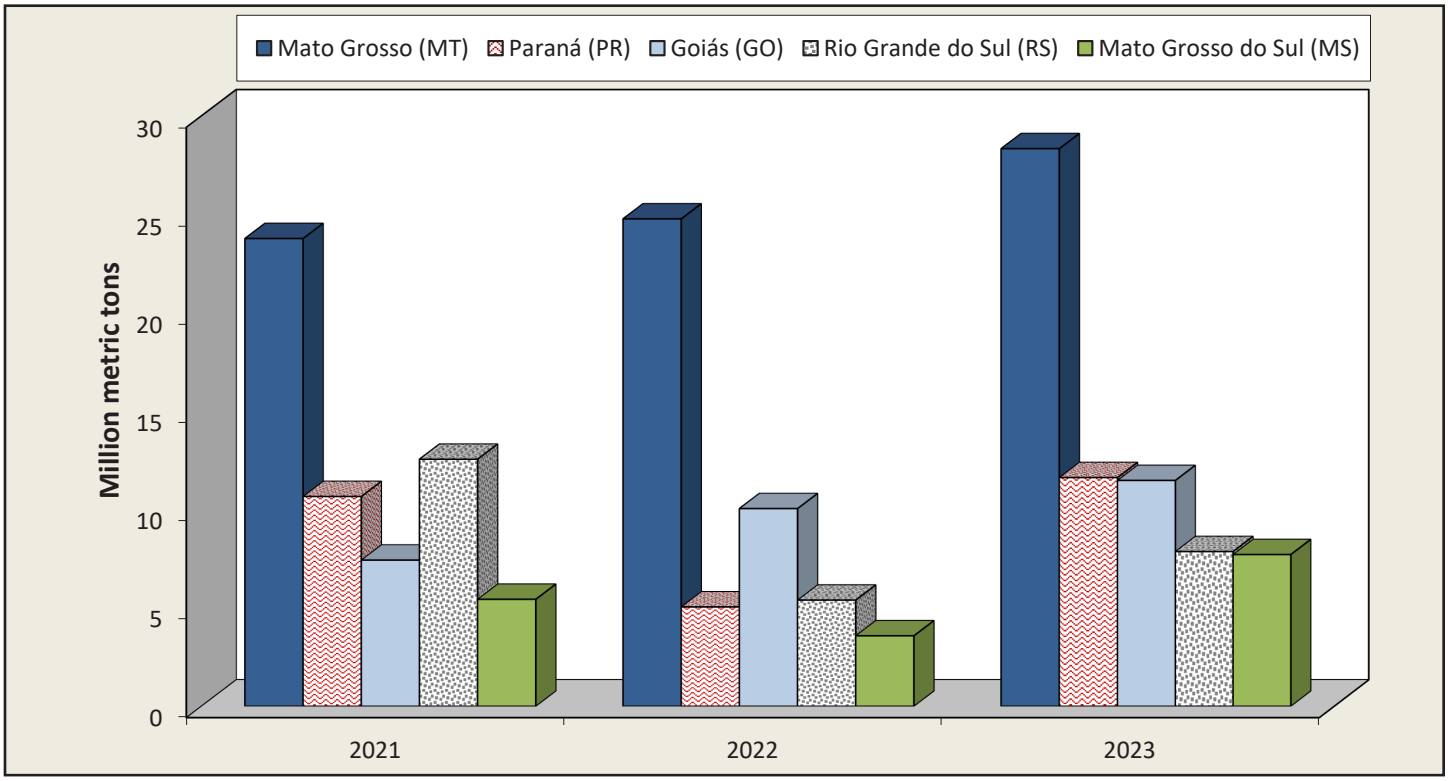


Top 15 Brazilian soybean exporting states, 2021–23

State	2021	2022	2023	Rank
	1,000 metric ton			
Mato Grosso (MT)	23,766	24,765	28,336	1
Paraná (PR)	10,644	5,038	11,606	2
Goiás (GO)	7,414	10,027	11,459	3
Rio Grande do Sul (RS)	12,538	5,383	7,846	4
Mato Grosso do Sul (MS)	5,426	3,574	7,696	5
Minas Gerais (MG)	4,668	5,503	6,249	6
São Paulo (SP)	4,959	5,060	5,767	7
Bahia (BA)	3,990	4,521	4,554	8
Maranhão (MA)	2,794	3,449	4,187	9
Tocantins (TO)	2,904	3,144	3,634	10
Pará (PA)	1,961	2,424	3,199	11
Piauí (PI)	1,501	1,940	2,406	12
Rondônia (RO)	1,539	1,721	2,152	13
Santa Catarina (SC)	1,455	1,025	1,568	14
Distrito Federal (DF)	100	146	256	15
Others	417	8,358	951	
Total	**86,100**	**78,726**	**101,865**	

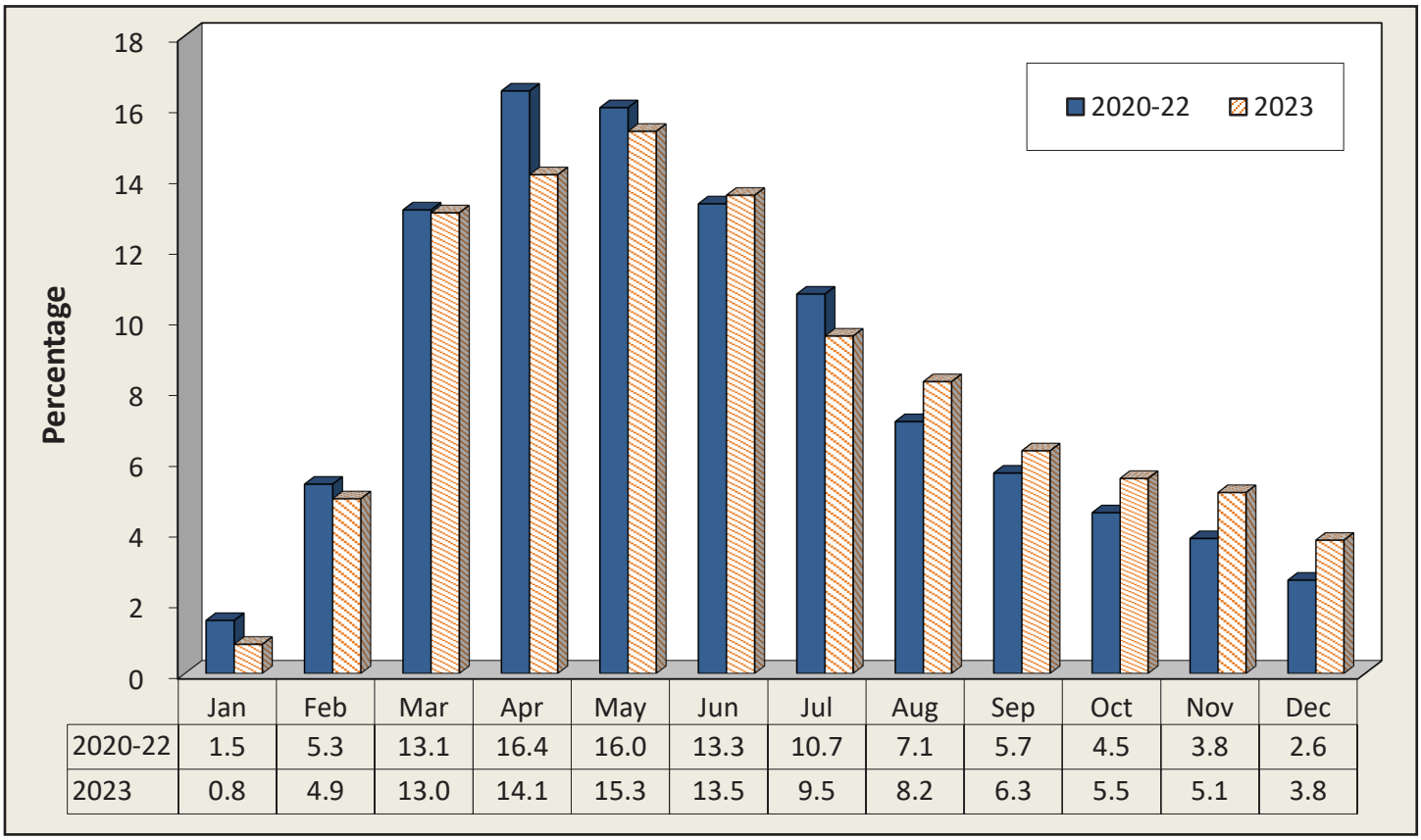
Source: Comex Stat, Ministério do Desenvolvimento, Indústria, Comércio e Serviços.

Top five Brazilian soybean exporting states, 2021–23



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

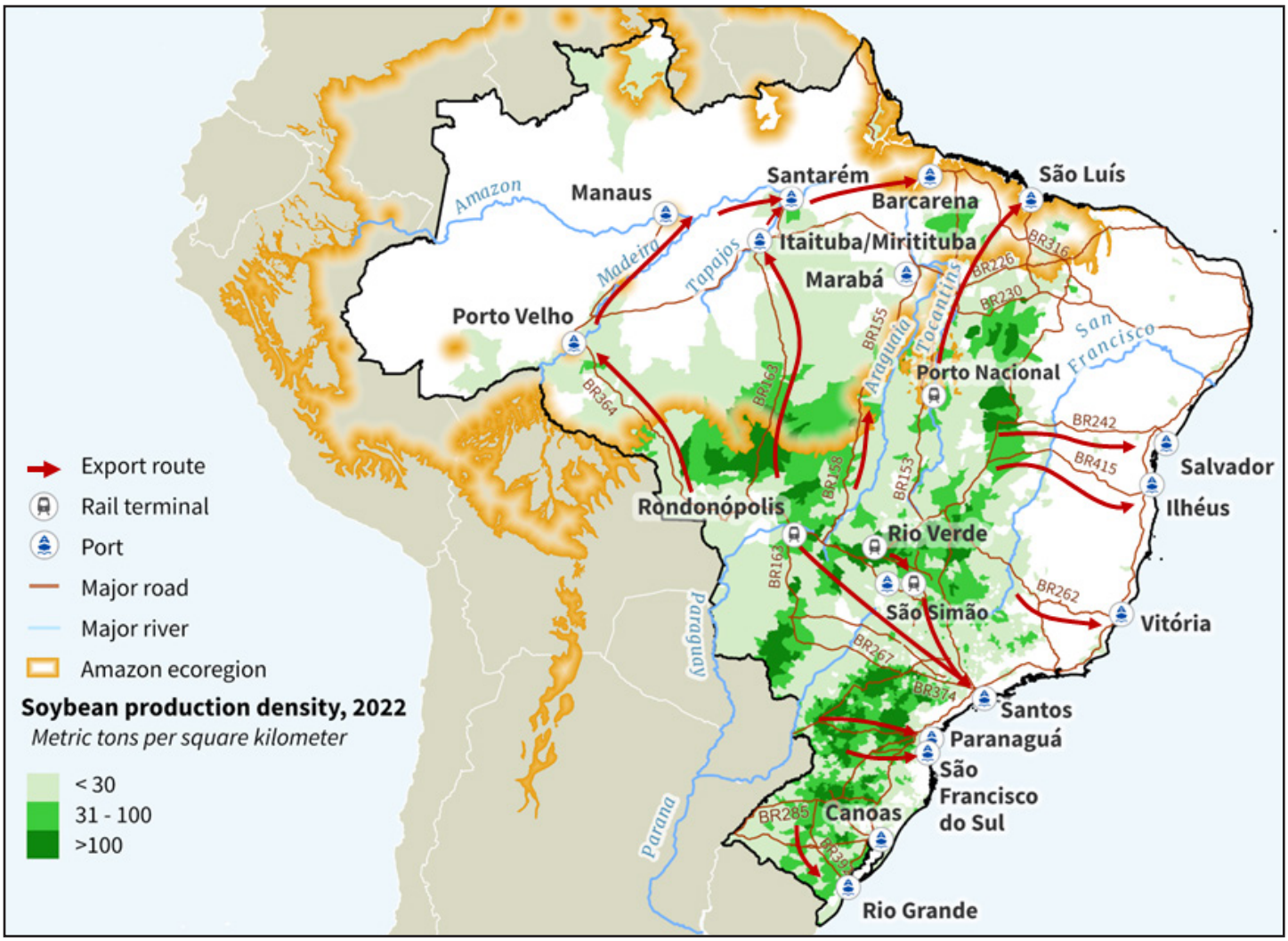
Brazil average monthly soybean exports, 2020–23



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2020-22	1.5	5.3	13.1	16.4	16.0	13.3	10.7	7.1	5.7	4.5	3.8	2.6
2023	0.8	4.9	13.0	14.1	15.3	13.5	9.5	8.2	6.3	5.5	5.1	3.8

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

Main export routes for soybeans



[1]World Wildlife Fund.
[2]Brazilian Institute of Geography and Statistics—Produção Agricola Municipal.
Source: USDA/Agricultural Marketing Service (AMS) and USDA/Foreign Agricultural Service (FAS).

