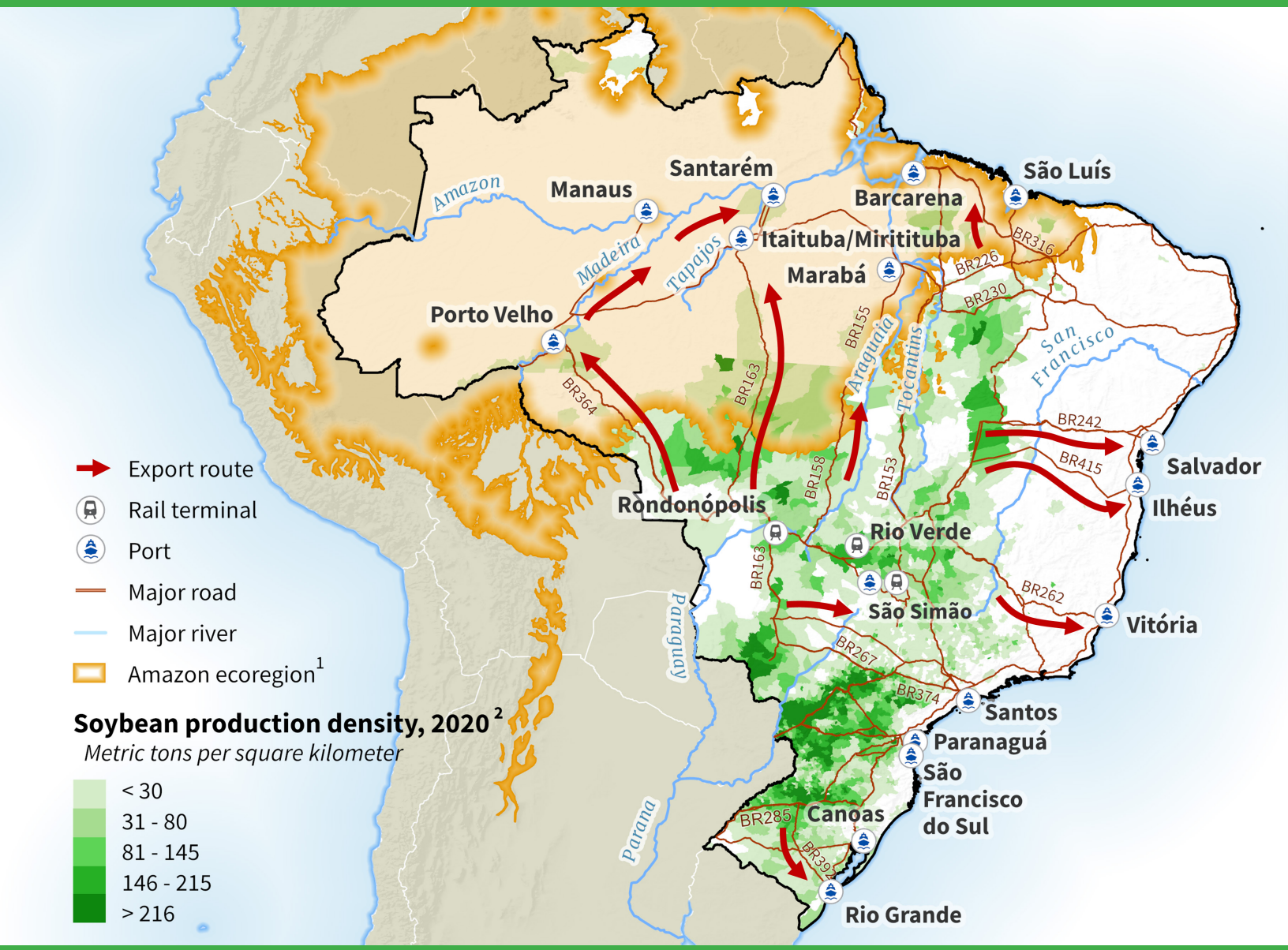
USDA Agricultural Marketing Service
U.S. DEPARTMENT OF AGRICULTURE

Soybean Transportation Guide
BRAZIL 2021



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

November 2022

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Preferred Citation
Salin, Delmy. Soybean Transportation Guide: Brazil 2021. November 2022. U.S. Dept. of Agriculture, Agricultural Marketing Service. Web. <http://dx.doi.org/10.9752/TS048.11-2022>

Contents

Soybean Transportation Guide: Brazil 2021

Executive Summary

The *Soybean Transportation Guide* is a visual snapshot of Brazilian soybean transportation in 2021. It provides data on the cost of shipping soybeans to Shanghai, China, and Hamburg, Germany. It also includes information about soybean production, exports, railways, ports, and infrastructural developments.

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

Since 2013, Brazil has gained enough of a cost advantage to surpass U.S. soybean exports, becoming the top world soybean exporter. However, the United States retains a significant share of global soybean exports. USDA forecasts Brazil will retain its position as the world's largest soybean exporter through 2031. In recent years, the United States and Brazil have continued to vie for the position of the world's leading exporter. The United States remains the second-largest exporter, followed by Argentina, Paraguay, and Canada. China represents the largest market for global soybean trade, accounting for more than half of soybean imports worldwide.

Soybean Transportation Cost and Export Demand

In 2021, Brazil exported nearly 86.1 million metric tons (mmt) of soybeans, 4 percent more than 2020's total of 83.0 mmt—an increase that also raised transportation demand. From 2020 to 2021, the rise in Brazil's soybean transportation costs reflected a significant rise in ocean rates. Ocean rates to Shanghai, China, rose 64-76 percent (from all ports) and doubled from the northern ports to Hamburg, Germany. The 2021 ocean rates were the highest levels seen since the second quarters of 2007 and 2008. The 2020-21 increases were due to strong demand for shipping bulk items. The increases also resulted from tight vessel supply caused by congestion and other pandemic-related logistic challenges. The cost of shipping a metric ton (mt) of soybeans 100 miles by truck decreased from $5.49 per mt in 2020 to $5.29 per mt in 2021. This nearly 4-percent drop was mostly due to the Brazilian real's (R$) depreciation against the U.S. dollar—5 percent from 2020 to 2021, from R$5.15 per U.S. dollar to R$5.40 per U.S. dollar.

From 2020 to 2021, in selected routes of shipping Brazilian soybeans to China, total transportation costs as a share of total landed costs declined. The diminished share reflected the fact that farm prices rose more than total transportation costs. In Mato Grosso, Brazil's largest soybean-producing State, 2021 transportation costs from Sorriso were 18-19 percent of the total landed costs of shipping to Shanghai through the Port of Santos. For comparison, transportation costs were 45 percent in 2006 and 34 percent in 2008.

Average Brazilian soybean export prices increased 31 percent, from $344 per mt to $449 per mt. Brazilian farmers have benefited from the real's depreciation against the U.S. dollar, because exported soybeans are priced in U.S. dollars, but producers are paid in reais. Measured in U.S. dollars, average soybean farm gate prices increased 40 percent from 2020 to 2021—from $346.55/mt to $485.13/mt. The depreciation of the real also led to higher domestic prices. On average, in reais, farm gate prices increased 46 percent from 2020 to 2021—from R$1,796.88/mt to R$2,614.67.

In 2021, Brazil exported 60.5 mmt of soybeans to China, valued at $27.2 billion, slightly less than 2020's total (60.6 mmt), accounting for 70 percent of Brazil's total 2021 exports (86.1 mmt). The next highest shares of Brazil's soybean exports (in declining order) went to Spain, the Netherlands, Thailand, and Turkey. Santos was the largest Brazilian soybean export port, followed by Rio Grande, Paranaguá, São Luís, Barcarena, and São Francisco do Sul. These six ports accounted for 83 percent of Brazil's 2021 total exports.

The southern ports of Santos, Rio Grande, Paranaguá, and São Francisco do Sul still dominate the soybean trade to China, collectively accounting for 74 percent of Brazil's soybean exports to China in 2021. Also, in 2021, the northeastern ports of São Luís, Vitória, Salvador, and Barcarena accounted for nearly 25 percent of soybean exports to China. The Amazon River ports of Manaus and Santarém exported a small amount to China (mainly from Manaus), but exported mostly to the European Union, North America, and Africa. Typically, Brazilian soybean exports peak in May and decline through the end of the year. In 2021, the ocean freight spread between the Shanghai routes from the northeastern port of São Luís ($57.90/mt) and the port of Santos ($53.40/mt) was $4.50/mt. Ocean freight spread is the cost difference between two vessel routes to the same destination.

Acknowledgments

For data, regional information, and maps of Brazil, the author would like to thank the Associação Nacional dos Transportadores Ferroviários; Escola Superior de Agricultura "Luiz de Queiroz"/ Grupo de Pesquisa e Extensão em Logística Agroindustrial; Assesoria de Comunicação dos Portos de Paranaguá e Antonina; and USDA, Foreign Agricultural Service (FAS), Global Market Analysis. The author is, also, grateful for comments and critiques by Keith Menzie (USDA, Office of the Chief Economist); Maria Bukowski (USDA, Economic Research Service); Agata Kingsbury, Timothy ONeil (USDA, FAS) and Joseph Degreenia (USDA, FAS, Agricultural Attaché, Brasilia). Thanks, also, to USDA, Agricultural Marketing Service employees Maria Williams, editor; Jessica Ladd, graphic designer; and Alexis Heyman, economist.

General Information

State and Abbreviation

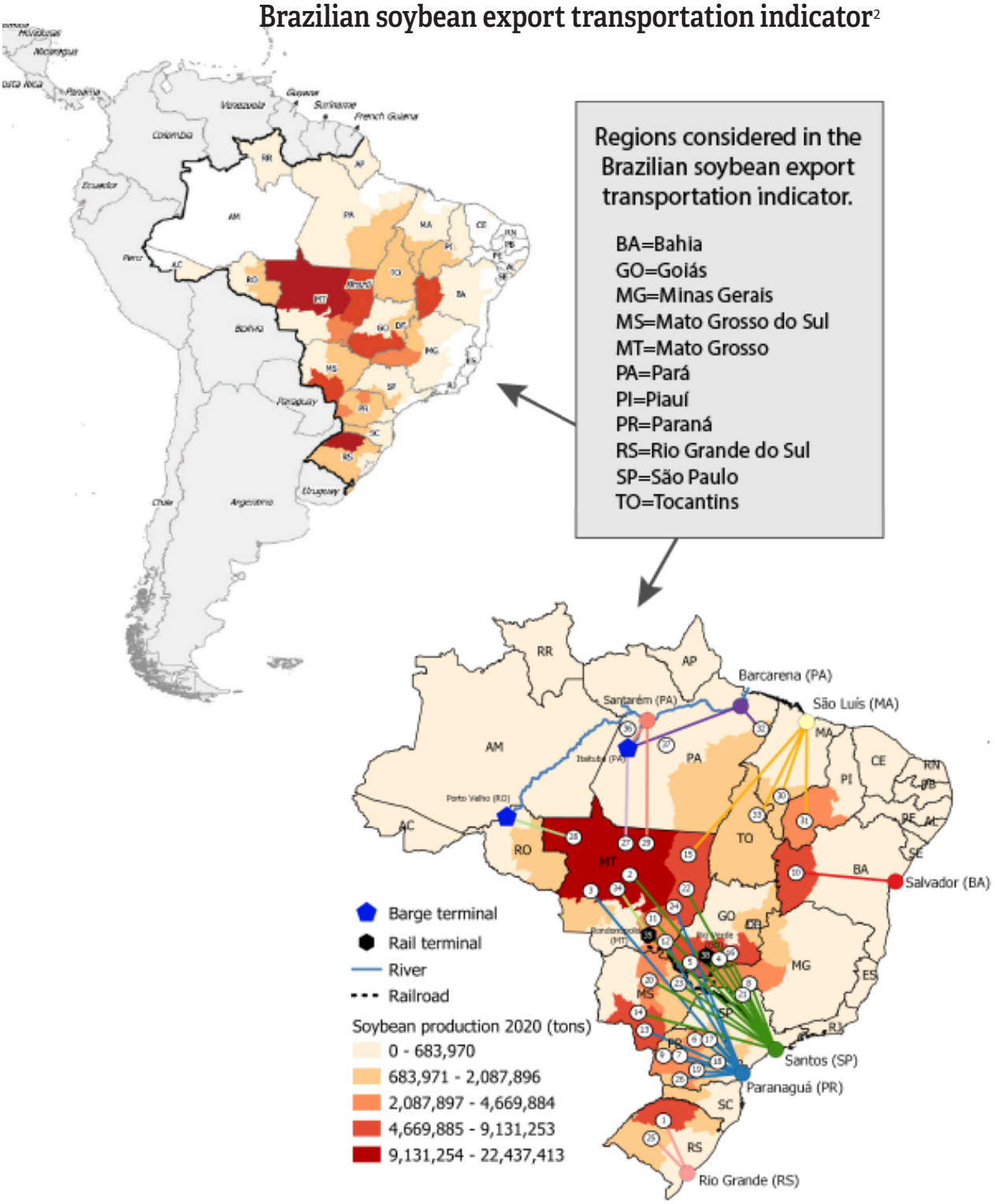
Acre (AC)	Pará (PA)
Alagoas (AL)	Paraíba (PB)
Amapá (AP)	Paraná (PR)
Amazonas (AM)	Pernambuco (PE)
Bahia (BA)	Piauí (PI)
Ceará (CE)	Rio de Janeiro (RJ)
Distrito Federal (DF)	Rio Grande do Sul (RS)
Espírito Santo (ES)	Rondônia (RO)
Goiás (GO)	Roraima (RR)
Maranhão (MA)	Santa Catarina (SC)
Mato Grosso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

Information about Brazil

Population:	213,317,639 (July 2021 estimate, Census, Instituto Brasileiro de Geografia e Estatística (IBGE))
Gross Domestic Product per Capita, 2021:	$16,161 (International Monetary Fund)
Inflation, 2021:	10.06 percent (IBGE)
Unemployment, 4th Quarter 2021:	11.1 percent (IBGE)
Area:	8,515,770 square kilometers
Languages:	Portuguese (official), Spanish, English, and French