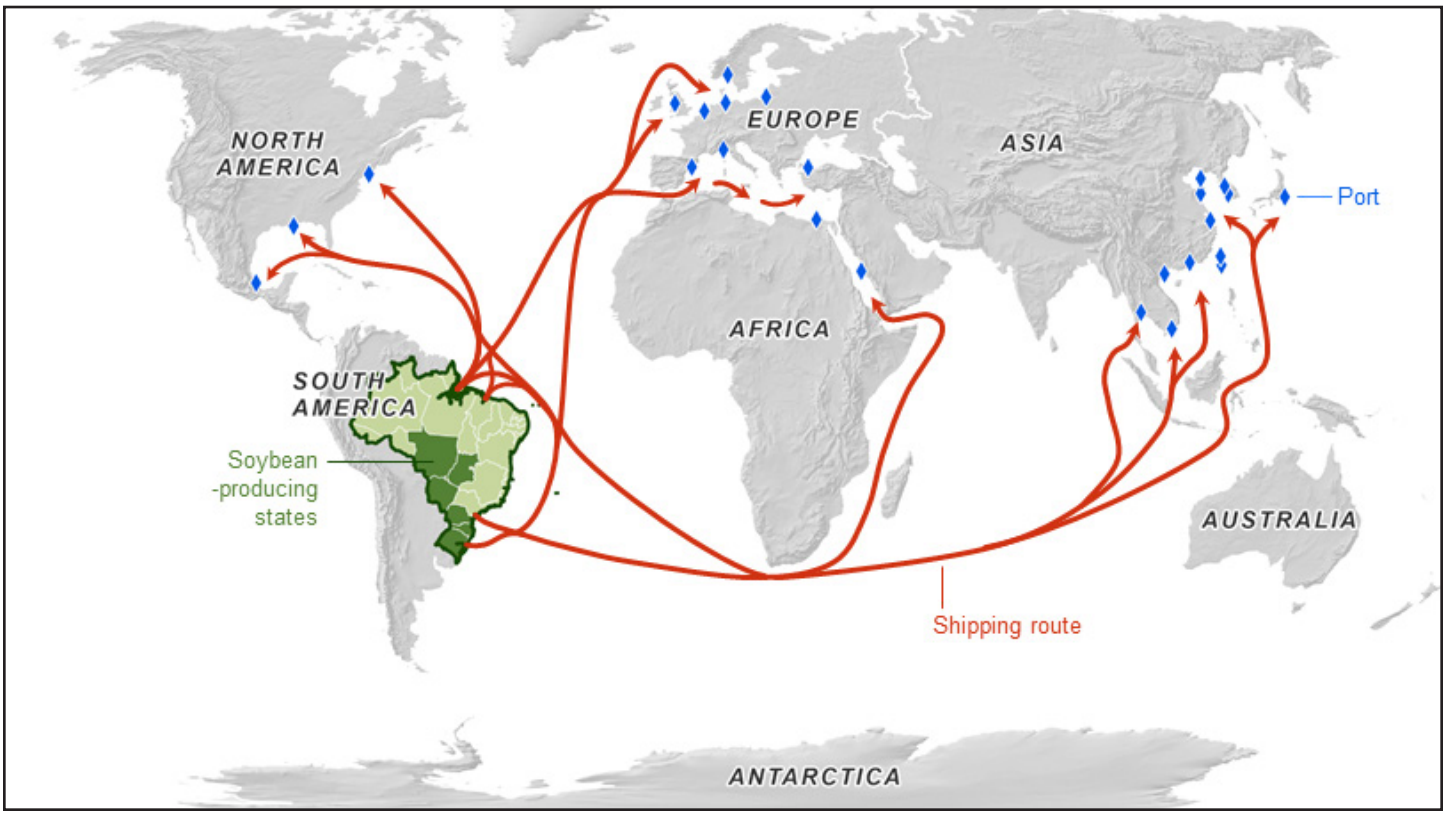
Mato Grosso soybean exports by port, 2021–23

Port	2021	2022	2023
	metric ton		
Santos	10,075,713	11,268,571	12,014,129
Barcarena/Belém	6,526,630	6,479,172	8,044,554
Manaus	1,714,576	1,802,283	2,309,039
Santarém	2,303,997	1,655,337	1,933,519
São Luís	1,892,595	1,883,670	1,748,169
Paranaguá	500,763	925,532	916,254
Rio Grande	4,764	8,792	443,077
Vitória	477,582	393,875	413,084
Santana	148,878	191,593	338,932
São Francisco do Sul	44,704	127,325	119,621
Imbituba	75,470	28,600	53,593
Salvador	0	0	2,117
Others	1,252,161	1,675,717	2,286,700
Top 5	**94.7**	**93.2**	**91.9**
Mato Grosso (MT) total	**23,765,673**	**24,764,750**	**28,336,110**
Brazil total exports	**86,100,404**	**78,726,374**	**101,865,107**
Port	**2021**	**2022**	**2023**
	% share		
Santos	42.4	45.5	42.4
Barcarena/Belém	27.5	26.2	28.4
Manaus	7.2	7.3	8.1
Santarém	9.7	6.7	6.8
São Luís	8.0	7.6	6.2
Paranaguá	2.1	3.7	3.2
Rio Grande	0.0	0.0	1.6
Vitória	2.0	1.6	1.5
Santana	0.6	0.8	1.2
São Francisco do Sul	0.2	0.5	0.4
Imbituba	0.3	0.1	0.2
Salvador	0.0	0.0	0.0
Top 5	**94.7**	**93.2**	**91.9**
Mato Grosso total	**100**	**100**	**100**
MT % share of total Brazil exports	**27.6**	**31.5**	**27.8**

MT = metric ton.

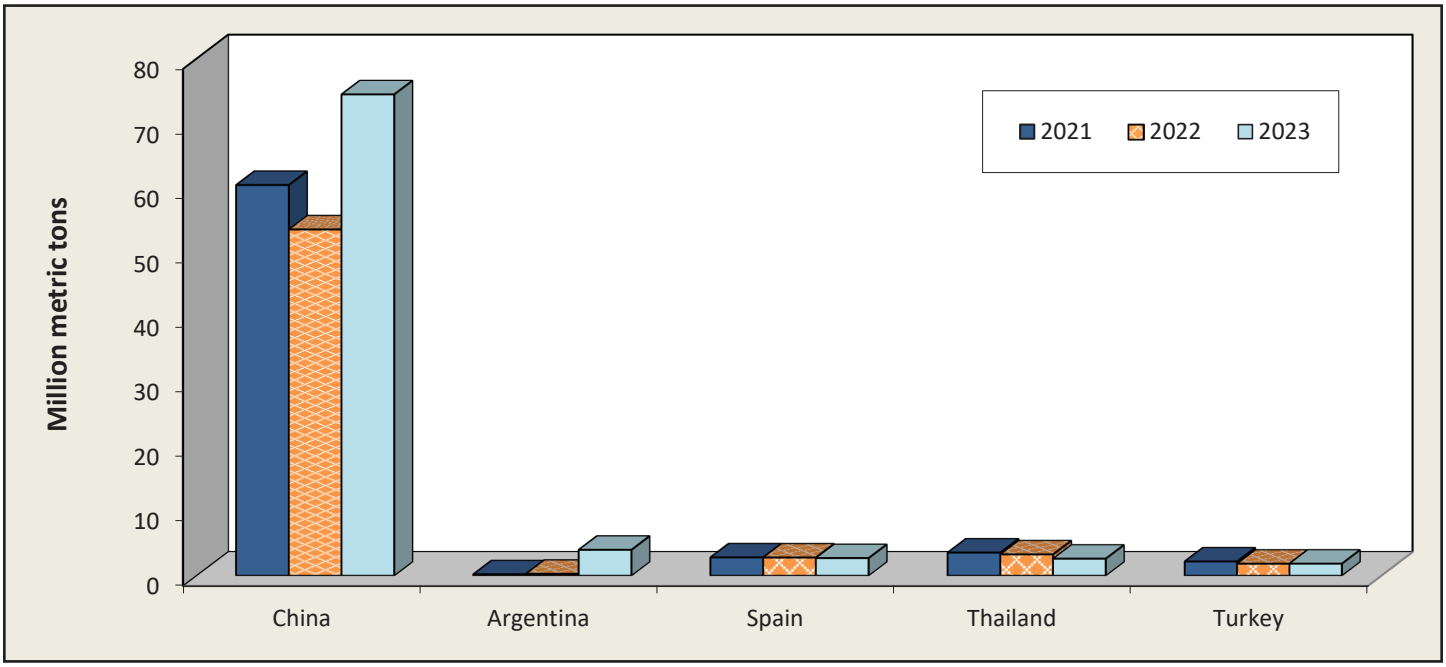
Source: Comex Stat, Ministério do Desenvolvimento, Indústria, Comércio e Serviços.

World export routes for Brazilian soybeans



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

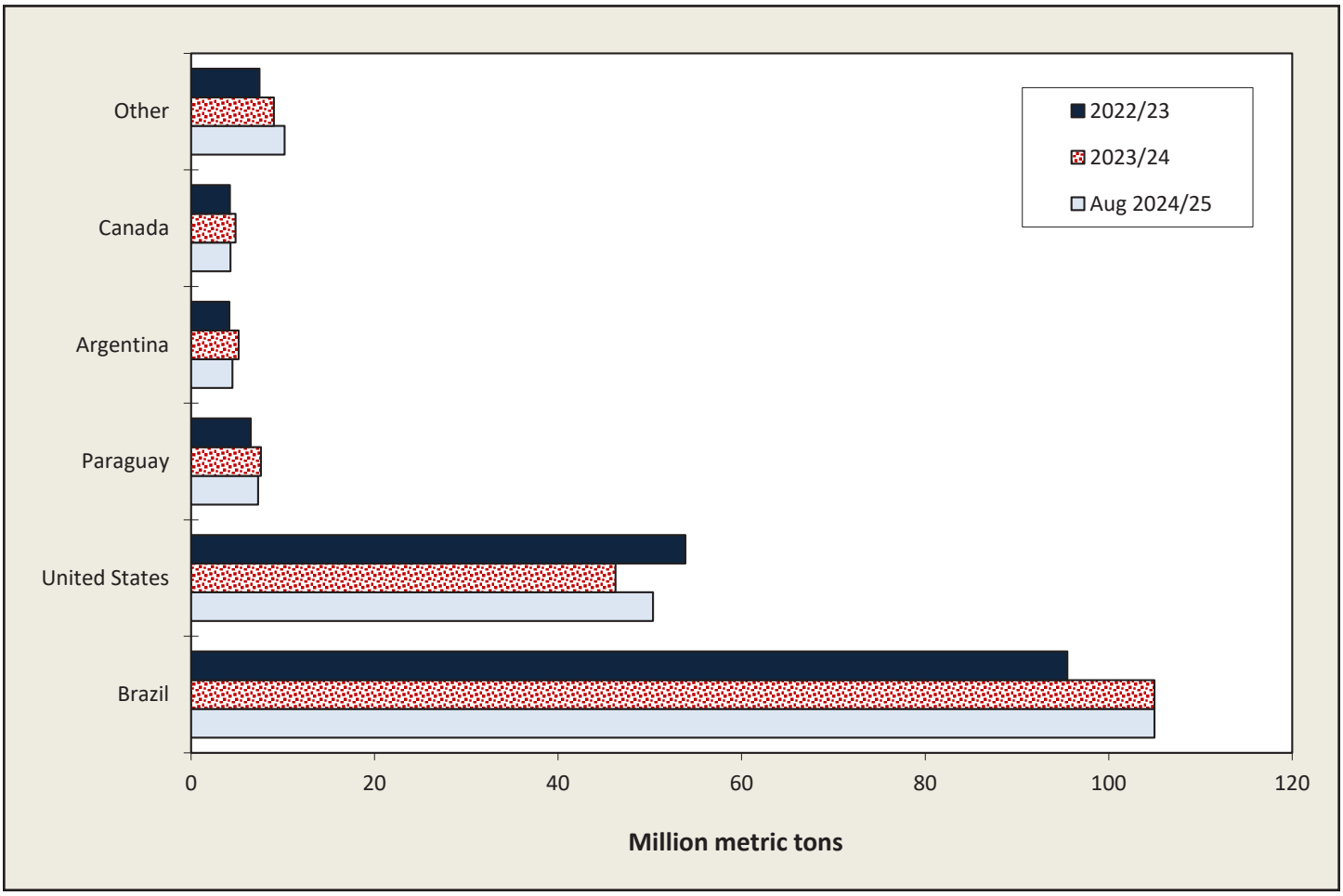
Top five Brazilian soybean–export destinations, 2021–23



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

In 2023, Brazil was the leading soybean exporter, followed by the United States, Paraguay, Argentina, and Canada. USDA forecasts that Brazil will sustain its leadership position in 2024.

Top five world soybean–exporting countries, 2022/23– 2024/25

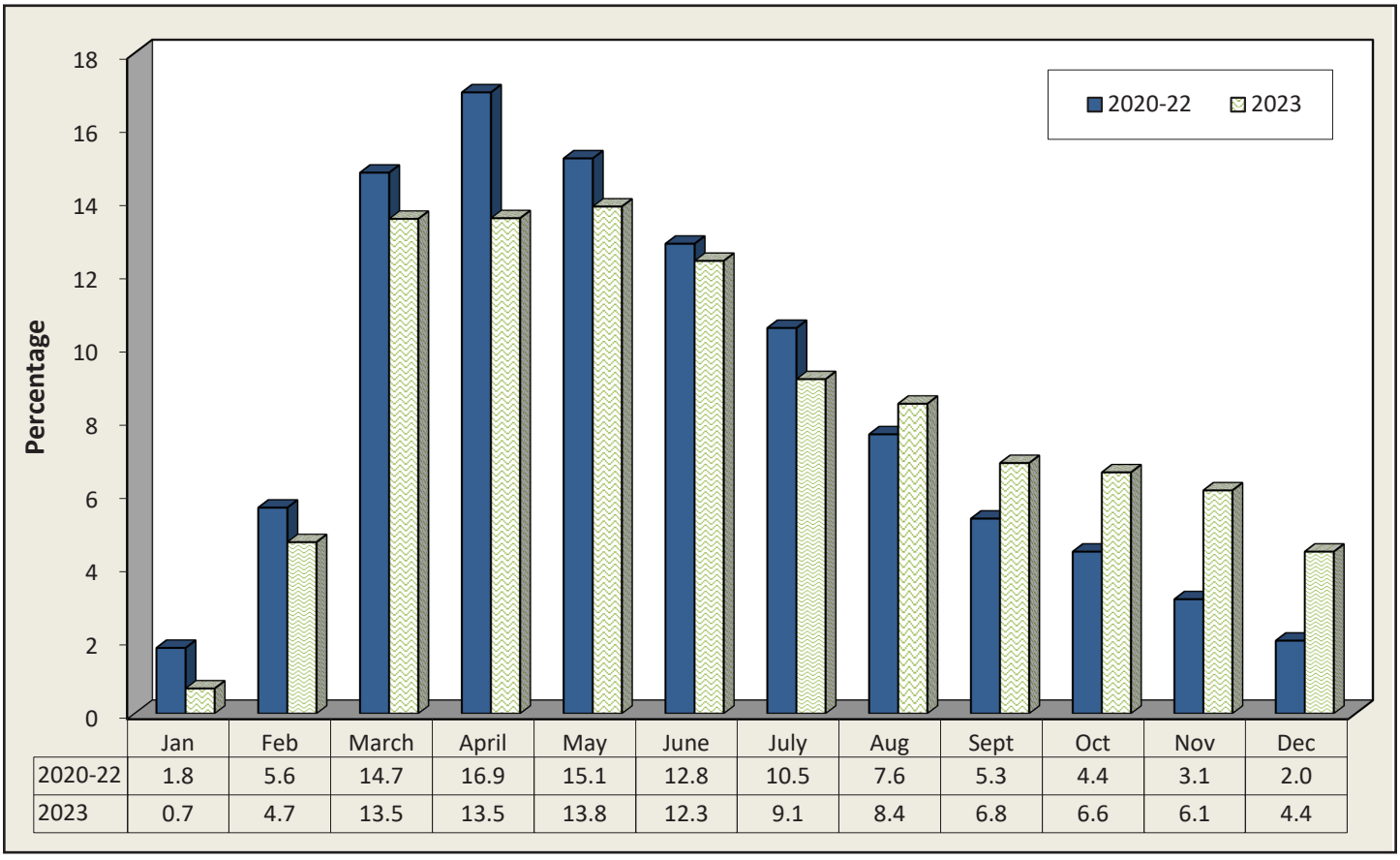


*Forecast September 2024.
Source:USDA/Foreign Agricultural Service/Market and Trade/Reports/PSD Reports/Oilseeds.

Exports to China

In 2023, Brazil exported 74.5 mmt of soybeans to China, valued at $38.9 billion, 39 percent more than 2022's total (53.6 mmt), accounting for 73 percent of Brazil's total exports (101.9 mmt). Over 90 percent of Brazilian soybean exports to China in 2023 originated from Mato Grosso, Paraná, Goiás, Rio Grande do Sul, Mato Grosso do Sul, Minas Gerais, São Paulo, Bahia, Maranhão, and Tocantins. As seen in the chart on this page, there is no longer a defined Brazilian export window to China: China buys throughout the year.

Brazil average monthly soybean exports to China, 2020–23



	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
2020-22	1.8	5.6	14.7	16.9	15.1	12.8	10.5	7.6	5.3	4.4	3.1	2.0
2023	0.7	4.7	13.5	13.5	13.8	12.3	9.1	8.4	6.8	6.6	6.1	4.4

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

Top 15 Brazilian soybean exporting states to China, 2021–23

State	2021	2022	2023	Rank
	1,000 metric ton			
Mato Grosso	12,326	14,226	17,318	1
Goiás	8,860	4,049	10,536	2
Rio Grande do Sul	6,036	8,487	9,979	3
Minas Gerais	11,733	4,575	6,712	4
Paraná	4,411	2,800	5,265	5
São Paulo	3,704	4,628	5,099	6
Bahia	4,001	3,982	4,637	7
Mato Grosso do Sul	2,776	3,367	3,595	8
Maranhão	1,680	2,195	3,160	9
Tocantins	1,920	2,015	2,785	10
Piauí	966	1,294	1,867	11
Santa Catarina	552	649	1,442	12
Pará	1,258	801	1,356	13
Distrito Federal	83	143	219	14
Rondônia	1	51	118	15
Others	168	353	386	
Brazil exports to China	**60,476**	**53,616**	**74,472**	
Brazil total exports	**86,100**	**78,726**	**101,865**	

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

Top 15 Mato Grosso soybean export destinations, 2021–23

State	2021	2022	2023	% share	Rank
	metric ton				
China	12,325,965	12,325,965	14,226,279	57.4	1
Spain	1,918,123	1,918,123	1,465,110	5.9	2
Mexico	895,521	1,472,851	1,176,168	4.7	3
Argentina	0	1,276,784	826,619	3.3	4
Turkey	1,276,784	512,512	800,869	3.2	5
Thailand	818,667	818,667	720,269	2.9	6
Netherlands	1,472,851	271,435	648,701	2.6	7
Russia	512,512	337,003	558,501	2.3	8
Iran	337,003	895,521	529,627	2.1	9
Algeria	271,435	580,995	396,602	1.6	10
Taiwan	241,475	169,873	345,247	1.4	11
Portugal	370,583	511,298	325,565	1.3	12
Vietnam	297,167	241,475	301,043	1.2	13
Italy	580,995	308,091	306,007	1.2	14
United Kingdom	169,873	215,781	268,071	1.1	15
Others	2,168,842	2,283,132	1,857,994	7.6	
Mato Grosso total	**23,657,797**	**24,764,750**	**28,336,110**	**100.0**	