2021 Summary

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



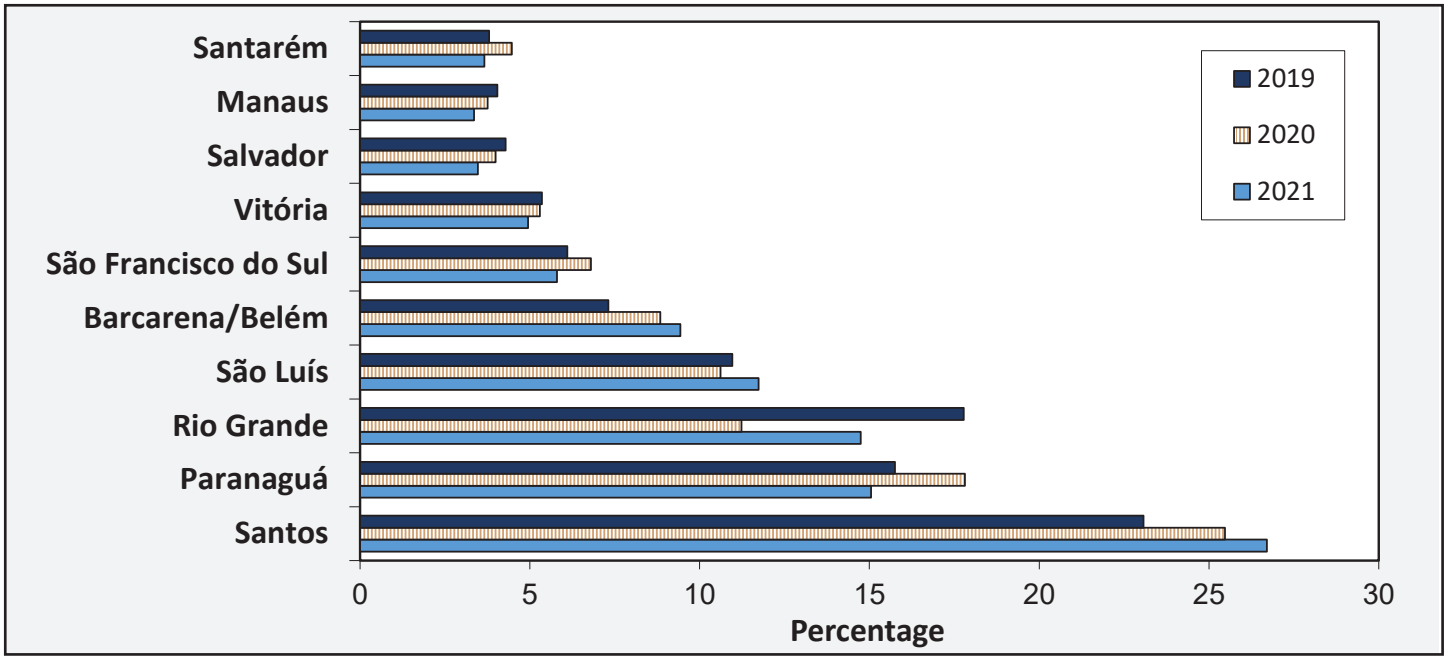
1 Table defining routes by number is shown on page 31.

2 Regions comprised about 79 percent of Brazilian soybean production in 2019 (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 largest soybean-exporting country, followed by the United States, Paraguay, Argentina, and Canada. In 2021, Santos was the largest Brazilian soybean export port, followed by Paranaguá, Rio Grande, São Luís, Barcarena, and São Francisco do Sul. These six ports accounted for nearly 83 percent of Brazil's total exports. The southern ports of Santos, Rio Grande, Paranaguá, and São Francisco do Sul still dominate the soybean trade to China, accounting for 74 percent of Brazil's soybean exports to China. The northeastern ports of São Luís, Vitória, Salvador, and Barcarena accounted for nearly 25 percent of soybean exports to China. The Amazon River ports of Manaus accounted for 0.1 percent of soybean exports to China in 2021.

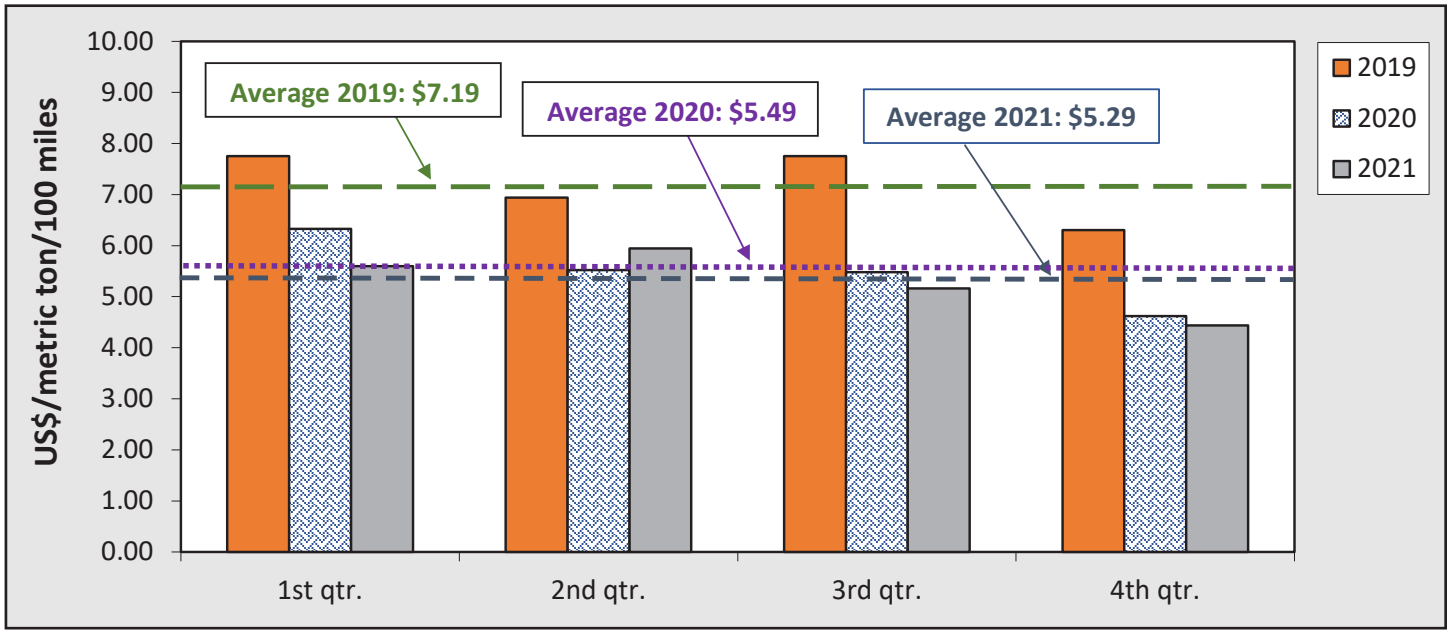
Brazilian soybean exports by port, 2019-21



Source: Comex Stat, Ministério da Economia.

From 2020 to 2021, the average cost in Brazil of shipping a metric ton (mt) of soybeans 100 miles by truck decreased from $5.49 per mt to $5.29 per mt.

Brazilian soybean export truck cost index, 2019-21



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

From 2020 to 2021, in selected routes of shipping Brazilian soybeans to China, total transportation costs as a share of total landed costs declined. The diminished share reflected the fact that farm prices rose more than total transportation costs. In Mato Grosso, Brazil's largest soybean-producing State, 2021 transportation costs from Sorriso were 18-19 percent of the total landed costs of shipping to Shanghai through the Port of Santos. For comparison, transportation costs were 45 percent in 2006 and 34 percent in 2008.

Costs of transporting Brazilian soybeans from the southern ports to Shanghai, China, 2016-21

	2016	2017	2018	2019	2020	2021	% Change 2020-21	2016	2017	2018	2019	2020	2021	% Change 2020-21
	North MT[1] - Santos[2] by truck —US$/mt—							Northwest RS[1] - Rio Grande[2] —US$/mt—						
Truck	75.49	92.95	91.76	79.28	60.65	59.30	-2.2	18.38	30.72	29.20	25.06	19.24	18.85	-2.0
Ocean	16.63	26.88	30.31	33.65	31.40	53.40	70.1	20.50	27.30	31.06	33.94	32.90	53.94	64.0
Total transportation	92.12	119.82	122.08	112.92	92.04	112.70	22.4	38.88	58.02	60.27	58.99	52.13	72.78	39.6
Farm gate price[3]	331.91	293.60	306.03	285.35	357.23	482.47	35.1	352.69	322.30	333.21	305.56	354.57	489.39	38.0
Landed cost	424.03	413.43	428.11	398.28	449.27	595.16	32.5	391.57	380.32	393.48	364.56	406.70	562.17	38.2
Transport % of landed cost	21.9	29.0	28.5	28.4	21.2	18.9	-10.9	9.9	15.3	15.3	16.2	13.1	12.9	-1.8
	North MT[1] - Santos[2] by rail —US$/mt—							South GO[1] - Santos[2] —US$/mt—						
Truck	-	-	33.49	27.62	21.47	20.64	-3.9	34.66	44.22	43.25	37.34	28.48	27.18	-4.6
Rail[4]	-	-	43.29	39.98	32.13	29.69	-7.6	-	-	-	-	-	-	-
Ocean	-	-	30.31	33.65	31.40	53.40	70.1	16.63	26.88	30.31	33.65	31.40	53.40	70.1
Total transportation	-	-	107.10	101.25	85.00	103.73	22.0	51.28	71.09	73.56	70.98	59.88	80.58	34.6
Farm gate price[3]	-	-	306.03	285.35	357.23	482.47	35.1	329.15	301.99	312.31	291.46	331.01	479.82	45.0
Landed cost	-	-	413.13	386.60	442.22	586.19	32.6	380.43	373.08	385.88	362.45	390.88	560.39	43.4
Transport % of landed cost	-	-	25.9	26.2	19.9	17.7	-11.4	13.6	19.1	19.1	19.6	15.8	14.4	-9.2

[1]Producing regions: RS=Rio Grande do Sul, MT=Mato Grosso, 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.
Source: University of São Paulo, Escola Superior de Agricultura "Luiz de Queiroz" (ESALQ/USP), Brazil, and USDA, Agricultural Marketing Service.

From 2020 to 2021, transportation costs to ship soybeans to Hamburg, Germany, from Mato Grosso, decreased 11-12 percent as a share of total landed costs.

Costs of transporting Brazilian soybeans from the southern ports to Hamburg, Germany, 2016-21

	2016	2017	2018	2019	2020	2021	% Change 2020-21	2016	2017	2018	2019	2020	2021	% Change 2020-21
	North MT[1] - Santos[2] by truck —US$/mt—							Northwest RS[1] - Rio Grande[2] —US$/mt—						
Truck	75.49	92.95	91.76	79.28	60.65	59.30	-2.2	23.85	30.72	29.20	25.06	19.24	18.85	-2.0
Ocean	18.13	24.50	25.25	25.63	24.75	45.11	82.3	17.25	25.50	26.25	25.63	25.13	46.28	84.2
Total transportation	93.62	117.45	117.01	104.90	85.40	104.41	22.3	41.10	56.22	55.45	50.68	44.36	65.12	46.8
Farm gate price[3]	331.91	293.60	306.03	285.35	357.23	482.47	35.1	348.28	322.30	333.21	305.56	354.57	489.39	38.0
Landed cost	425.53	411.05	423.05	390.25	442.62	586.88	32.6	389.37	378.52	388.66	356.25	398.93	554.51	39.0
Transport % of landed cost	22.1	28.6	27.6	26.9	20.0	17.8	-11.2	10.6	14.9	14.3	14.2	11.4	11.7	2.6
	North MT[1] - Santos[2] by rail —US$/mt—							South GO[1] - Santos[2] —US$/mt—						
Truck	-	-	33.49	27.62	21.47	20.64	-3.9	34.66	44.22	43.25	37.34	28.48	27.18	-4.6
Rail[4]	-	-	43.29	39.98	32.13	29.69	-7.6	-	-	-	-	-	-	-
Ocean	-	-	25.25	25.63	24.75	45.11	82.3	18.13	24.50	25.25	25.63	24.75	45.11	82.3
Total transportation	-	-	102.03	93.23	78.35	95.44	21.8	52.78	68.72	68.50	62.96	53.23	72.29	35.8
Farm gate price[3]	-	-	306.03	285.35	357.23	482.47	35.1	329.15	301.99	312.31	291.46	331.01	479.82	45.0
Landed cost	-	-	408.07	378.58	435.58	577.90	32.7	381.93	370.71	380.81	354.42	384.24	552.11	43.7
Transport % of landed cost	-	-	25.0	24.6	18.7	16.5	-11.7	13.9	18.6	18.0	17.8	14.3	13.1	-8.7

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

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

Transportation costs increased from the selected routes of Brazil's northern and northeastern ports to Shanghai, China, and Hamburg, Germany.