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

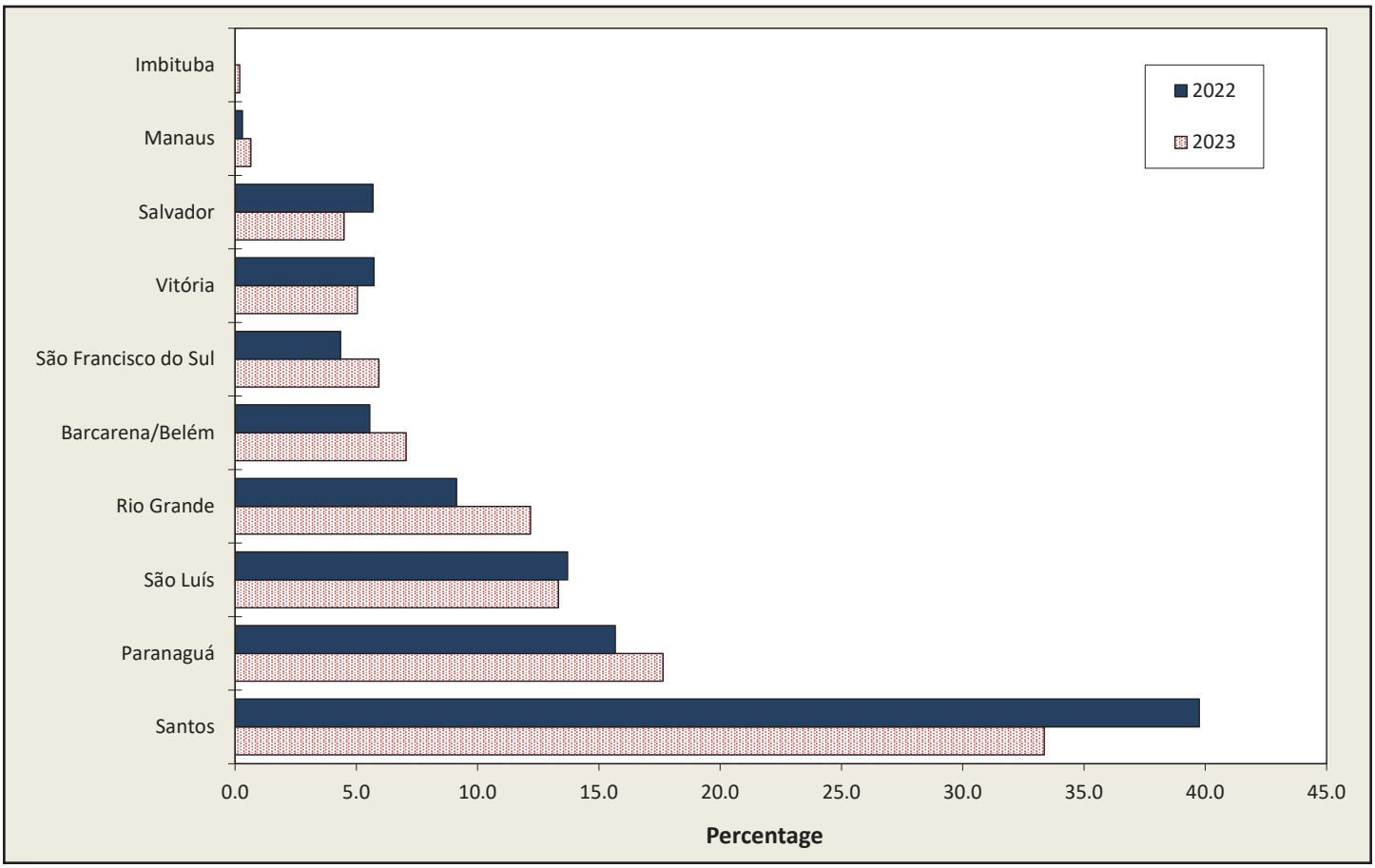
The southern ports of Santos, Rio Grande, Paranaguá, and São Francisco do Sul still dominate Brazil's soybean trade to China, accounting for 69 percent of Brazil's soybean exports to China. The northeastern ports of São Luís, Vitória, Salvador, and Barcarena accounted for 30 percent of soybean exports to China in 2023. The Amazon River ports of Manaus accounted for a small amount of soybean exports to China in 2023.

Total Brazilian soybean exports by port to China, 2021–23

Ports	2021	2022	2023
	metric ton		
Santos	17,688,345	21,310,999	24,842,802
Paranaguá	10,934,936	8,406,844	13,141,028
São Luís	6,441,382	7,350,074	9,931,491
Rio Grande	11,931,608	4,894,756	9,069,434
Barcarena/Belém	2,737,855	2,975,017	5,250,813
Subtotal	**49,734,126**	**44,937,692**	**62,235,569**
Others	10,741,989	8,678,010	12,236,375
Total exports to China	**60,476,116**	**53,615,702**	**74,471,944**
Brazil total exports	**86,100,404**	**78,726,374**	**101,865,107**
Ports	**2021**	**2022**	**2023**
	% share of exports to China		
Santos	29.2	39.7	33.4
Paranaguá	18.1	15.7	17.6
São Luís	10.7	13.7	13.3
Rio Grande	19.7	9.1	12.2
Barcarena/Belém	4.5	5.5	7.1
Subtotal	**82.2**	**83.8**	**83.6**
Others	17.8	16.2	16.4
Total exports to China	**100.0**	**100.0**	**100.0**
Ports	**2021**	**2022**	**2023**
	% share of Brazil total exports		
Santos	20.5	27.1	24.4
Paranaguá	12.7	10.7	12.9
São Luís	7.5	9.3	9.7
Rio Grande	13.9	6.2	8.9
Barcarena/Belém	3.2	3.8	5.2
Subtotal	**57.8**	**57.1**	**61.1**
Others	12.5	11.0	12.0
Total exports to China	**70.2**	**68.1**	**73.1**

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

Brazil soybean exports to China by port, 2022–23



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

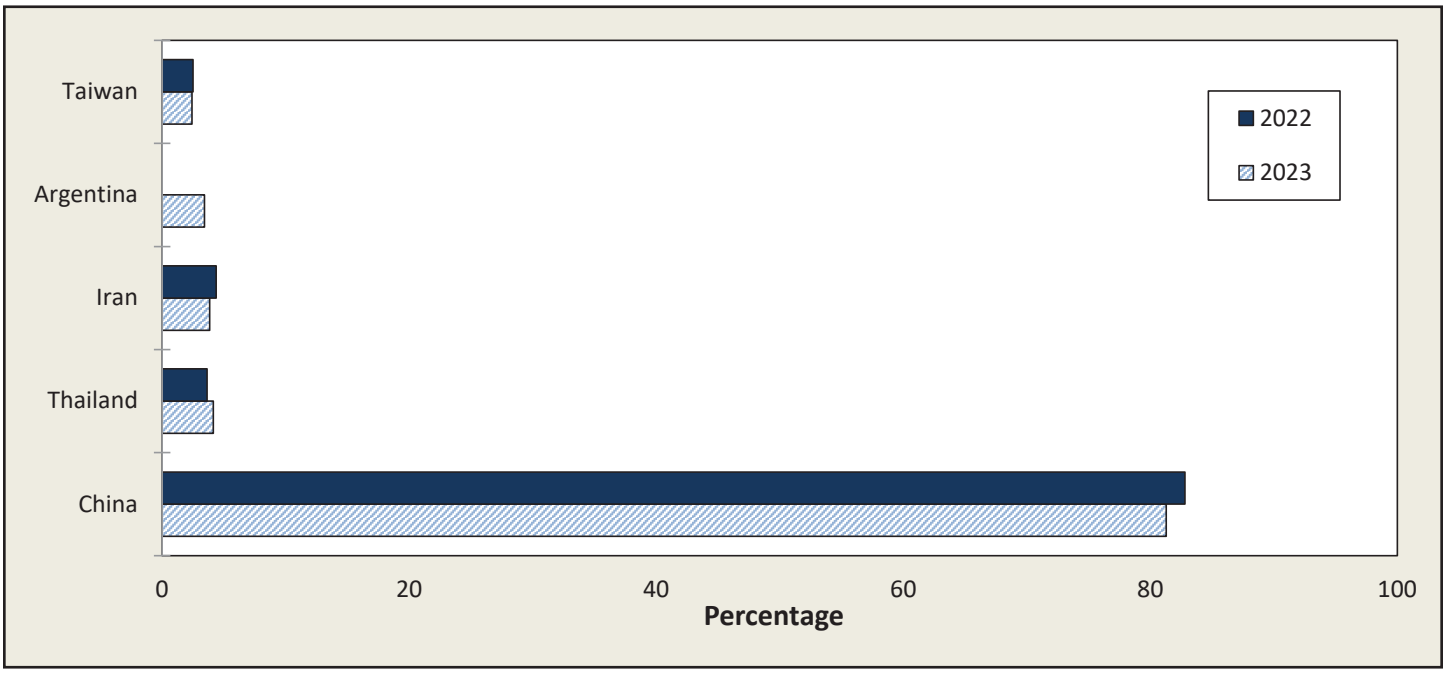
*Vessel speed: 14 knots.

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

Sources: http://sea-distances.com/ and Ports.com.

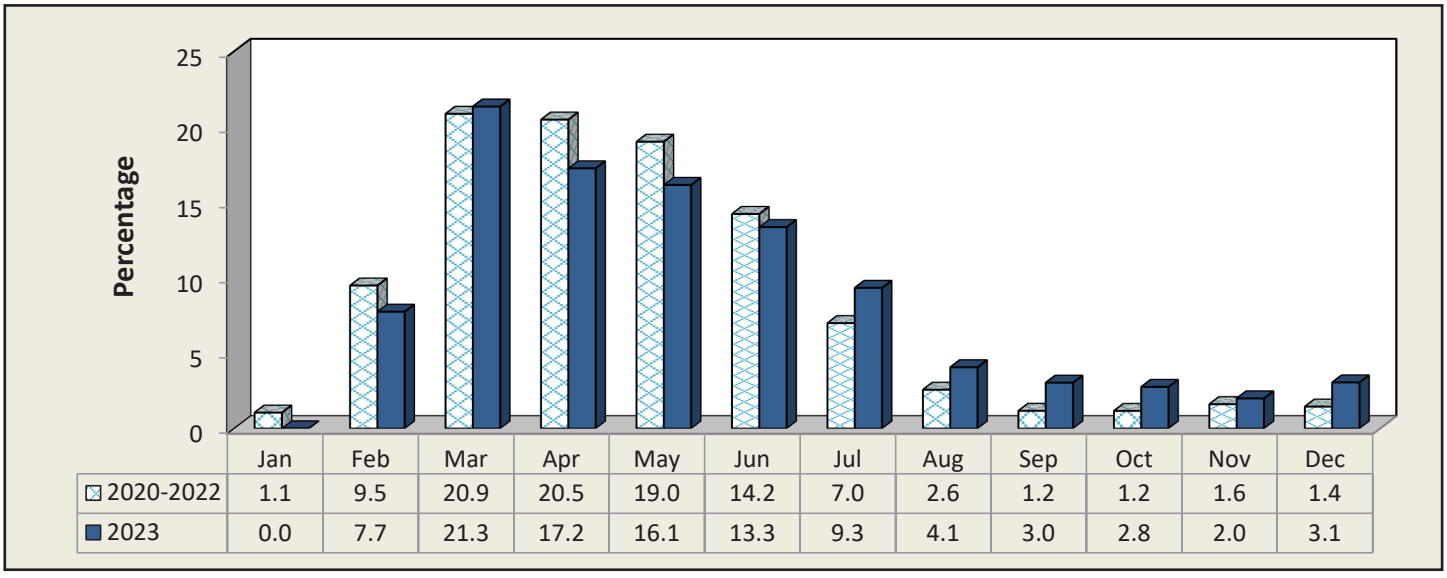
Through the port of Santos, Brazil's largest soybean-exporting port, the top destination for Brazilian soybeans in 2023 was China, followed by (in descending order) Thailand, Iran, Argentina, and Taiwan. The peak of soybean shipments to China from Santos usually occurs from March to May. About 39 percent 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, 2022–23