Cost of transporting soybeans from the northern and northeastern ports to Shanghai, China, 2019-21

	2019	2020	2021	% Change 2020-21	2019	2020	2021	% Change 2020-21
	North MT[1] - Santarém[2] —US$/mt—				South MA[1] - São Luís[2] —US$/mt—			
Truck	52.04	39.20	37.91	-3.3	32.99	26.83	24.85	-7.4
Ocean	35.06	33.66	57.31	70.3	34.81	34.02	57.90	70.2
Total transportation	87.10	72.86	95.22	30.7	67.80	60.85	82.75	36.0
Farm gate price[3]	285.35	357.23	482.47	35.1	297.05	353.30	484.89	37.2
Landed cost	372.45	430.08	577.69	34.3	364.85	414.15	567.63	37.1
Transport % of landed cost	23.4	17.6	16.5	-6.3	18.6	15.0	14.5	-3.3
	Southwest PI[1] - São Luís[2] —US$/mt—				North MT[1] - Barcarena[2] —US$/mt—			
Truck	39.34	29.81	29.15	-2.2	46.64	31.72	31.84	0.4
Barge[4]	-	-	-	-	18.85	14.68	15.53	5.8
Ocean	34.81	34.02	57.90	70.2	34.96	34.96	59.55	70.3
Total transportation	74.15	63.83	87.05	36.4	100.45	81.35	106.92	31.4
Farm gate price[3]	295.87	342.39	475.78	39.0	285.35	357.23	482.47	35.1
Landed cost	370.02	406.23	562.82	38.5	385.80	438.58	589.38	34.4
Transport % of landed cost	20.9	16.0	15.5	-3.4	26.1	19.2	18.1	-5.8

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

Cost of transporting soybeans from the northern and northeastern ports to Hamburg, Germany, 2019-21

	2019	2020	2021	% Change 2020-21	2019	2020	2021	% Change 2020-21
	North MT[1] - Santarém[2] —US$/mt—				South MA[1] - São Luís[2] —US$/mt—			
Truck	52.04	39.20	37.91	-3.3	32.99	26.83	24.85	-7.4
Ocean	23.42	20.94	42.09	101.0	20.34	22.76	48.36	112.5
Total transportation	75.45	60.14	80.00	33.0	53.33	49.59	73.21	47.6
Farm gate price[3]	285.35	357.23	482.47	35.1	297.05	353.30	484.89	37.2
Landed cost	360.81	417.37	562.47	34.8	350.38	402.89	558.10	38.5
Transport % of landed cost	20.9	15.0	14.2	-5.4	15.2	12.6	13.1	4.1
	Southwest PI[1] - São Luís[2] —US$/mt—				North MT[1] - Barcarena[2] —US$/mt—			
Truck	39.34	29.81	29.15	-2.2	46.64	31.72	31.84	0.4
Barge[4]	-	-	-	-	18.85	14.68	15.53	5.8
Ocean	20.34	22.76	48.36	112.5	21.16	20.31	41.00	101.8
Total transportation	59.68	52.58	77.51	47.4	86.64	66.71	88.37	32.5
Farm gate price[3]	295.87	342.39	475.78	39.0	285.35	357.23	482.47	35.1
Landed cost	355.55	394.97	553.28	40.1	372.00	423.93	570.83	34.7
Transport % of landed cost	16.8	13.6	14.0	3.4	23.3	16.4	15.5	-5.7

[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.

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

In response to higher transportation costs and farm prices, total landed costs of U.S. soybeans increased via the U.S. Gulf to Germany and China. From 2020 to 2021, transportation costs rose in response to many factors: strong demand for U.S. soybeans; flooding and infrastructure damage from Hurricane Ida; tight vessel supply caused by congestion and other pandemic-related logistic challenges; and severe winter weather, which limited barge and labor supplies.

Average costs of transporting U.S. soybeans via U.S. Gulf to Hamburg, Germany, and Shanghai, China, 2017-21

	2017	2018	2019	2020	2021	% Change 2020-21	2017	2018	2019	2020	2021	% Change 2020-21
	To Hamburg, Germany											
	Minneapolis, Minnesota —US$/mt—						Davenport, Iowa —US$/mt—					
Truck	12.71	12.14	10.10	11.04	13.58	23.0	12.71	12.14	10.10	11.04	13.58	23.0
Rail[1]	45.91	46.37	47.96	36.73	36.38	-1.0	34.98	30.92	32.13	33.03	33.33	0.9
Barge[2]	22.62	29.97	21.99	26.14	27.48	5.1	17.60	24.51	20.43	20.05	23.09	15.1
Ocean[3]	15.46	19.85	18.15	16.61	25.31	52.4	15.47	19.85	18.15	16.61	25.31	52.4
Total transportation[4]	62.26	73.55	74.22	62.97	75.47	19.9	54.53	64.23	64.73	55.96	70.32	25.7
Farm price[5]	338.20	330.51	305.65	321.45	481.65	49.8	344.53	336.05	307.27	330.02	482.26	46.1
Landed cost[6]	400.46	404.06	379.86	384.42	557.12	44.9	399.06	400.28	372.00	385.98	552.58	43.2
Transport % of landed cost	15.5	18.1	19.4	16.4	13.6	-16.8	13.6	16.0	17.4	14.4	12.8	-11.2
	To Shanghai, China											
	Minneapolis, Minnesota —US$/mt—						Davenport, Iowa —US$/mt—					
Truck	12.71	12.14	10.10	11.04	13.58	23.0	12.71	12.14	10.10	11.04	13.58	23.0
Rail[1]	45.91	46.37	47.96	36.73	36.38	-1.0	34.98	30.92	32.12	33.03	33.33	0.9
Barge[2]	22.62	29.97	21.99	26.14	27.48	5.1	17.60	24.51	20.43	20.05	23.09	15.1
Ocean[3]	38.37	44.42	44.55	40.08	68.58	71.1	38.37	44.42	44.55	40.08	68.58	71.1
Total transportation[4]	85.17	98.12	100.62	86.44	118.74	37.4	77.43	88.80	91.14	79.43	113.58	43.0
Farm price[5]	338.20	330.56	305.65	321.45	481.65	49.8	344.53	336.05	307.27	330.02	482.26	46.1
Landed cost[6]	423.37	428.68	406.27	407.89	600.39	47.2	421.96	424.85	398.41	409.45	595.85	45.5
Transport % of landed cost	20.1	22.8	24.7	21.2	19.8	-6.5	18.3	20.9	22.9	19.4	19.1	-1.2

[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]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: 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; totals may not add exactly due to rounding.

Source: Compiled by the USDA, Agricultural Marketing Service.

From North and South Dakota to Shanghai, China, via the Pacific Northwest (PNW), U.S. soybean transportation costs, as a share of total landed costs, decreased 15-16 percent from 2020 to 2021 in response to higher soybean prices.

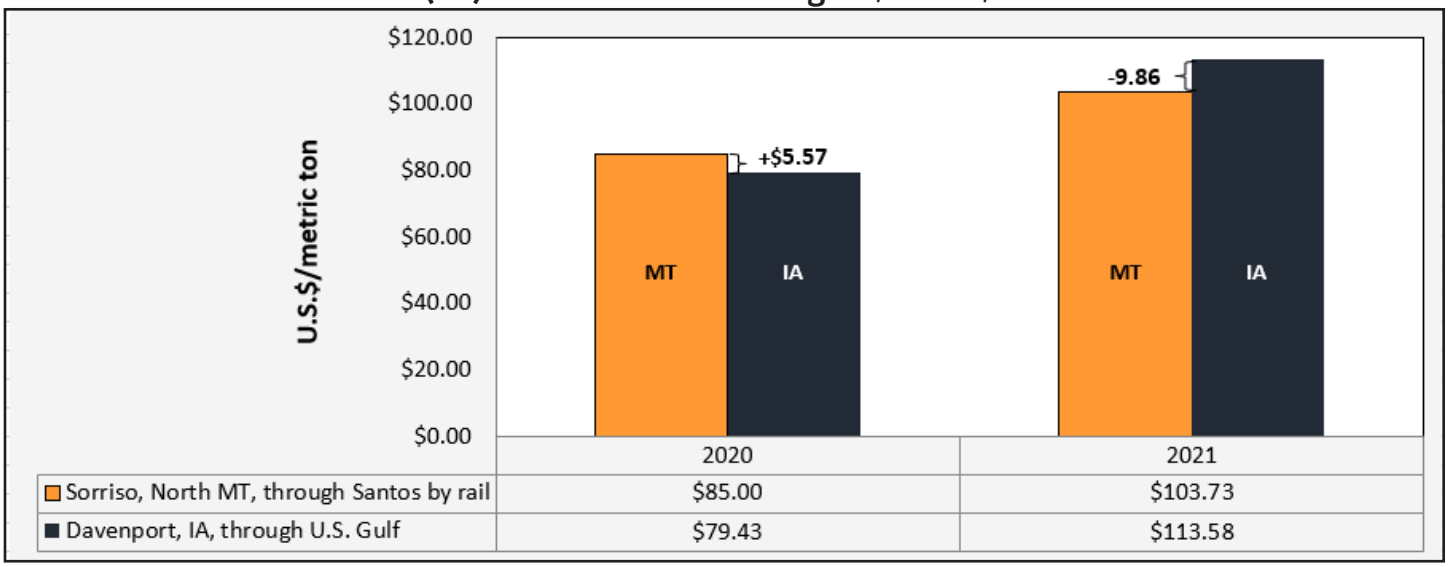
Average costs of transporting U.S. soybeans via Pacific Northwest to Shanghai, China, 2017-21

	2017	2018	2019	2020	2021	% Change 2020-21	2017	2018	2019	2020	2021	% Change 2020-21
	To Shanghai, China											
	Fargo, North Dakota —US$/mt—						Sioux Falls, South Dakota —US$/mt—					
Truck	12.71	12.14	10.10	11.04	13.58	23.0	12.71	12.14	10.10	11.04	13.58	23.0
Rail[1]	54.66	55.12	56.36	57.10	57.76	1.2	55.65	56.11	57.35	58.09	58.76	1.1
Ocean[2]	20.37	24.34	24.59	21.38	38.05	78.0	20.37	24.34	24.59	21.38	38.05	78.0
Total transportation	87.74	91.60	91.05	89.52	109.39	22.2	88.74	92.59	92.04	90.51	110.39	22.0
Farm price[3]	324.57	319.55	285.65	306.11	465.42	52.0	328.98	320.38	293.98	315.51	474.61	50.4
Landed cost[4]	412.31	411.14	376.70	395.62	574.81	45.3	417.72	412.96	386.02	406.01	584.99	44.1
Transport % of landed cost	21.3	22.3	24.2	22.7	19.1	-16.0	21.2	22.5	23.8	22.4	18.9	-15.4

[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; totals may not add up exactly due to rounding.
Source: Compiled by the USDA, Agricultural Marketing Service.

In 2021, the cost per metric ton (mt) to ship soybeans from Sorriso, North Mato Grosso, via rail-Santos-Shanghai, China, was $9.86 less than from Davenport, IA, via U.S. Gulf. From 2020 to 2021, the U.S. cost advantage narrowed. More than two thirds of soybeans exported from Santos were hauled by rail. Sorriso is located 1,190 miles from the Port of Santos. From the Port of New Orleans, Davenport is about 900 miles by truck, 908 miles by rail, and 1,343 miles by barge.

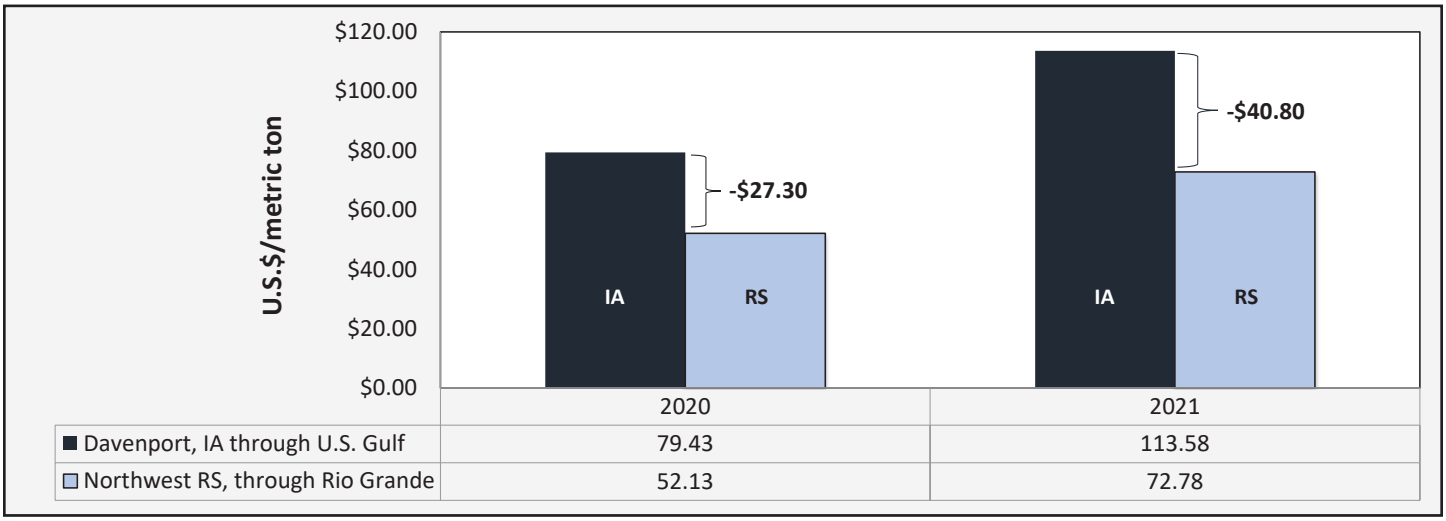
Transportation cost differences between Mato Grosso (MT) via rail and Iowa (IA) via U.S. Gulf to Shanghai, China, 2020-21



Source: USDA, Agricultural Marketing Service.

In 2021, the cost of shipping a metric ton of soybeans from Cruz Alta, Northwest Rio Grande do Sul, to Shanghai, China, was $40.80 less than from Davenport, IA. From 2020 to 2021, the Brazilian cost advantage widened, as Iowa transportation costs increased more than the Brazilian costs. The distance from Cruz Alta to the port of Rio Grande is 288 miles.