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

Port of Santos average monthly soybean exports to China, 2020–23

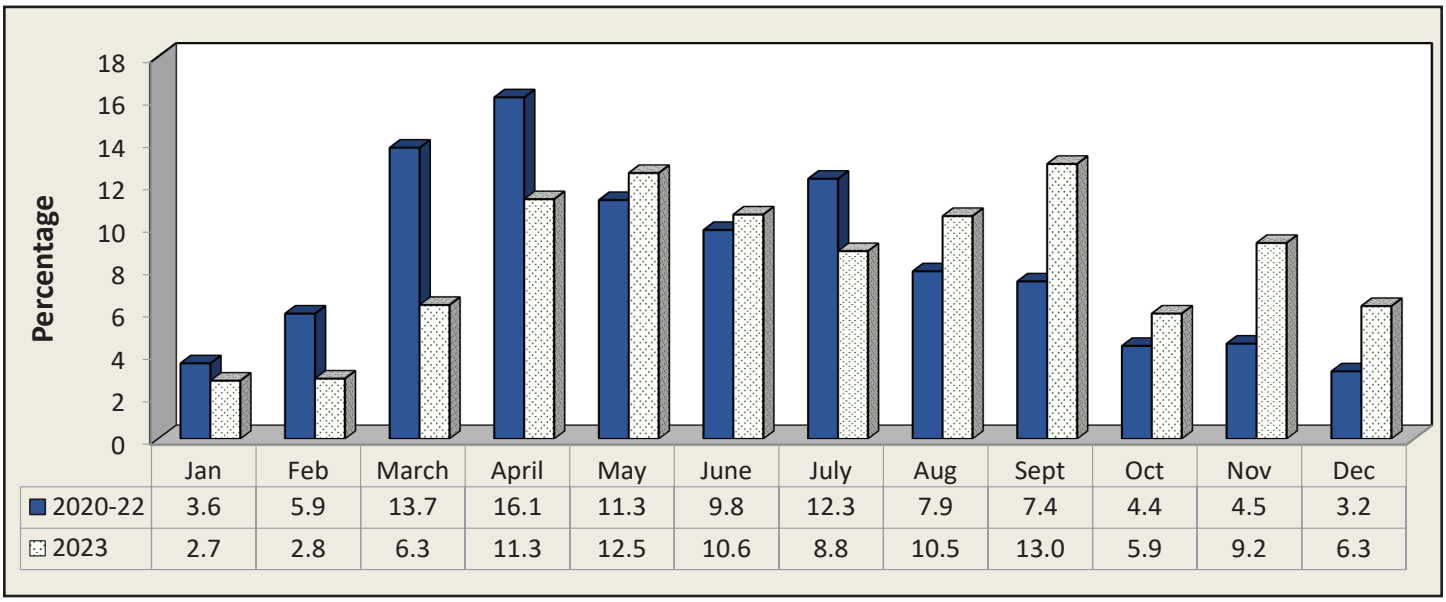


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2020-2022	1.1	9.5	20.9	20.5	19.0	14.2	7.0	2.6	1.2	1.2	1.6	1.4
2023	0.0	7.7	21.3	17.2	16.1	13.3	9.3	4.1	3.0	2.8	2.0	3.1

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

Through the Port of Paranaguá, the top Brazilian soybean-export destination in 2023 was China, followed by (in descending order) South Korea, Bangladesh, Thailand, and Russia. Typically, soybean shipments to China from Paranaguá peak from March to May. Fifty-seven percent of Paranaguá exports originated from Paraná. The next-highest levels of Paranaguá exports (in descending order) originated from Mato Grosso do Sul, São Paulo, Mato Grosso, and Goiás.

Port of Paranaguá average monthly soybean exports to China, 2020–23

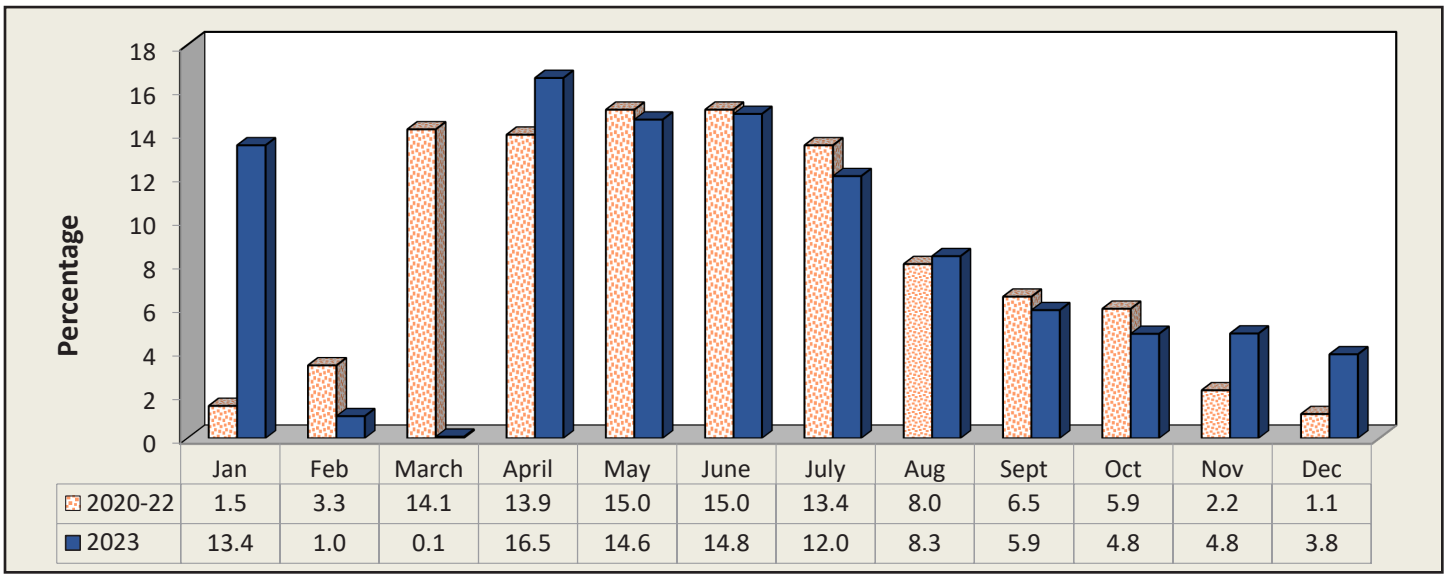


	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
2020-22	3.6	5.9	13.7	16.1	11.3	9.8	12.3	7.9	7.4	4.4	4.5	3.2
2023	2.7	2.8	6.3	11.3	12.5	10.6	8.8	10.5	13.0	5.9	9.2	6.3

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

Through the Port of São Luís, the top Brazilian soybean-export destination in 2023 was China, accounting for nearly 77 percent, followed by (in descending order) Spain, Thailand, Turkey, and the Netherlands. Typically, soybean shipments to China from the Port of São Luís peak from March to July. About 60 percent of exports from the port of São Luís originated from Maranhão and Tocantins. The next-highest levels of São Luís exports (in descending order) originated from Piauí, Mato Grosso, Pará, and Bahia.

Port of São Luís average monthly soybean exports to China, 2020–23

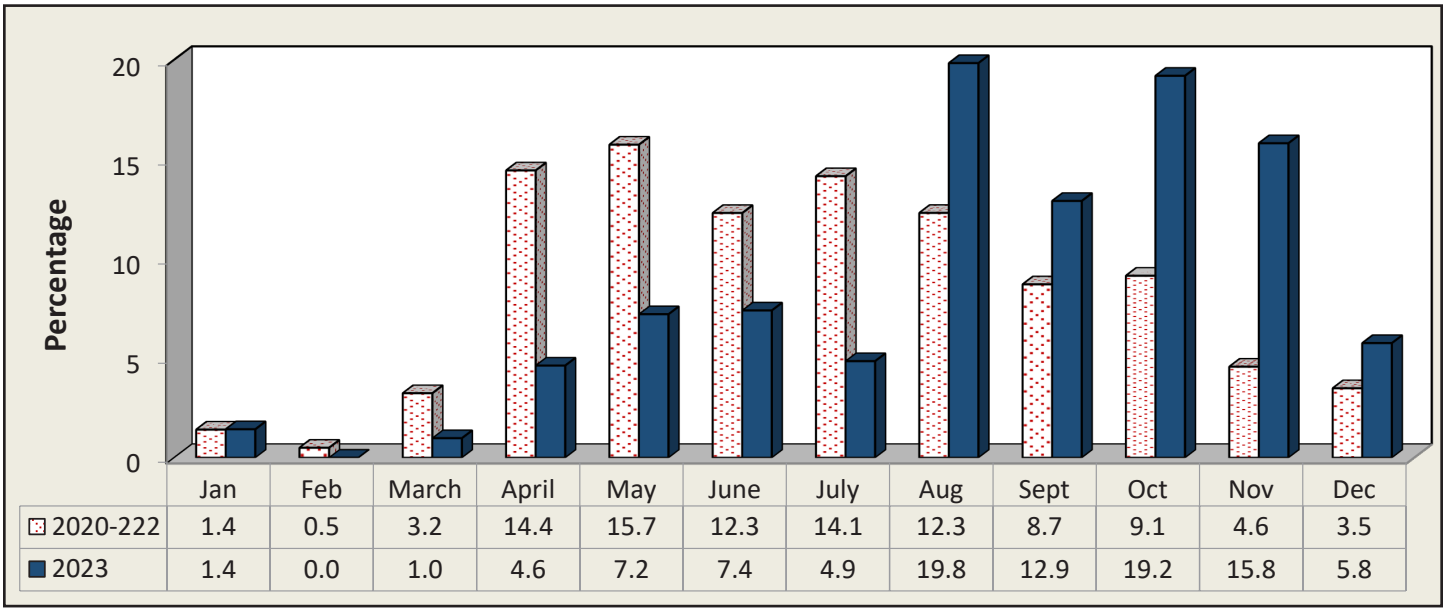


	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
2020-22	1.5	3.3	14.1	13.9	15.0	15.0	13.4	8.0	6.5	5.9	2.2	1.1
2023	13.4	1.0	0.1	16.5	14.6	14.8	12.0	8.3	5.9	4.8	4.8	3.8

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

Via the port of Rio Grande, the top destination for Brazilian soybeans in 2023 was China, accounting for 87 percent, followed by Iran, Iraq, Thailand, and Vietnam. Typically, soybean shipments to China through the port of Rio Grande peak from April to July. However, in 2023, the peak of soybean shipments occurred from August to November. About 74 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, Mato Grosso, and Santa Catarina.

Port of Rio Grande average monthly soybean exports to China, 2020–23

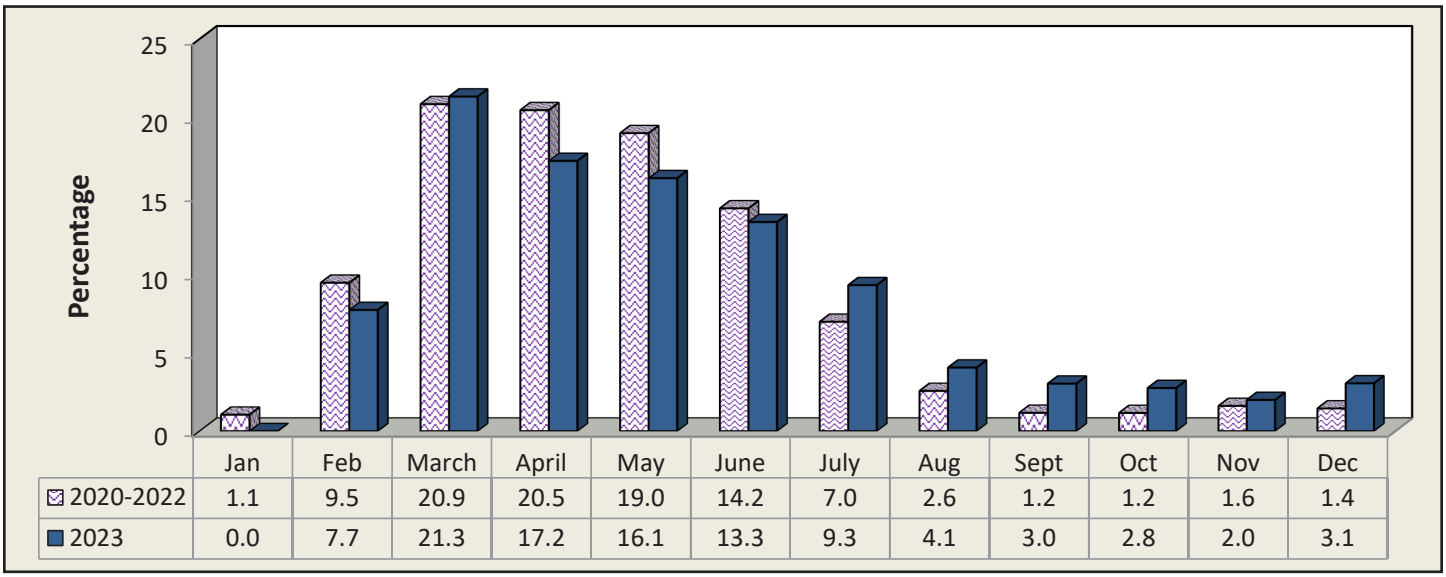


	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
2020-222	1.4	0.5	3.2	14.4	15.7	12.3	14.1	12.3	8.7	9.1	4.6	3.5
2023	1.4	0.0	1.0	4.6	7.2	7.4	4.9	19.8	12.9	19.2	15.8	5.8

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

Through the Port of Barcarena/Belém, the top Brazilian soybean export destination in 2023 was China, accounting for 51 percent, followed by (in descending order) Spain, the Netherlands, Mexico, and Russia. Typically, soybean shipments to China from the Port of Barcarena/Belém peak from March to June. Seventy-eight percent of exports from the port of Barcarena/Belém originated from Mato Grosso. The next-highest levels of São Luís exports (in descending order) originated from Pará, Maranhão, and Rondônia.