Transportation cost differences between Rio Grande do Sul (RS) and Iowa (IA) to Shanghai, China, 2020-21

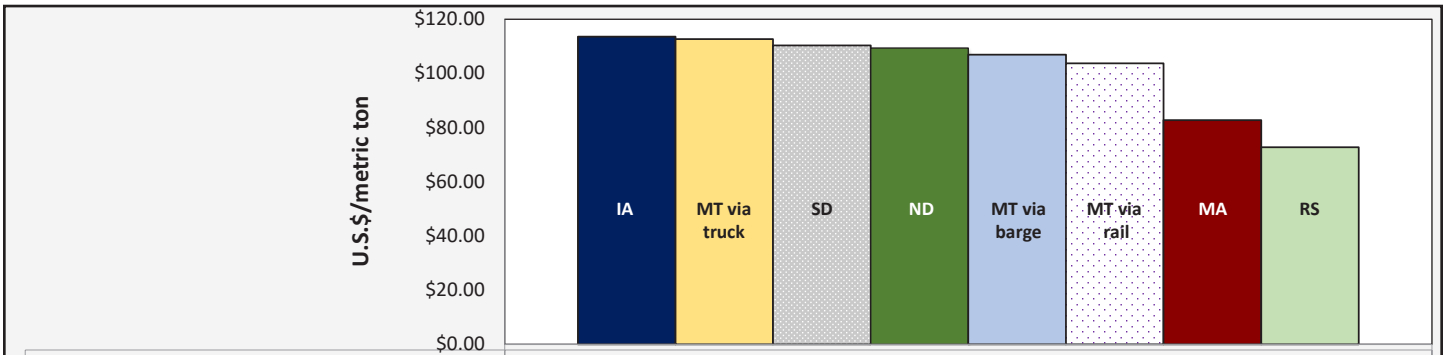


	2020	2021
Davenport, IA through U.S. Gulf	79.43	113.58
Northwest RS, through Rio Grande	52.13	72.78

Source: USDA, Agricultural Marketing Service.

During 2021, soybeans shipped by rail from Sorriso, North Mato Grosso, to Shanghai, China, cost about $9-10 per metric ton less than U.S. shipments to Shanghai, by the U.S. Gulf and $6 per metric ton less by the PNW routes. However, the cost advantage narrowed to $0.88 per metric ton when North Mato Grosso soybeans were shipped by truck to Santos and widened to about $7 per metric ton when shipped by barge to Barcarena. In Brazil, there are no published rail and barge tariff rates. Rail rates can be up to 30 percent lower than truck 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 railroad and barge companies and shippers.

Transportation cost differences between selected Brazil-U.S. routes to Shanghai, China, 2021



Davenport, IA, through U.S. Gulf	$113.58
Sorriso, North MT, through Santos via truck	$112.70
Sioux Falls, SD, through Pacific Northwest	$110.39
Fargo, ND, through Pacific Northwest	$109.39
Sorriso, North MT, through Barcarena	$106.92
Sorriso, North MT, through Santos via rail	$103.73
Balsas, South MA, through São Luís	$82.75
Cruz Alta, Northwest RS, through Rio Grande	$72.78

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 2021, selected Brazilian export truck routes, measured in reais (R$), saw proportionally higher transportation costs than those estimated in U.S. dollars. Brazil's higher costs were due to the 5 percent depreciation of the Brazilian Real (R$) against the U.S. dollar.

Truck rates for selected Brazilian soybean export routes, US$/metric ton, 2016-21

Route #	Origin[1] (reference city)	Destination	Distance[2] (miles)	2016	2017	2018	2019	2020	2021	% change 2020-21
				Freight price, US$/metric ton[3]						
1	Northwest RS[4] (Cruz Alta)	Rio Grande	288	23.85	30.72	29.20	25.06	19.24	18.85	-2.0
2	North MT (Sorriso)	Santos	1,190	75.49	92.95	91.76	79.28	60.65	59.30	-2.2
3	North MT (Sorriso)	Paranaguá	1,262	74.42	89.41	90.20	75.78	59.87	58.62	-2.1
4	South GO (Rio Verde)	Santos	587	34.66	44.22	43.25	37.34	28.48	27.18	-4.6
6	North Central PR (Londrina)	Paranaguá	268	21.31	29.29	27.22	22.64	18.13	17.20	-5.1
11	Southeast MT (Primavera do Leste)	Santos	901	51.29	63.63	62.16	53.56	41.57	40.89	-1.6
27	North MT (Sorriso)	Itaituba	672	41.72	59.65	56.27	46.64	31.72	31.84	0.4
29	North MT (Sorriso)	Santarém	876	49.60	55.08	58.86	52.04	39.20	37.91	-3.3
30	South MA (Balsas)	São Luís	482	31.04	37.69	37.60	32.99	26.83	24.85	-7.4
31	Southwest PI (Bom Jesus)	São Luís	606	34.23	44.44	46.52	39.34	29.81	29.15	-2.2
32	Southeast PA (Paragominas)	Barcarena	249	17.93	25.00	22.39	20.12	15.20	14.42	-5.2
33	East TO (Campos Lindos)	São Luís	842	50.55	61.69	56.94	50.55	37.72	36.02	-4.5
34	North MT (Sorriso)	Rondonópolis (Rail terminal)	382	–na–	–na–	33.49	27.62	21.47	20.64	-3.9
35	Rondonópolis MT (Rail teminal)[5]	Santos	1019	–na–	–na–	43.29	39.98	32.13	29.69	-7.6
36	Itaituba PA (Barge terminal)[6]	Santarém	224	–na–	–na–	–na–	14.67	9.17	9.89	7.9
37	Itaituba PA (Barge terminal)[6]	Barcarena	738	–na–	–na–	–na–	18.85	14.68	15.53	5.8

[1]Although each origin region comprises several cities, the main city is considered as a reference to establish the freight price; na=not available.
[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 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.
[6]In Brazil, there are no published barge rates. Barge rates can be up to 60 percent lower than truck rates, depending on the volumes hauled and the terms of contracts signed between the barge company and shippers. The distance is in nautical miles.
Source: University of São Paulo, Escola Superior de Agricultura "Luiz de Queiroz" (ESALQ/ USP), Brazil, and USDA, Agricultural Marketing Service.

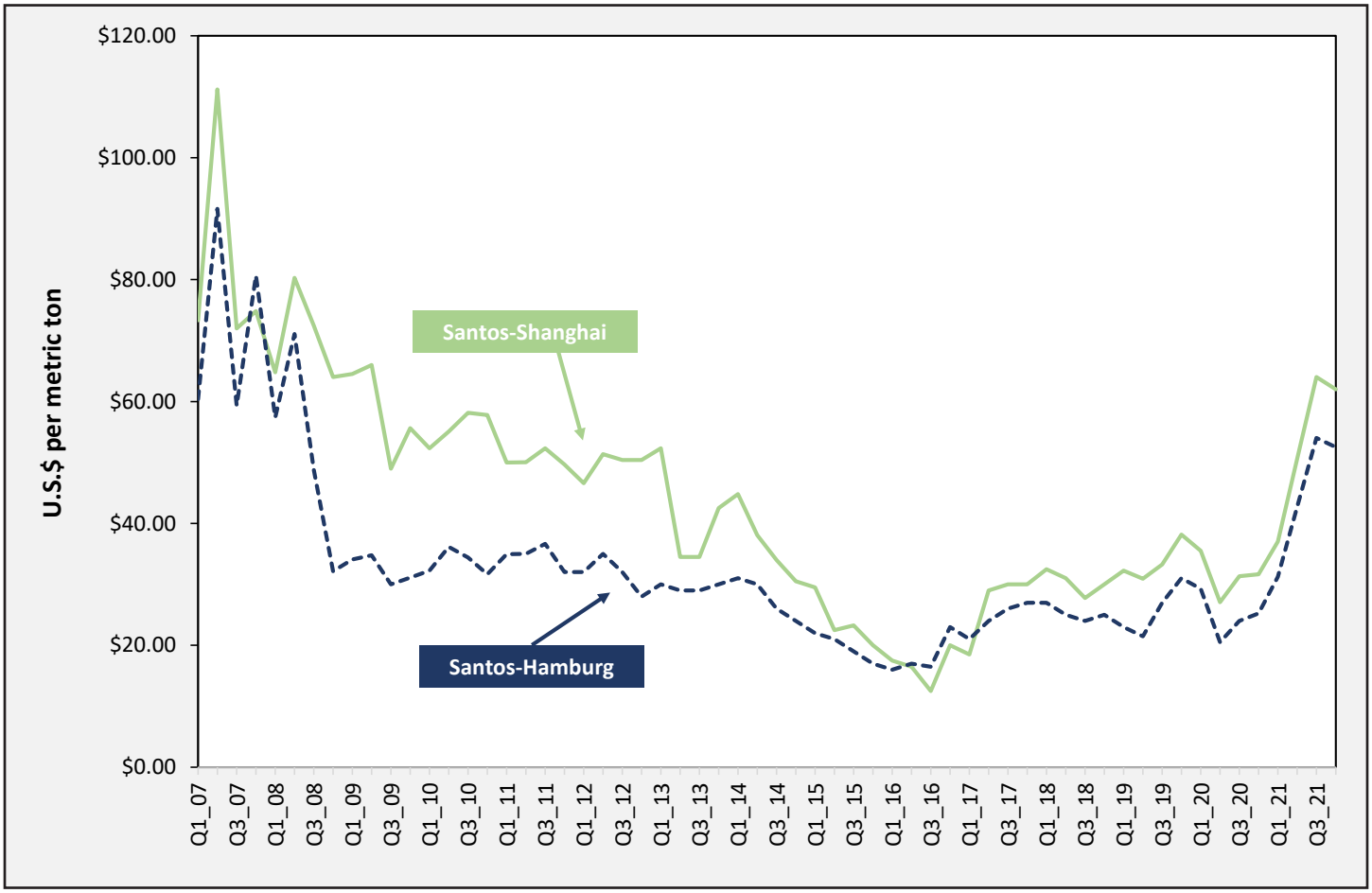
Truck rates for selected Brazilian soybean export routes, reais/metric ton, 2016-21

Route #	Origin[1] (reference city)	Destination	Distance[2] (miles)	2016	2017	2018	2019	2020	2021	% change 2020-21
				Freight price, reais/metric ton[3]						
1	Northwest RS[4] (Cruz Alta)	Rio Grande	288	83.70	97.91	106.15	98.63	98.34	101.66	3.4
2	North MT (Sorriso)	Santos	1,190	263.26	296.36	334.43	312.20	310.69	319.76	2.9
3	North MT (Sorriso)	Paranaguá	1,262	259.49	285.12	328.71	298.83	306.56	316.02	3.1
4	South GO (Rio Verde)	Santos	587	121.33	140.95	157.35	146.75	145.87	146.61	0.5
6	North Central PR (Londrina)	Paranaguá	268	74.77	93.34	98.87	89.07	92.75	92.80	0.1
11	Southeast MT (Primavera do Leste)	Santos	901	179.27	202.86	226.32	210.83	212.84	220.44	3.6
27	North MT (Sorriso)	Itaituba	672	145.97	190.01	204.53	183.26	162.06	171.70	6.0
29	North MT (Sorriso)	Santarém	876	174.02	175.70	214.29	204.53	200.87	204.50	1.8
30	South MA (Balsas)	São Luís	482	107.94	120.16	137.16	129.69	138.13	133.96	-3.0
31	Southwest PI (Bom Jesus)	São Luís	606	119.74	141.67	169.77	154.46	153.25	157.30	2.6
32	Southeast PA (Paragominas)	Barcarena	249	62.95	79.64	81.19	78.95	77.84	77.83	0.0
33	East TO (Campos Lindos)	São Luís	842	175.24	196.74	207.55	198.95	193.24	194.31	0.6
34	North MT (Sorriso)	Rondonópolis (Rail terminal)	382	–na–	–na–	121.48	108.61	109.95	111.36	1.3
35	Rondonópolis MT (Rail teminal)[5]	Santos	1019	–na–	–na–	157.64	157.62	164.24	160.22	-2.4
36	Itaituba PA (Barge terminal)[6]	Santarém	224	–na–	–na–	–na–	25.78	21.19	24.12	13.8
37	Itaituba PA (Barge terminal)[6]	Barcarena	738	–na–	–na–	–na–	74.17	75.24	83.88	11.5

[1]Although each origin region comprises several cities, the main city is considered as a reference to establish the freight price; na = not available.
[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 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.
[6]In Brazil, there are no published barge rates. Barge rates can be up to 60 percent lower than truck rates, depending on the volumes hauled and the terms of contracts signed between the barge company and shippers. The distance is in nautical miles.
Source: University of São Paulo, Escola Superior de Agricultura "Luiz de Queiroz" (ESALQ/ USP), Brazil, and USDA, Agricultural Marketing Service.

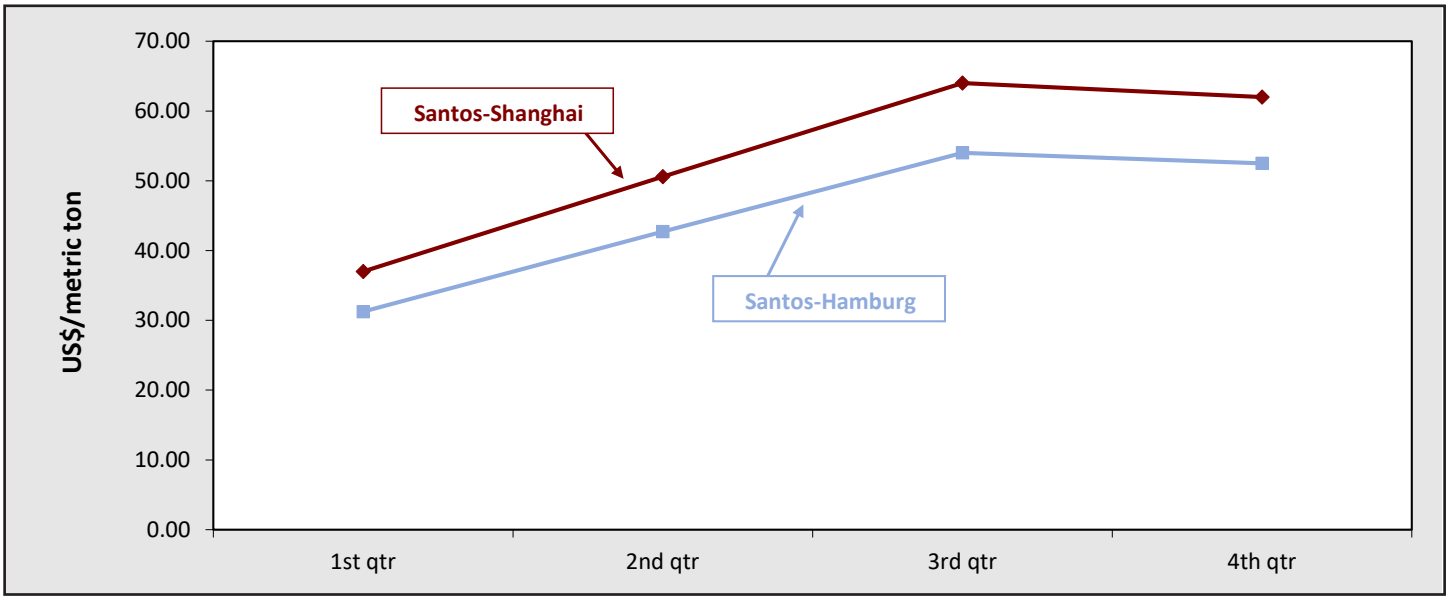
The 2021 ocean rates were the highest levels seen since the second quarters of 2007 and 2008. From 2020 to 2021, on average, ocean rates from the southern Brazilian ports increased 6 percent to Hamburg, Germany, and 3 percent to Shanghai, China. The increases were due to strong demand for shipping bulk items. The increases also resulted from tight vessel supply caused by congestion and other pandemic-related logistic challenges.