Port of Barcarena/Belém average monthly soybean exports to China, 2020–23



	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
2020-2022	1.1	9.5	20.9	20.5	19.0	14.2	7.0	2.6	1.2	1.2	1.6	1.4
2023	0.0	7.7	21.3	17.2	16.1	13.3	9.3	4.1	3.0	2.8	2.0	3.1

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.

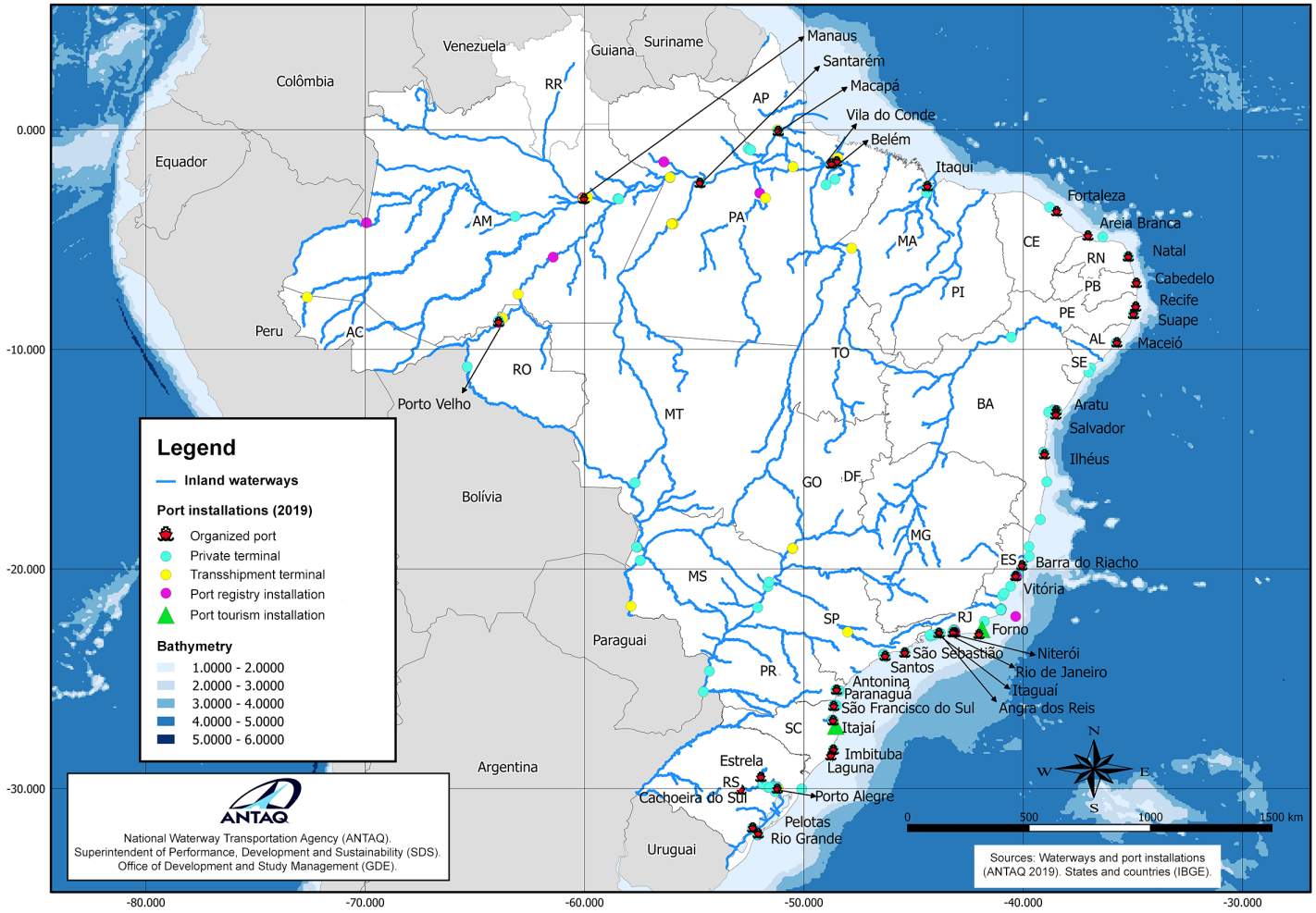
Brazil waterway system

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

Source: Confederação Nacional do Transporte.

Brazilian port installations

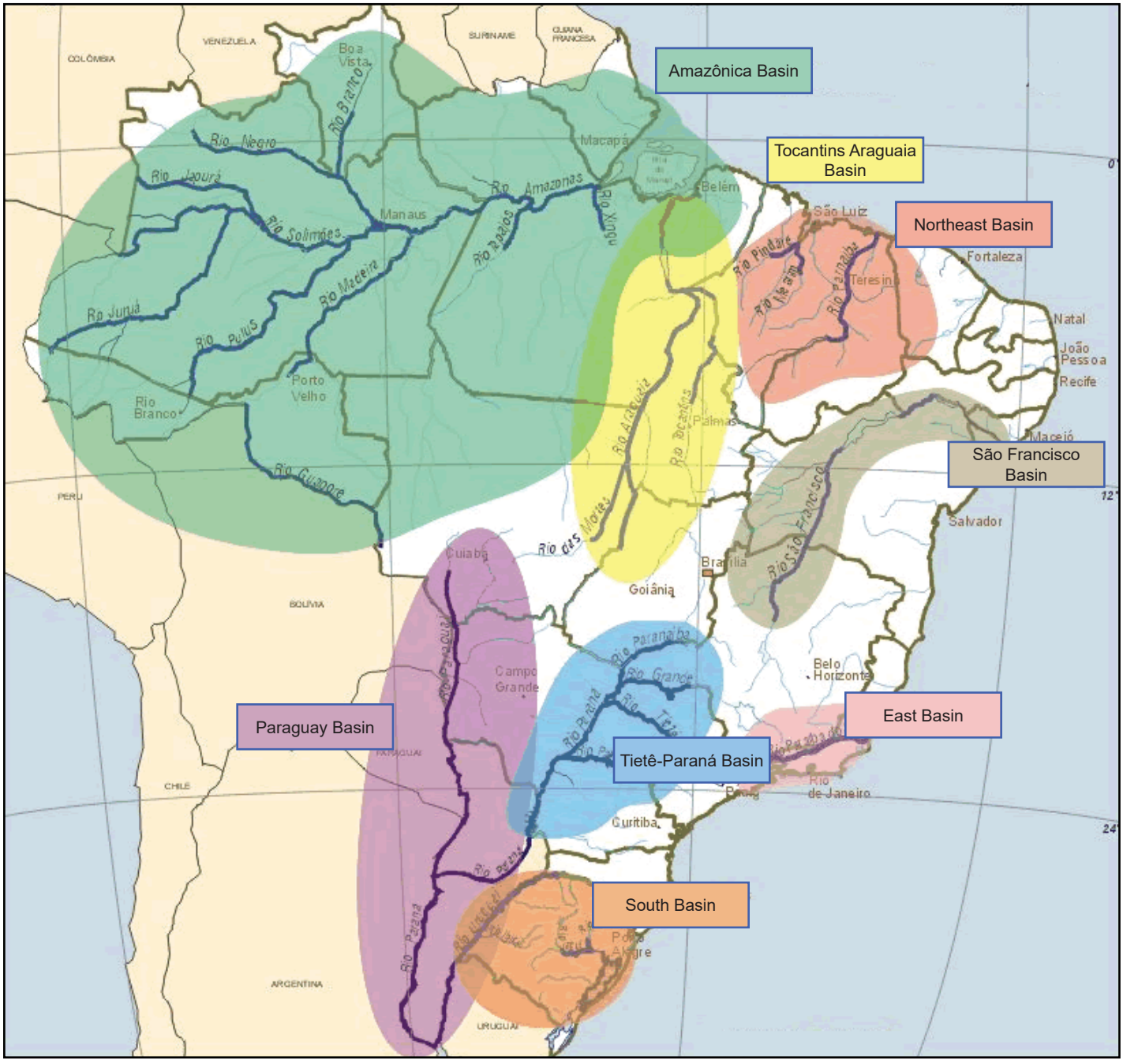
The Port of Manaus access channel is 1,640 ft wide and 114.8 ft deep. Porto Velho's access channel depth varies from 8.2 to 57.4 ft. The Port of Santarém's access channel is 5,904 ft wide and 49.2 ft deep.



Source: Agência Nacional de Transportes Aquaviários (ANTAQ).