Brazilian soybean ocean freight from Santos to Shanghai, China, and Hamburg, Germany, 2007-2021



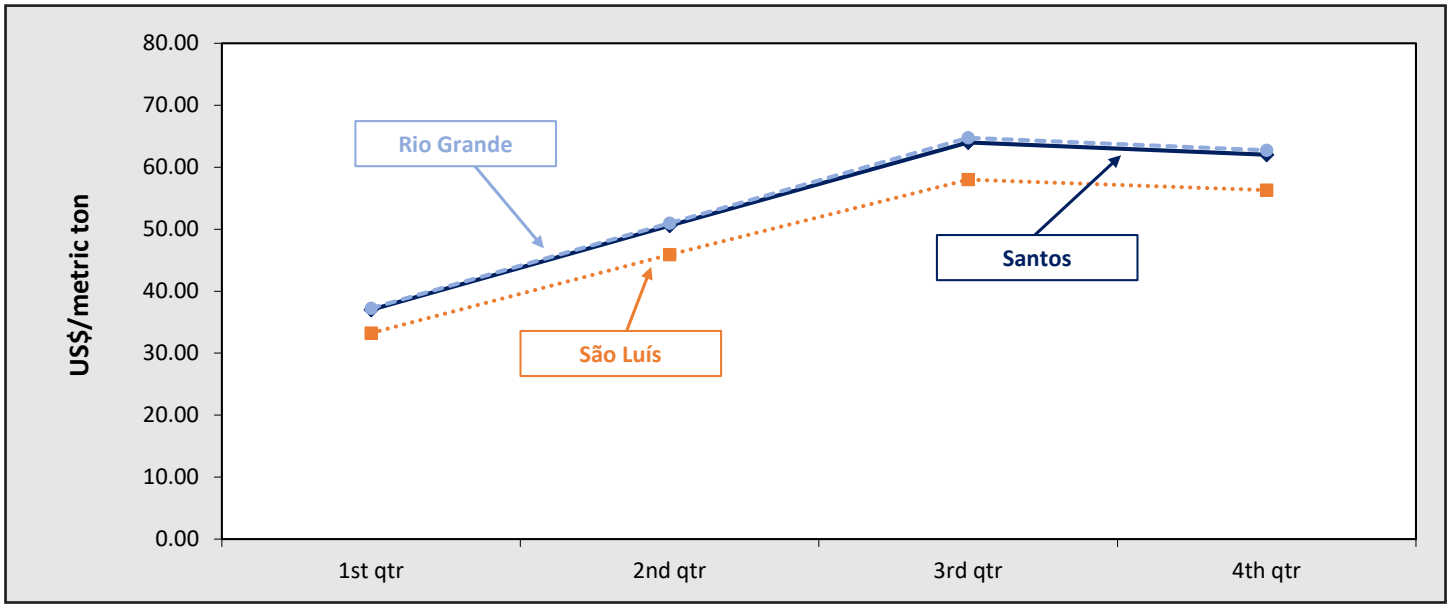
Source: University of São Paulo, Escola Superior de Agricultura "Luiz de Queiroz" (ESALQ/ USP), Brazil, and USDA, Agricultural Marketing Service.

Brazilian soybean ocean freight from Santos to Shanghai, China and Hamburg, Germany, 2021



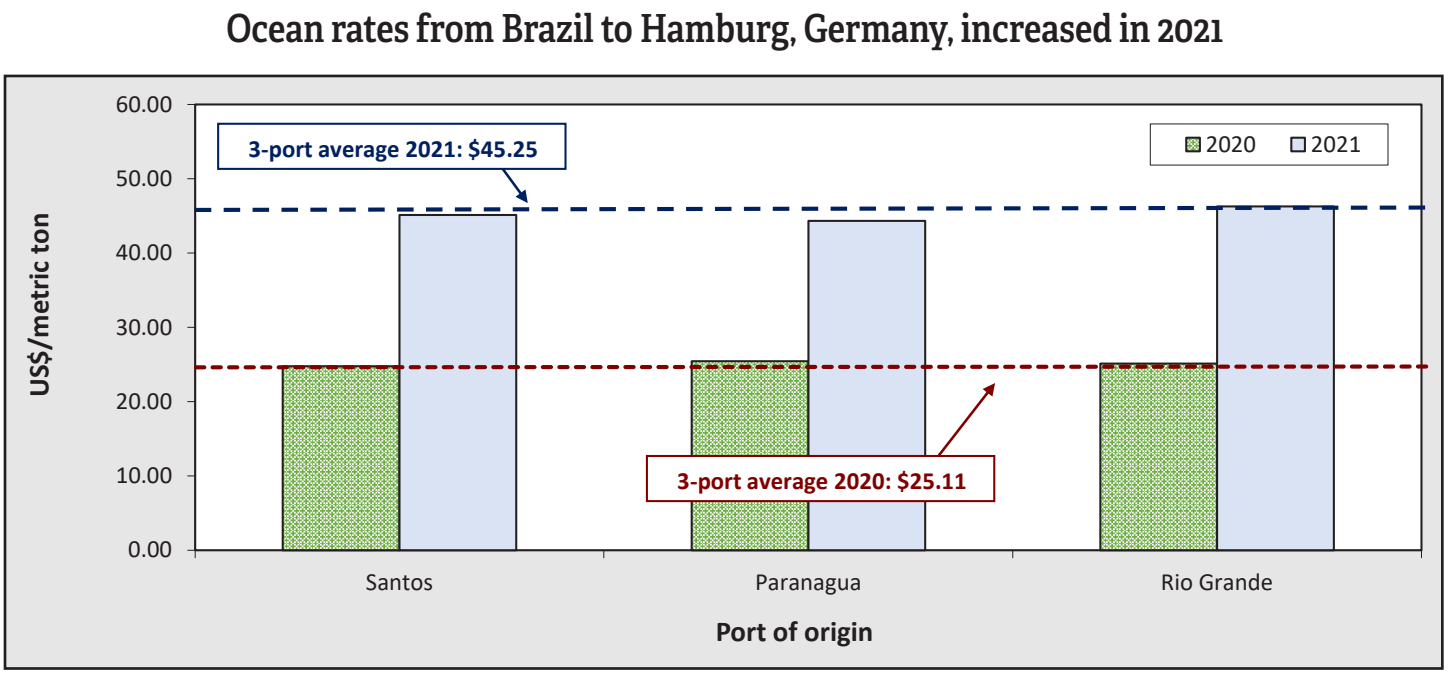
Source: University of São Paulo, Escola Superior de Agricultura "Luiz de Queiroz" (ESALQ/ USP), Brazil, and USDA, Agricultural Marketing Service.

Brazilian soybean ocean freight from selected ports to Shanghai, China, 2021



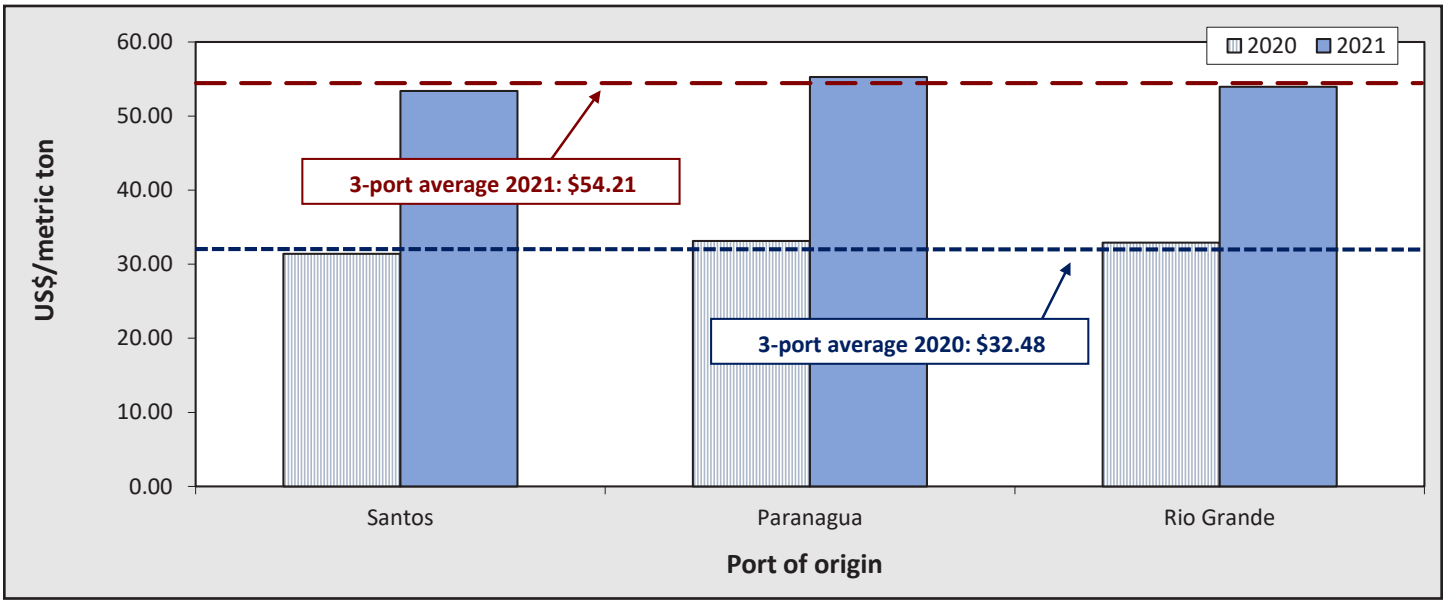
Source: University of São Paulo, Escola Superior de Agricultura "Luiz de Queiroz" (ESALQ/ USP), Brazil, and USDA, Agricultural Marketing Service.

On average, the cost to ship 1 mt of soybeans from Brazil to Hamburg, Germany, by oceangoing vessel increased from $25.11/mt in 2020 to $45.25/mt in 2021.



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

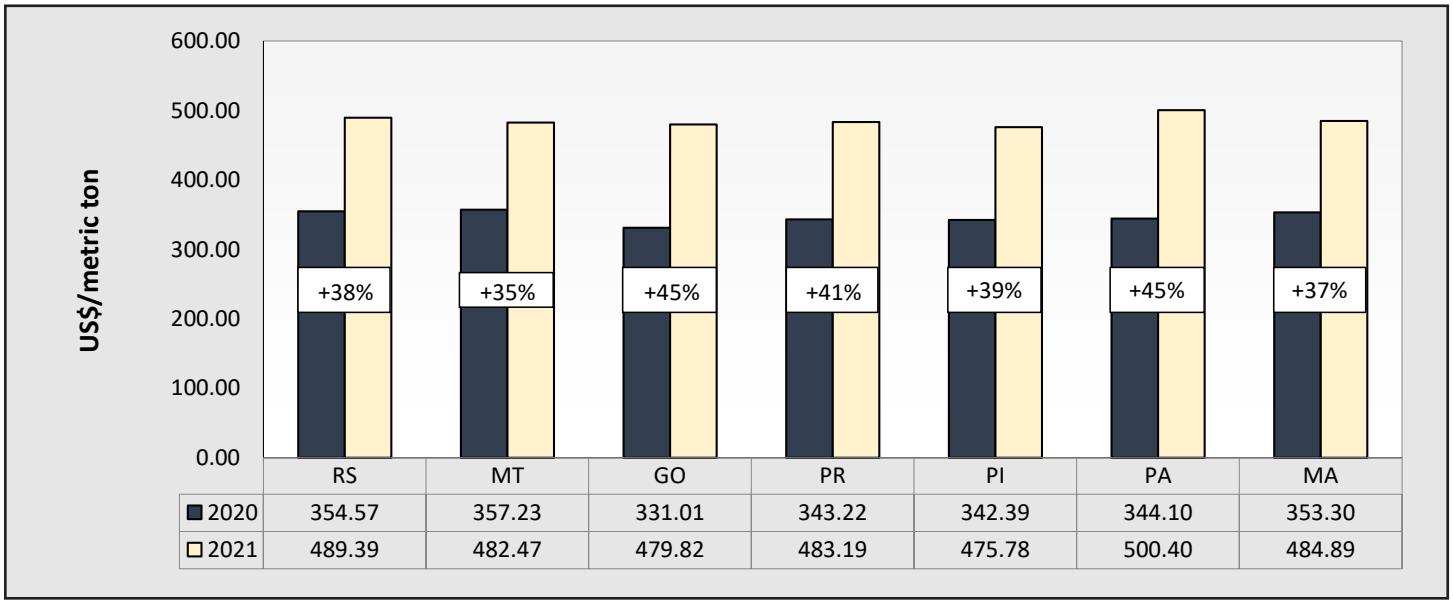
On average, the cost to ship 1 mt of soybeans from Brazil to Shanghai by ocean vessel increased from $32.48/mt in 2020 to $54.21/mt in 2021.



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

Brazilian farmers have benefited from the real's depreciation against the U.S. dollar, because exported soybeans are priced in U.S. dollars, but producers are paid in reais. Measured in U.S. dollars, average soybean farm gate prices increased 40 percent from 2020 to 2021—from $346.55/mt to $485.13/mt. The depreciation of the real also led to higher domestic prices. On average, in reais, farm gate prices increased nearly 46 percent from 2020 to 2021—from R$1,796.88/mt to R$2,614.67.

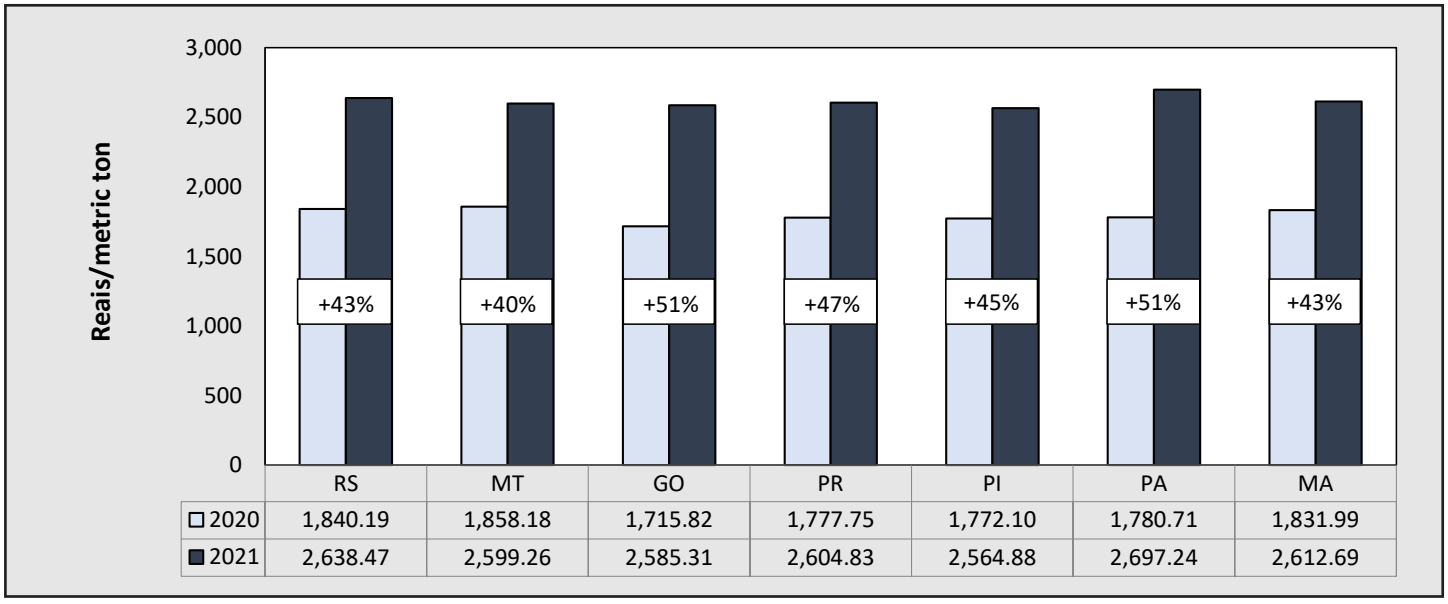
Selected Brazilian farm prices, US$/metric ton, 2020-21



	RS	MT	GO	PR	PI	PA	MA
2020	354.57	357.23	331.01	343.22	342.39	344.10	353.30
2021	489.39	482.47	479.82	483.19	475.78	500.40	484.89

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, 2020-21

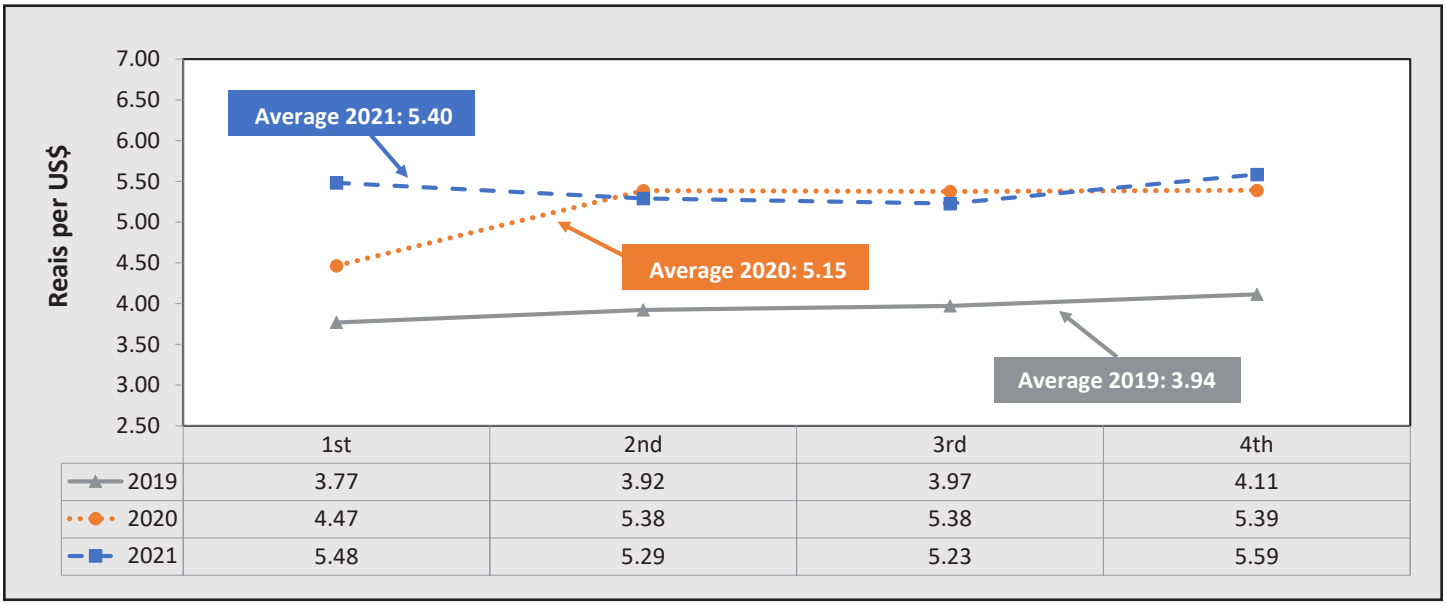


	RS	MT	GO	PR	PI	PA	MA
2020	1,840.19	1,858.18	1,715.82	1,777.75	1,772.10	1,780.71	1,831.99
2021	2,638.47	2,599.26	2,585.31	2,604.83	2,564.88	2,697.24	2,612.69

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 2020 to 2021, the Brazilian real depreciated nearly 5 percent against the U.S. dollar, from R$5.15 per U.S. dollar to R$5.40 per U.S. dollar.

Average quarterly exchange rate, real per U.S. dollar, 2019-21



	1st	2nd	3rd	4th
2019	3.77	3.92	3.97	4.11
2020	4.47	5.38	5.38	5.39
2021	5.48	5.29	5.23	5.59

Source: Banco Central do Brasil

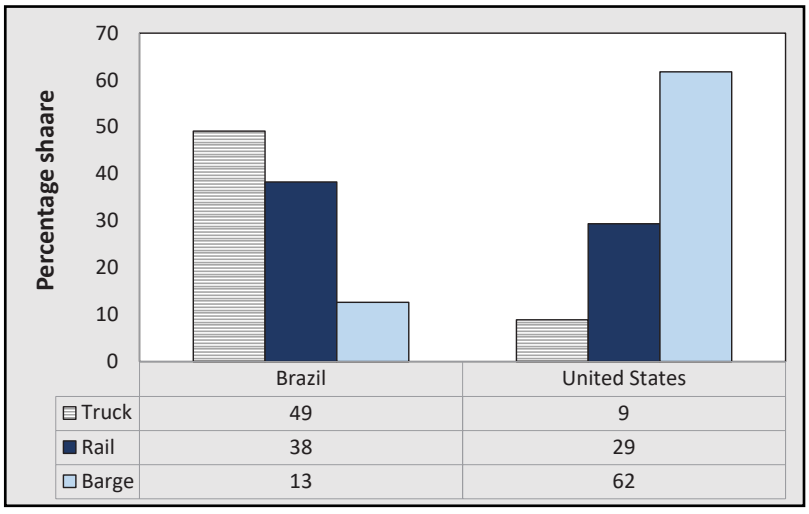
Nearly half of Brazilian soybeans exports are moved by truck.

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 truck. Brazil continues to depend heavily on trucks to transport grain to major destinations. This dependence is ensured for some time, because of the long distances between major production regions and terminals for barge and rail, as well as limited rail and inland waterway infrastructure capacity. In Brazil, short-haul movements' average distance is about 440 miles (707 kilometers (km)) from farm to rail and barge terminals. In the United States, the average distance from farm to inland grain elevators terminals is about 25-100 miles.

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

Mode	Brazil	United States
Total		
Truck	67	53
Rail	24	20
Barge	9	27
Exports		
Truck	49	9
Rail	38	29
Barge	13	62
Domestic		
Truck	97	86
Rail	1	12
Barge	2	2

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

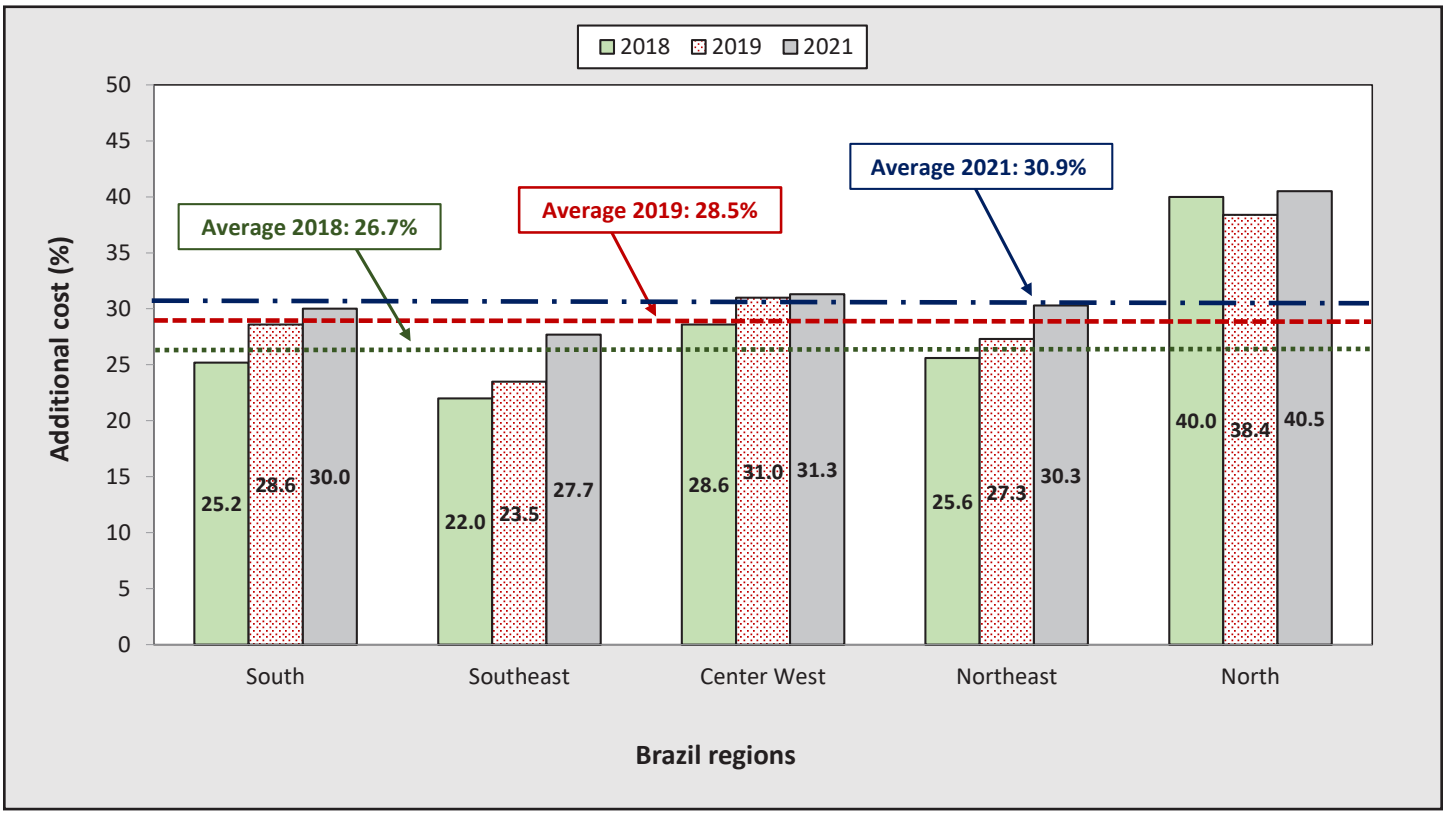


	Brazil	United States
Truck	49	9
Rail	38	29
Barge	13	62

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).
*Because of rounding, shares do not sum exactly to 100.
Source: Modal share analysis results—calculations by the University of São Paulo, Escola Superior de Agricultura "Luiz de Queiroz" (ESALQ/ USP), Brazil, and USDA, Agricultural Marketing Service.