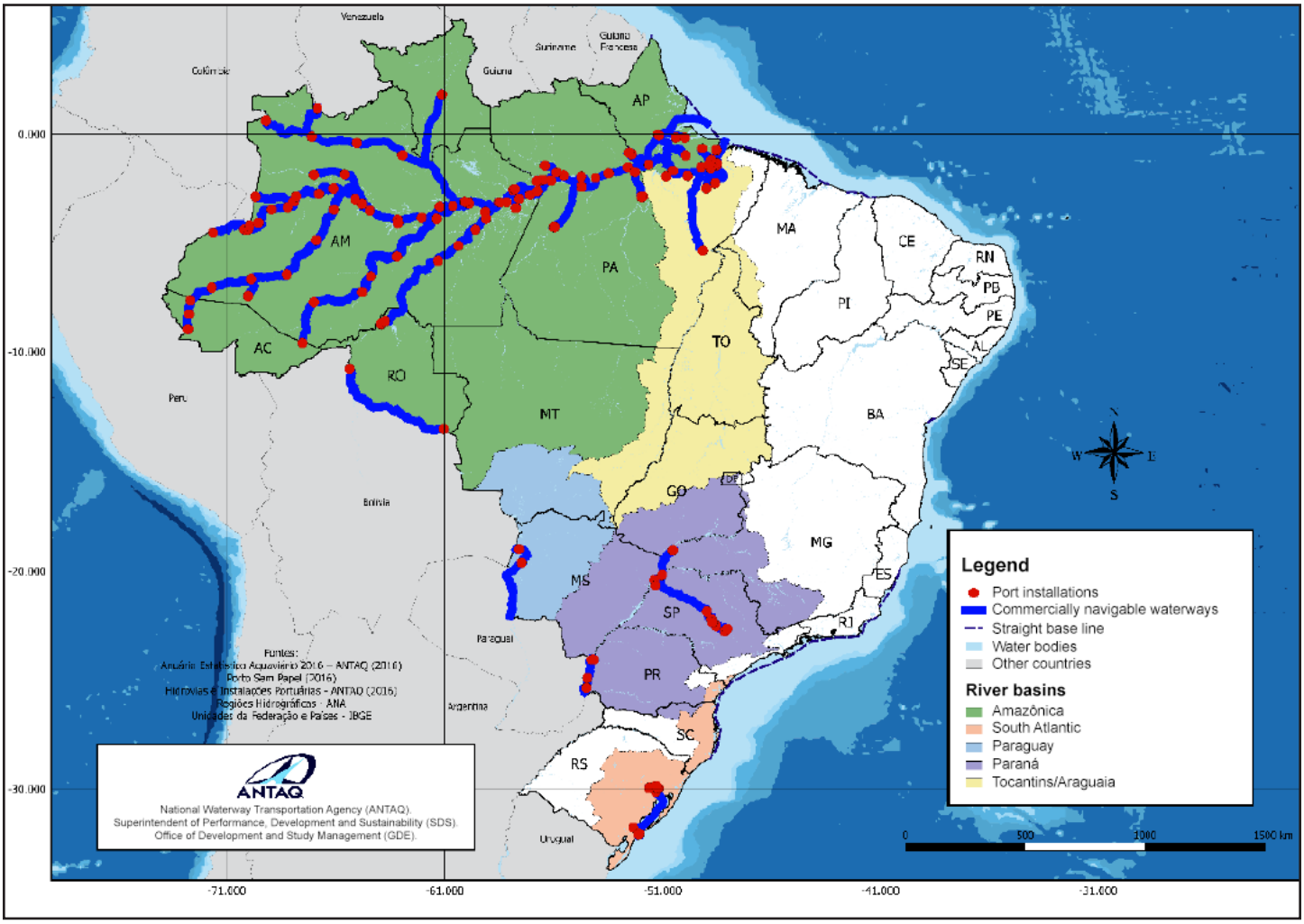
Brazilian river basins

Brazil's river system comprises eight basins: Amazônica, Northeast, Tocantins Araguaia, São Francisco, East, Tietê-Paraná, Paraguay, and South. The Amazônica and Paraguay Basin account for 72 percent of the total area of the Brazilian basins. The Paraguay Basin serves Argentina, Brazil, Bolivia, Paraguay, and Uruguay. Its navigable portion is comparable with the Mississippi River in the United States and the Rhine River in Europe.



Source: Ministério dos Transportes, Brazil.

Brazilian commercial inland waterways



Source: Agência Nacional de Transportes Aquaviários.

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, 2023

	Miles	% Paved	% Unpaved
Federal	46,113	88	11
State and county	923,319	10	90
Total (federal + state and county)	**969,432**		
All roads		**14**	**86**

Note: Percentage totals may not sum exactly to 100 because of rounding.
Source: Confederação Nacional do Transporte (CNT).

U.S. highway system, 2021

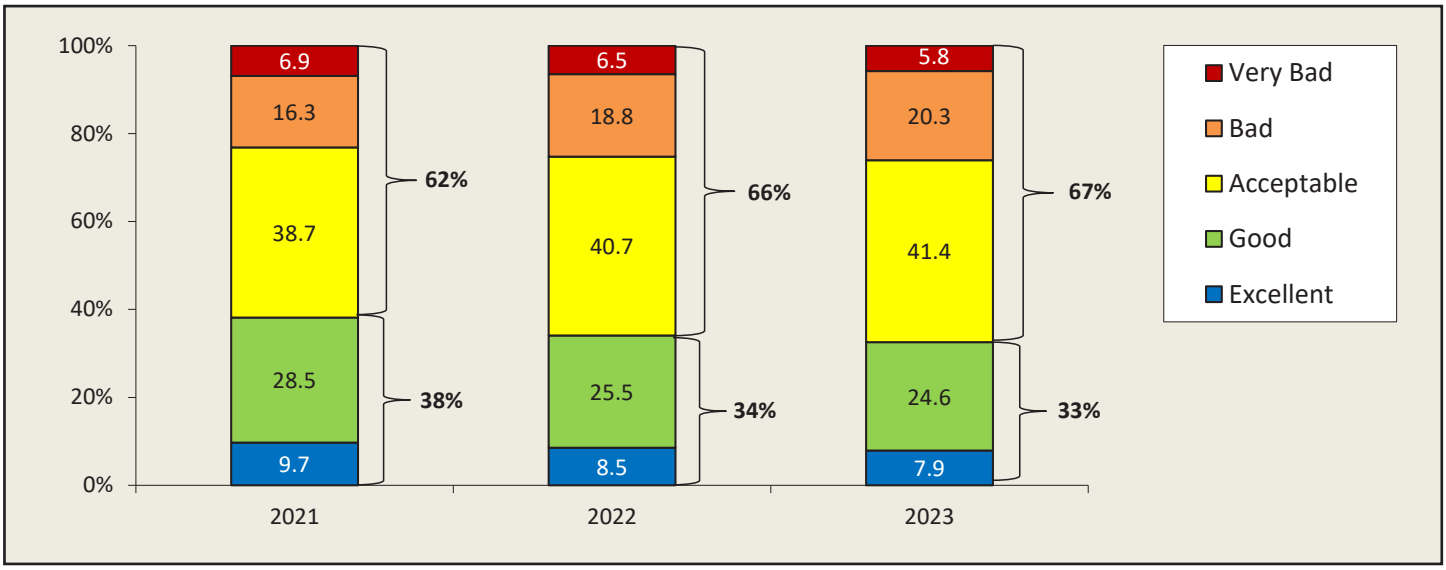
	Extension[1] (in miles)	% Share
Rural	2,939,099	70
Urban	1,255,154	30
Total	**4,194,252**	

[1]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

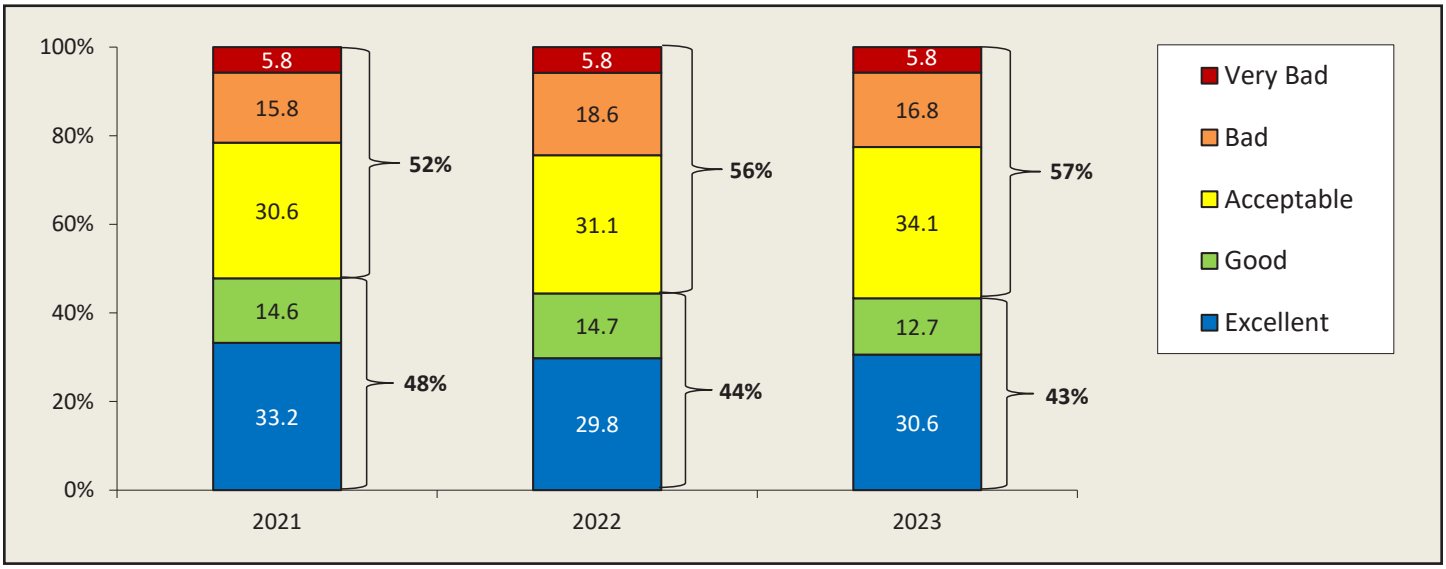
According to the 2023 Confederação Nacional do Transporte (CNT) survey of the overall highway conditions in Brazil, 33 percent of the roads ranged from good to excellent in 2023 (versus 34 percent in that range in 2022). The remaining 67 percent ranged from acceptable to very bad. Also, in 2023, 43 percent of the paved roads were in good to excellent condition; 37 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 68,406 miles in 2022 to 69,131 miles in 2023.

Brazilian highway conditions, 2021–23



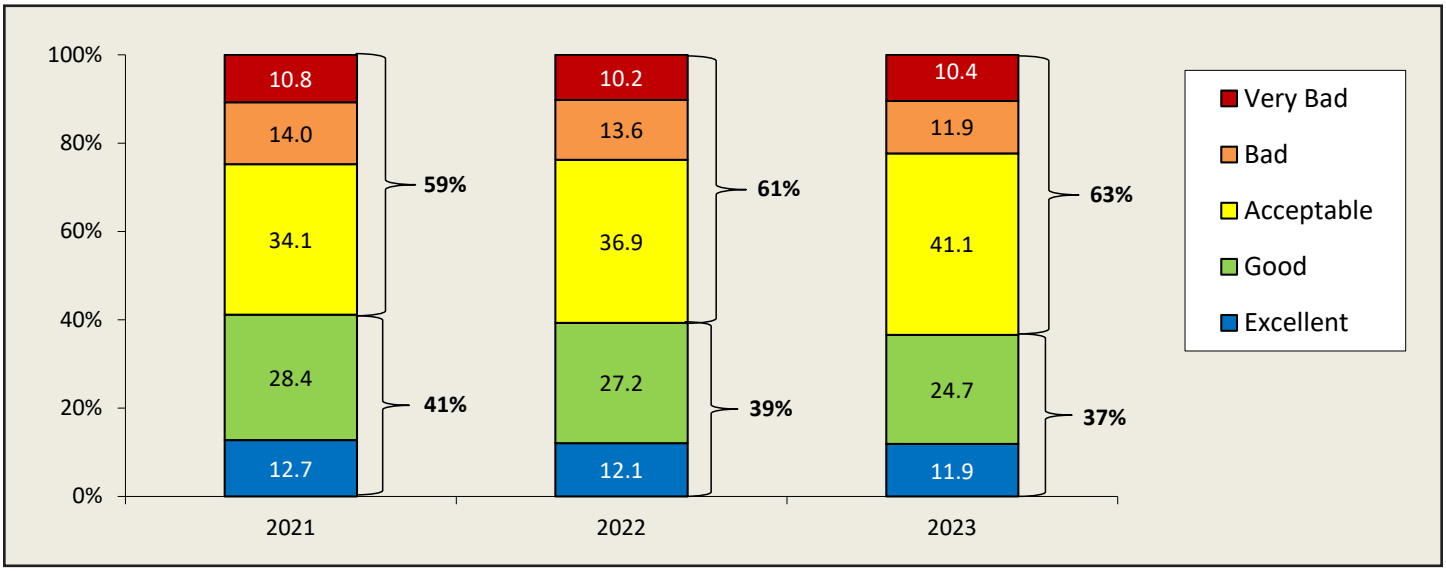
Source: Confederação Nacional do Transporte (CNT).

Brazilian paved highway conditions, 2021–23



Source: Confederação Nacional do Transporte (CNT).