According to estimates based on the 2021 Confederação Nacional do Transporte (CNT) survey of overall highway conditions in Brazil, the 2021 marginal operational cost of cargo trucks was nearly 31 percent higher than it would have been if the trucks had used only paved roads in optimal condition. This additional cost reflects number of paved roads in poor condition. The share of the cost for not using paved roads in optimal condition continues to grow, rising from 29 percent in 2019 to 31 percent in 2021. For example, according to CNT, the actual cost in 2021 of shipping a metric ton of soybeans from Sorriso, North MT, to Santos was $100 per metric ton (mt), but the optimal cost was $69.1/mt.

Cost increases because of poor road pavement conditions, 2018-21



Note: Data for 2020 are not available.

Source: Confederação Nacional do Transporte (CNT).

Transportation Infrastructure

Brazilian Minimum Freight Rates Law Update

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

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

Current status: The Brazilian Supreme Court held several conciliation hearings about the constitutionality of the law. Conciliation hearings are suspended because of the COVID-19 pandemic. A new date will be appointed in due time. Until then, the current law remains in force. The Brazilian Government created a provisional measure that changes the automatic parameters of the freight table according to the variation in the price of diesel from 10 percent to 5 percent due to the high volatility of fuel in Brazil. In July 2022, the ANTT's adjustments to the minimum freight rates resulted in an average increase of nearly 2 percent.

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

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

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

Investment Partnership Program (PPI): Selected Infrastructure Project Priorities That Facilitate Agricultural Exports

On February 1, 2019, the Brazilian government announced the infrastructure priorities for President Bolsonaro's Administration (ANTT and CNT):

1. **The North-South (EF-151) Railroad**: Porto National, Tocantins-Estrela d'Oeste, São Paulo. This railroad integrates four States: Tocantins, Goiás, Minas Gerais, and São Paulo with access to the northeastern port of Itaquí-Sâo Luis, Maranhão, and the southern port of Santos with an extension that is 955 miles (1,537 km) long. On August 8, 2019, Rumo S.A. signed the 30-year concession contract for Ferrovia Norte-Sul (North-South Railway) from Estrela d'Oeste to Porto Nacional. Rumo has 2 years to complete the 424 miles (682 km) between Anápolis and Estrela d'Oeste (95 percent completed) and start operations in 2021. Rumo has 2 years to make the railroad operate.

   Current Status:At the end of July 2021, Rumo started operating the most important section of Norte-Sul Railroad between Estrela D'Oeste (São Paulo), and São Simão (Goiás) (Globo.com). In addition, the company set up a rail terminal in Rio Verde (Goiás) with a capacity to handle 11 million metric tons of grain and soybean meal per year to serve Goiás and eastern Mato Grosso. Despite being 124 miles (200 km) from São Simão, the terminal is now the closest one to the southwest Goiás producers. These two 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. According to Rumo, this rail expansion offers an alternative route to Center-West producers that currently costs 15-20 percent less than trucking and offers even greater savings over barge through the Tietê-Paraná waterway.

   In April 2022, Rumo stopped work on the last 180 miles (290 km) of the Norte-Sul Railroad between Rio Verde and Ouro Verde de Goiás. The previously constructed railroad section, ending in Tocantins, is already operating. Expected to be completed by the end of 2022, the Norte-Sul Railroad will be used to haul agricultural cargo from the north Goiás and south Tocantins to the Port of Santos. In addition, the new railroad will be used to transport containers from Maranhão to the Southeast region. Currently, Rumo's focus is on transporting grain and oilseeds, such as soybeans, corn, and soybean meal. However, there is potential for other cargoes. In Rio Verde, a fertilizer plant was built in partnership with Andali—a joint venture of BRFertil with CHS Inc. (the largest U.S. agricultural cooperative). On August 9, 2022, the plant began operations and will offer structures for cargo transportation and fertilizer mixing.

2. **The West-East Integration (FIOL) Railroad (EF-334)**: Ilhéus, Bahia, to Figueirópolis, Tocantins. Extension: 949 miles (1,527 km). FIOL 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: Section I: Ilhéus - Caetité, Bahia (334 miles (537 km)); Section 2: Caetité - Barreiras, Bahia (301 miles (485 km)); and Section 3: Barreiras - Figueirópolis, Tocantins (314 miles (505 km)).

   Current Status: The Brazilian Government announced that Valec Engenharia, Construções e Ferrovias S.A. in partnership with the Army Engineering Construction Battalion will build the railroad. On April 8, 2021, Bahia Mineração S.A. (Bamin) won the auction of the 35-year concession to complete and operate section 1 (between Caetité and Ilhéus), which will facilitate iron ore exports from Bamin's mines to the ports. In 2025, this section is expected to begin operations.

3. **Ferrogrão Railroad (EF-170)**: The purpose is to consolidate the new Brazilian export rail corridor of the "Arco Norte" by connecting the grain-producing region of the Center-West to the State of Pará, ending at Miritituba Port. The EF-170 is expected to increase transport capacity and competitiveness within the corridor and alleviate traffic conditions on highway BR-163 by serving as an alternative route for soybean and corn exports. The estimated cost of the project is $2.5 billion (R$14 billion).[5] The concession is for 65 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.

4. **BR-163**: The 663-mile (1,067 km) stretch of BR-163 from Sorriso, North Mato Grosso, (Brazil's largest grain producer) to Miritituba was completed in late November 2019. Currently, using 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 Brazilian toll road BR 163. The concession is for 10 years, renewable for 2 more years. There are reports of road deterioration (A Tribuna).

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 law 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 project**, 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 project**, with an extension equal to or greater than 6.2 miles (10 kilometers). Examples include a railway bypass, new stretch, branch, variant, or duplication of a railway line.
- **Special artwork design project**, such as a bridge, railway viaduct, underpass, and footbridge.
- **Auxiliary installation project**, such as an administrative building, filling and washing station, sandpit, and wagon and locomotive workshop; and
- **Diverse project**, such as level crossing (PN), pedestrian crossing (PNP) and signaling, as well as control system.

In the case of the PIC, if the project is classified as small railroads, special works of art, auxiliary installations and diverse, there will be an automatic authorization, after the presentation of PIC's standard form. Except those projects that impact the economic-financial balance of the contract.

In the case of PIT projects, the works will be authorized after the concessionaire approves them and submits a standard form to ANTT. Most PIT projects encompass essential public services, such as railway crossings;

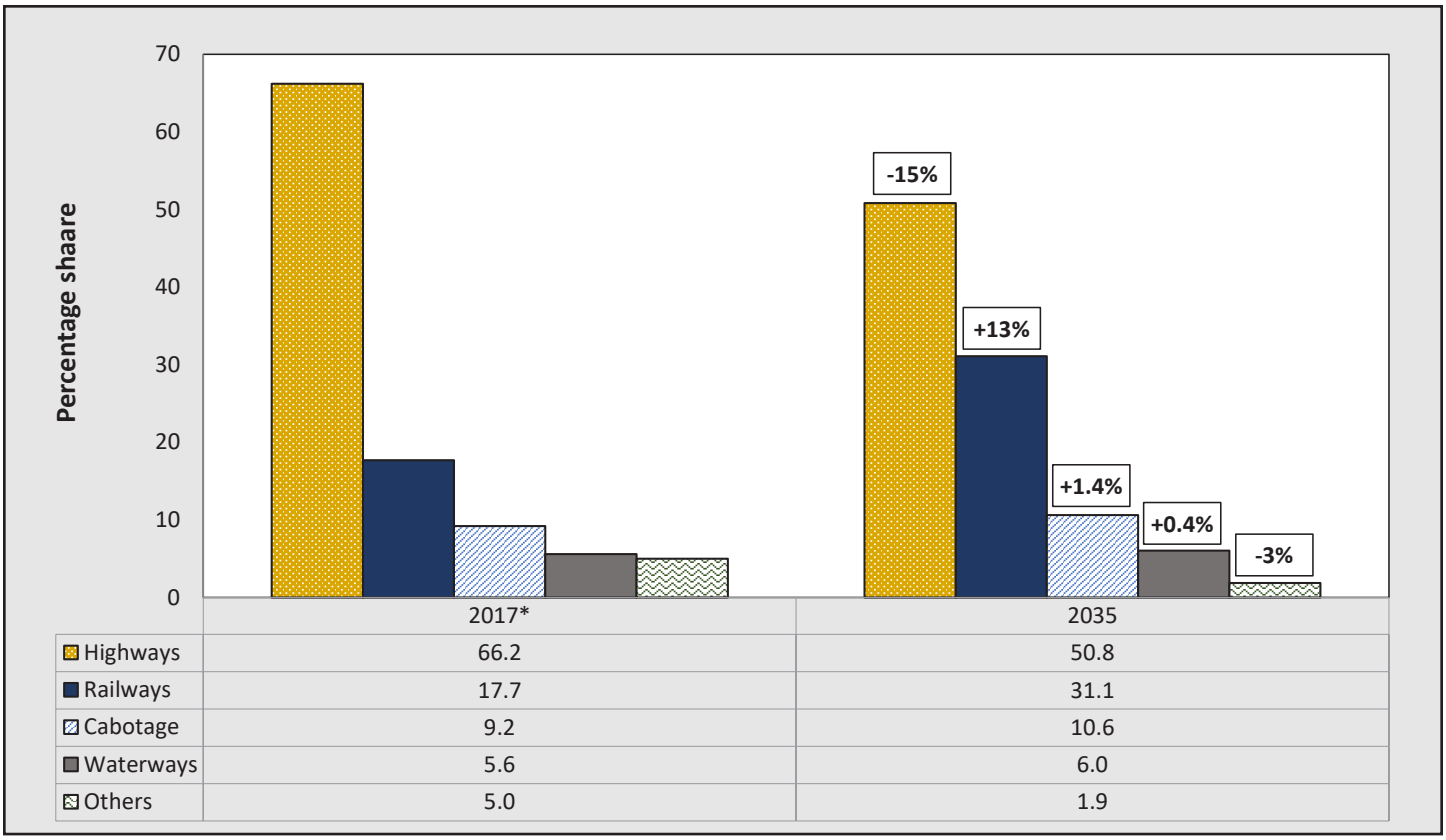
5 Exchange rate of 5.48 real per U.S. dollar, July 22, 2022.

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 cabotage in the national territory. With "BR do Mar," the Government's intention is to make the cabotage sector more attractive, stimulating competition and lowering costs. According to the Planning and Logistics Company (EPL), a public company linked to the Federal Government, cabotage accounts for only 11 percent of cargo transport in Brazil. Most of the freight is carried by truck (65 percent). EPL estimates that the BR do Mar program could reduce cabotage costs by more than 15 percent. According to EPL, the program could also increase containers transported per year from 1.2 million containers in 2019 to 2 million in 2022. Finally, EPL estimates the fleet dedicated to cabotage could increase by 40 percent in the next 3 years.

In 2021, the Brazilian Enterprise for Planning and Logistics (EPL) presented the Brazilian National Logistics Plan 2035 (NLP 2035) through joint efforts with the Ministry of Infrastructure to systematize and integrate the entire transport planning cycle at the federal level. The intention is that within the next 13 years, truck shipments will be reduced by 15 percent, from 66 to nearly 51 percent; railways' participation will increase 13 percent, from 18 to 31 percent; and cabotage and waterways usage will increase slightly. The improved infrastructure has significantly contributed to higher production of corn and soybeans in major agricultural producing regions. The NLP 2035 is a database with an integrated strategic plan of all modes of transport.

Brazil modal share for general cargo, 2017-35



	2017*	2035
Highways	66.2	50.8
Railways	17.7	31.1
Cabotage	9.2	10.6
Waterways	5.6	6.0
Others	5.0	1.9

*Because of rounding, 2017 shares do not sum exactly to 100.

Source: National Logistics Plan (NLP) 2035, Scenario 4: planned projects and BR do Mar, Brazil Ministry of Infrastructure, Planning and Logistics Company (EPL) 2021.

Tonnages and modal share for Brazil soybeans, 2010-2019

Year	Long-haul truck*		Short-haul truck*				Total soybeans
			Rail		Barge		
	1,000 tons	Percent	1,000 tons	Percent	1,000 tons	Percent	1,000 tons
Total							
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
Export							
2010	12,980	44.7	13,676	47.0	2,417	8.3	29,073
2011	13,964	42.4	15,960	48.4	3,051	9.2	32,975
2012	15,396	46.9	14,462	43.9	3,048	9.2	32,906
2013	23,492	55.0	15,997	37.3	3,307	7.7	42,796
2014	26,320	57.7	15,796	34.5	3,577	7.8	45,693
2015	31,406	57.9	17,456	32.1	5,462	10.0	54,324
2016	28,165	54.7	17,393	33.7	6,024	11.6	51,582
2017	36,323	53.4	24,017	35.2	7,815	11.4	68,154
2018	40,975	49.3	32,565	39.1	9,718	11.6	83,258
2019	36,225	49.1	28,442	38.3	9,406	12.6	74,073
Domestic							
2010	38,239	96.7	232	0.5	1,145	2.9	39,614
2011	40,972	96.9	208	0.4	1,168	2.8	42,349
2012	32,283	96.5	134	0.4	1,060	3.1	33,477
2013	37,416	96.7	123	0.3	1,165	3.0	38,703
2014	39,799	98.4	190	0.4	492	1.2	40,481
2015	42,535	99.5	234	0.5	0	0	42,770
2016	43,243	98.1	273	0.6	600	1.3	44,116
2017	45,494	97.2	307	0.6	1,071	2.2	46,873
2018	38,416	96.2	276	0.6	1,310	3.2	40,001
2019	44,332	97.2	342	0.7	972	2.1	45,645

Note: Data compiled from the National Land Transport Agency (ANTT); National Water Transport Agency (ANTAQ), Comex-Vis, Ministry of Economy, and National Supply Company (CONAB). Data for 2020-21 is not available.