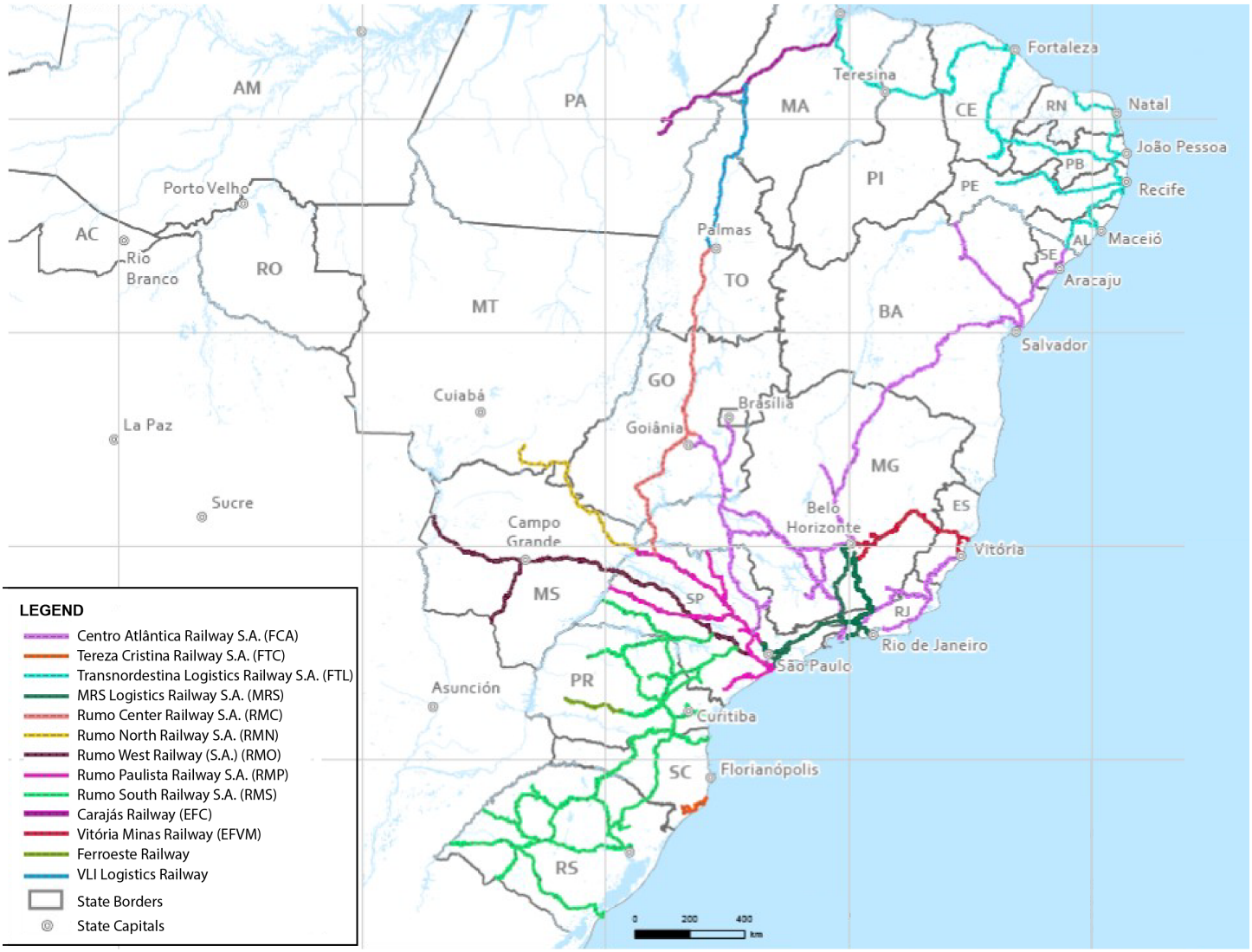
Brazilian road sign conditions, 2021–23



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

Unlike in North America, which uses a standard gauge (distance between two rails), the Brazilian gauge system varies by region, creating difficulty in integrating rail movements across the country. 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, 2023

	Minneapolis, Minnesota (US$/mt)				
	2023 1st qtr.	2023 2nd qtr.	2023 3rd qtr.	2023 4th qtr.	2023 Average
Truck	14.75	14.19	14.75	16.75	15.11
Rail[1]	42.67	-	-	-	42.67
Barge[2]	19.88	29.54	37.80	38.76	31.50
Ocean[3]	26.09	27.98	25.87	29.54	27.37
Total transportation	103.39	71.71	78.42	85.05	84.64
Farm price[4]	541.36	519.31	509.94	467.87	509.62
Landed cost[5]	644.75	591.02	588.36	552.92	594.26
Transport % of landed cost	16.0	12.1	13.3	15.4	14.2
	Davenport, Iowa (US$/mt)				
	2023 1st qtr.	2023 2nd qtr.	2023 3rd qtr.	2023 4th qtr.	2023 Average
Truck	14.75	14.19	14.75	16.75	15.11
Rail[1]	37.93	-	-	-	37.93
Barge[2]	19.88	21.93	30.79	31.78	26.10
Ocean[3]	26.09	27.98	25.87	29.54	27.37
Total transportation	98.65	64.10	71.41	78.07	78.06
Farm price[4]	545.03	532.78	513.19	475.22	516.56
Landed cost[5]	643.68	596.88	584.60	553.29	594.61
Transport % of landed cost	15.3	10.7	12.2	14.1	13.1

[1]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.

[2]The Mississippi River closes from Minneapolis to just north of St. Louis during mid-December to late March.

[3]Source for the U.S. ocean freight rates: O'Neil Commodity Consulting.

[4]Source for the U.S. farm prices: USDA, National Agricultural Statistics Service.

[5]Landed cost is transportation cost plus farm price.

Note: qtr.=quarter; 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, 2023

	Minneapolis, Minnesota (US$/mt)				
	2023 1st qtr.	2023 2nd qtr.	2023 3rd qtr.	2023 4th qtr.	2023 Average
Truck	14.75	14.19	14.75	16.75	15.11
Rail[1]	42.67	-	-	-	42.67
Barge[2]	19.88	29.54	37.80	38.76	31.50
Ocean[3]	50.46	50.70	50.07	58.23	52.37
Total transportation	127.76	94.43	102.62	113.74	109.64
Farm price[4]	541.36	519.31	500.94	467.87	507.37
Landed cost[5]	669.12	613.74	603.56	581.61	617.01
Transport % of landed cost	19.1	15.4	17.0	19.6	17.8
	Davenport, Iowa (US$/mt)				
	2023 1st qtr.	2023 2nd qtr.	2023 3rd qtr.	2023 4th qtr.	2023 Average
Truck	14.75	14.19	14.75	16.75	15.11
Rail[1]	37.93	-	-	-	37.93
Barge[2]	19.88	21.93	30.79	31.78	26.10
Ocean[3]	50.46	50.70	50.07	58.23	52.37
Total transportation	123.02	86.82	95.61	106.76	103.05
Farm price[4]	545.03	532.78	513.19	475.22	516.56
Landed cost[5]	668.05	619.60	608.80	581.98	619.61
Transport % of landed cost	18.4	14.0	15.7	18.3	16.6

[1]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.
[2]The Mississippi River closes from Minneapolis to just north of St. Louis during mid-December to late March.
[3]Source for the U.S. ocean freight rates: O'Neil Commodity Consulting.
[4]Source for the U.S. farm prices: USDA, National Agricultural Statistics Service.
[5]Landed cost is transportation cost plus farm price.
Note: qtr.=quarter; 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, 2023

	Fargo, North Dakota (US$/mt)				
	2023 1st qtr.	2023 2nd qtr.	2023 3rd qtr.	2023 4th qtr.	2023 Average
Truck	14.75	14.19	14.75	16.75	15.11
Rail[1]	68.15	65.91	65.02	67.27	66.59
Ocean[2]	28.09	27.85	26.93	30.18	28.26
Total transportation	110.99	107.95	106.70	114.20	109.96
Farm price[3]	518.09	499.71	471.54	455.62	486.24
Landed cost[4]	629.08	607.66	578.24	569.82	596.20
Transport % of landed cost	17.6	17.8	18.5	20.0	18.4
	Sioux Falls, South Dakota (US$/mt)				
	2023 1st qtr.	2023 2nd qtr.	2023 3rd qtr.	2023 4th qtr.	2023 Average
Truck	14.75	14.19	14.75	16.75	15.11
Rail[1]	69.90	67.38	66.31	68.85	68.11
Ocean[2]	28.09	27.85	26.93	30.18	28.26
Total transportation	112.74	109.42	107.99	115.78	111.48
Farm price[3]	540.13	522.99	498.49	466.64	507.06
Landed cost[4]	652.87	632.41	606.48	582.42	618.55
Transport % of landed cost	17.3	17.3	17.8	19.9	18.1

[1]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.
[2]Source for the U.S. ocean freight rates: O'Neil Commodity Consulting.
[3]Source for the U.S. farm prices: USDA, National Agricultural Statistics Service.
[4]Landed cost is transportation cost plus farm price.
Note: qtr.=quarter; mt=metric ton; total may not add exactly due to rounding.
Source: Compiled by the USDA, Agricultural Marketing Service.

Average quarterly exchange rate, 2015–23

Quarter	Real per US$
1st	2.8637
2nd	3.0722
3rd	3.5480
4th	3.8426
2015 Average	**3.3316**
1st	3.8999
2nd	3.5076
3rd	3.2912
4th	3.2953
2016 Average	**3.4985**
1st	3.1429
2nd	3.2137
3rd	3.1639
4th	3.2506
2017 Average	**3.1928**
1st	3.2425
2nd	3.7732
3rd	3.9505
4th	3.8084
2018 Average	**3.6936**
1st	3.7684
2nd	3.9221
3rd	3.9736
4th	4.1144
2019 Average	**3.9446**

Quarter	Real per US$
1st	4.4651
2nd	5.3848
3rd	5.3766
4th	5.3915
2020 Average	**5.1545**
1st	5.4827
2nd	5.2901
3rd	5.2280
4th	5.5853
2021 Average	**5.3965**
1st	5.2234
2nd	4.9260
3rd	5.2456
4th	5.2548
2022 Average	**5.1624**
1st	5.1957
2nd	4.9499
3rd	4.8799
4th	4.9529
2023 Average	**4.9946**

Source:Banco Central do Brasil

Selected quarterly Brazilian farm prices, 2017–23 (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
2017 Avg	**322.30**	**293.60**	**301.99**	**321.54**	**283.05**	**334.99**	**343.39**
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
2018 Avg	**333.21**	**306.03**	**312.31**	**334.06**	**306.26**	**339.01**	**333.03**
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
2019 Avg	**305.56**	**285.35**	**291.46**	**302.61**	**295.87**	**307.90**	**297.05**
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
2020 Avg	**354.57**	**357.23**	**331.01**	**343.22**	**342.39**	**344.10**	**353.30**
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
2021 Avg	**489.39**	**482.47**	**479.82**	**483.19**	**475.78**	**500.40**	**484.89**
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
2022 Avg	**579.79**	**536.97**	**536.05**	**564.25**	**542.19**	**577.29**	**558.13**
1st	525.80	472.04	479.17	504.74	499.05	522.07	508.13
2nd	437.80	384.93	390.39	424.21	406.67	431.96	420.39
3rd	469.48	399.94	406.45	440.87	432.42	424.31	428.33
4th	457.20	406.91	406.12	427.46	440.89	460.14	426.71
2023 Avg	**472.57**	**415.95**	**420.54**	**449.32**	**444.76**	**459.62**	**445.89**

Source: Companhia Nacional de Abastecimento (CONAB) www.conab.gov.br

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