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

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

Transportation Indicators

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

	2021									
	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	60.94	66.24	59.59	50.42	59.30	58.57	65.99	59.53	50.39	58.62
Ocean	37.00	50.60	64.00	62.00	53.40	38.75	52.40	66.00	64.00	55.29
Total transportation	97.94	116.84	123.59	112.42	112.70	97.32	118.39	125.53	114.39	113.91
Farm gate price[3]	463.10	495.57	513.31	457.88	482.47	463.10	495.57	513.31	457.88	482.47
Landed cost	561.04	612.41	636.91	570.30	595.16	560.42	613.96	638.84	572.28	596.37
Transport % of landed cost	17.5	19.1	19.4	19.7	18.9	17.4	19.3	19.6	20.0	19.1
	North MT[1] - Santos[2] by rail —US$/mt—					Northwest RS[1] - Rio Grande[2] —US$/mt—				
Truck	22.18	23.05	19.88	17.44	20.64	19.91	21.09	18.32	16.06	18.85
Rail[4]	30.95	30.44	30.09	27.27	29.69	-	-	-	-	-
Ocean	37.00	50.60	64.00	62.00	53.40	37.25	51.00	64.75	62.75	53.94
Total transportation	90.13	104.10	113.97	106.71	103.73	57.16	72.09	83.07	78.81	72.78
Farm gate price[3]	463.10	495.57	513.31	457.88	482.47	475.64	505.86	497.59	478.45	489.39
Landed cost	553.22	599.67	627.28	564.59	586.19	532.80	577.95	580.66	557.26	562.17
Transport % of landed cost	16.3	17.4	18.2	18.9	17.7	10.7	12.5	14.3	14.1	12.9

[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.

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

	2021									
	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	60.94	66.24	59.59	50.42	59.30	58.57	65.99	59.53	50.39	58.62
Ocean	31.25	42.70	54.00	52.50	45.11	31.00	41.90	53.00	51.50	44.35
Total transportation	92.19	108.94	113.59	102.92	104.41	89.57	107.89	112.53	101.89	102.97
Farm gate price[3]	463.10	495.57	513.31	457.88	482.47	463.10	495.57	513.31	457.88	482.47
Landed cost	555.29	604.51	626.91	560.80	586.88	552.67	603.46	625.84	559.78	585.44
Transport % of landed cost	16.6	18.0	18.1	18.4	17.8	16.2	17.9	18.0	18.2	17.6
	North MT[1] - Santos[2] by rail —US$/mt—					Northwest RS[1] - Rio Grande[2] —US$/mt—				
Truck	22.18	23.05	19.88	17.44	20.64	19.91	21.09	18.32	16.06	18.85
Rail[4]	30.95	30.44	30.09	27.27	29.69	-	-		-	-
Ocean	31.25	42.70	54.00	52.50	45.11	32.00	43.80	55.50	53.80	46.28
Total transportation	84.38	96.20	103.97	97.21	95.44	51.91	64.89	73.82	69.86	65.12
Farm gate price[3]	463.10	495.57	513.31	457.88	482.47	475.64	505.86	497.59	478.45	489.39
Landed cost	547.47	591.77	617.28	555.09	577.90	527.55	570.75	571.41	548.31	554.51
Transport % of landed cost	15.4	16.3	16.8	17.5	16.5	9.8	11.4	12.9	12.7	11.7

[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.

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

	2021									
	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	40.01	42.08	37.51	32.06	37.91	25.06	28.77	25.51	20.06	24.85
Ocean	40.54	55.60	67.50	65.60	57.31	41.00	55.60	68.00	66.00	57.65
Total transportation	80.55	97.68	105.01	97.66	95.22	66.06	84.37	93.51	86.06	82.50
Farm gate price[3]	463.10	495.57	513.31	457.88	482.47	466.73	503.18	501.47	468.17	484.89
Landed cost	543.64	593.25	618.32	555.54	577.69	532.79	587.55	594.97	554.23	567.38
Transport % of landed cost	14.8	16.5	17.0	17.6	16.5	12.4	14.4	15.7	15.5	14.5
	Southwest PI[1] - São Luís[2] —US$/mt—					North MT[1] - Barcarena[2] —US$/mt—				
Truck	29.27	34.77	27.33	25.22	29.15	34.86	38.44	29.35	24.71	31.84
Barge[4]	-	-	-	-	-	16.37	15.79	14.89	15.05	15.53
Ocean	41.00	55.60	68.00	66.00	57.65	42.00	58.20	70.00	68.00	59.55
Total transportation	70.27	90.37	95.33	91.22	86.80	93.23	112.44	114.24	107.76	106.92
Farm gate price[3]	484.07	489.79	483.65	445.58	475.78	463.10	495.57	513.31	457.88	482.47
Landed cost	554.34	580.17	578.98	536.80	562.57	556.33	608.01	627.56	565.64	589.38
Transport % of landed cost	12.7	15.7	16.5	17.0	15.5	16.8	18.5	18.2	19.1	18.1

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

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

	2021									
	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	40.01	42.08	37.51	32.06	37.91	25.06	28.77	25.51	20.06	24.85
Ocean	28.65	40.00	50.60	49.10	42.09	33.25	45.90	58.00	56.30	48.36
Total transportation	68.66	82.08	88.11	81.16	80.00	58.31	74.67	83.51	76.36	73.21
Farm gate price[3]	463.10	495.57	513.31	457.88	482.47	466.73	503.18	501.47	468.17	484.89
Landed cost	531.75	577.65	601.42	539.04	562.47	525.04	577.85	584.97	544.53	558.10
Transport % of landed cost	12.9	14.2	14.6	15.1	14.2	11.1	12.9	14.3	14.0	13.1
	Southwest PI[1] - São Luís[2] —US$/mt—					North MT[1] - Barcarena[2] —US$/mt—				
Truck	29.27	34.77	27.33	25.22	29.15	34.86	38.44	29.35	24.71	31.84
Barge[4]	-	-	-	-	-	16.37	15.79	14.89	15.05	15.53
Ocean	33.25	45.90	58.00	56.30	48.36	28.10	38.90	49.20	47.80	41.00
Total transportation	62.52	80.67	85.33	81.52	77.51	79.33	93.14	93.44	87.56	88.37
Farm gate price[3]	484.07	489.79	483.65	445.58	475.78	463.10	495.57	513.31	457.88	482.47
Landed cost	546.59	570.47	568.98	527.10	553.28	542.43	588.71	606.76	545.44	570.83
Transport % of landed cost	11.4	14.1	15.0	15.5	14.0	14.6	15.8	15.4	16.1	15.5

[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.

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 transportation routes, 2021

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	12.0	6.91	7.32	6.36	5.58	6.54
2	North MT (Sorriso)	Santos	1,190	3.3	5.12	5.57	5.01	4.24	4.98
3	North MT (Sorriso)	Paranaguá	1,262	3.1	4.64	5.23	4.72	3.99	4.65
4	South GO (Rio Verde)	Santos	587	4.9	4.96	5.11	4.54	3.91	4.63
5	South GO (Rio Verde)	Paranaguá	726	3.9	5.07	5.33	4.77	4.07	4.81
6	North Central PR (Londrina)	Paranaguá	268	2.8	7.17	7.15	6.08	5.26	6.42
7	Western Central PR (Mamborê)	Paranaguá	311	2.2	6.63	6.27	5.48	5.09	5.87
8	Triangle MG (Uberaba)	Santos	339	3.0	6.86	6.94	6.03	5.25	6.27
9	West PR (Assis Chateaubriand)	Paranaguá	377	1.7	6.08	5.93	5.23	4.60	5.46
10	West Extreme BA (São Desidério)	Salvador	535	5.9	5.28	5.69	5.17	4.30	5.11
11	Southeast MT (Primavera do Leste)	Santos	901	2.5	4.69	5.27	4.43	3.77	4.54
12	Southeast MT (Primavera do Leste)	Paranaguá	975	2.3	4.58	5.08	4.43	3.77	4.47
13	Southwest MS (Maracaju)	Paranaguá	612	3.0	5.68	5.51	4.92	4.23	5.09
14	Southwest MS (Maracaju)	Santos	652	2.8	5.47	5.60	4.86	4.18	5.03
15	West PR (Assis Chateaubriand)	Santos	550	1.2	5.35	5.54	4.92	4.24	5.01
16	East GO (Cristalina)	Santos	585	1.9	5.72	6.00	5.34	4.57	5.41
17	North PR (Cornélio Procópio)	Paranaguá	306	1.7	5.84	5.81	4.86	4.32	5.21
18	Eastern Central PR (Castro)	Paranaguá	130	2.0	8.74	9.00	7.52	6.46	7.93
19	South Central PR (Guarapuava)	Paranaguá	204	2.3	8.46	8.45	7.25	6.27	7.61
20	North Central MS (São Gabriel do Oeste)	Santos	720	2.4	4.61	4.79	4.26	3.65	4.33
21	Ribeirão Preto SP (Guairá)	Santos	314	0.0	5.42	5.69	4.76	4.21	5.02
22	Northeast MT (Canarana)	Santos	950	3.6	4.78	5.34	4.55	3.88	4.64
23	East MS (Chapadão do Sul)	Santos	607	0.0	4.64	4.79	4.22	3.63	4.32
24	Northeast MT (Canarana)	Paranaguá	1,075	3.2	4.23	5.04	4.54	3.85	4.42
25	Western Central RS (Tupanciretã)	Rio Grande	273	2.7	5.42	6.62	5.98	4.79	5.70
26	Southwest PR (Chopinzinho)	Paranaguá	291	1.5	6.83	7.32	6.37	5.50	6.51
27	North MT (Sorriso)	Itaituba	672	5.8	5.19	5.72	4.37	3.68	4.74
28	North MT (Sorriso)	Porto Velho	632	6.2	4.55	4.94	4.39	3.77	4.41
29	North MT (Sorriso)	Santarém	876	4.4	4.57	4.80	4.28	3.66	4.33
30	South MA (Balsas)	São Luís	482	2.2	5.20	5.97	5.30	4.17	5.16
31	Southwest PI (Bom Jesus)	São Luís	606	2.5	4.83	5.74	4.51	4.16	4.81
32	Southeast PA (Paragominas)	Barcarena	249	1.6	6.61	6.46	5.36	4.77	5.80
33	East TO (Campos Lindos)	São Luís	842	1.4	4.51	4.75	4.24	3.62	4.28
	Weighted average		**587**	**100.0**	**5.60**	**5.94**	**5.16**	**4.44**	**5.29**
34	North MT (Sorriso)	Rondonópolis (Rail terminal)	382		5.81	6.04	5.20	4.57	5.40
35	Rondonópolis MT (Rail teminal)[6]	Santos	1,019		3.04	2.99	2.95	2.68	2.91
36	Itaituba PA (Barge terminal)[7]	Santarém	224		5.97	4.49	3.51	3.69	4.41
37	Itaituba PA (Barge terminal)[7]	Barcarena	738		2.22	2.14	2.02	2.04	2.10

[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.

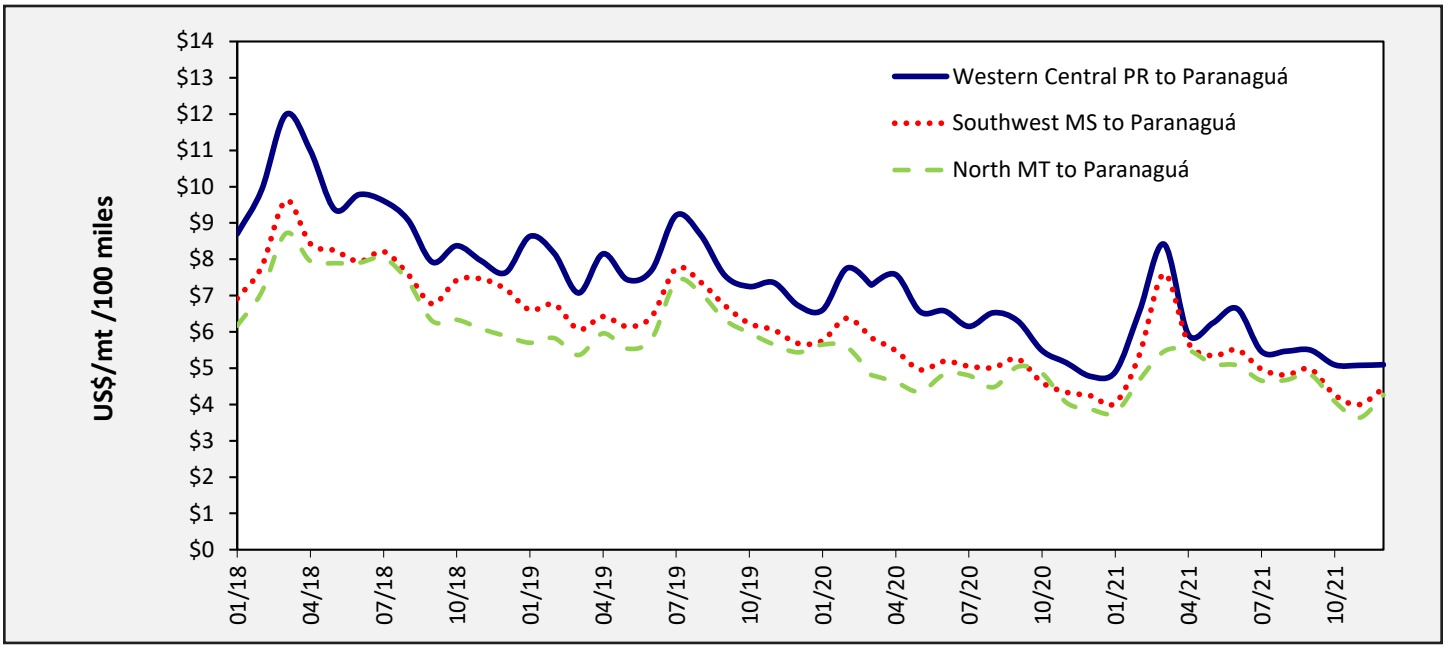
[8]In Brazil, there are no published barge rates. Barge rates can be up to 60 percent lower than truck rates, depending on the volumes hauled and the terms of contracts signed between the barge company and shippers. The distance is in nautical miles.

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

For more details, on the definitions/calculations contact esalqlog@esalqlog.esalq.usp.br.

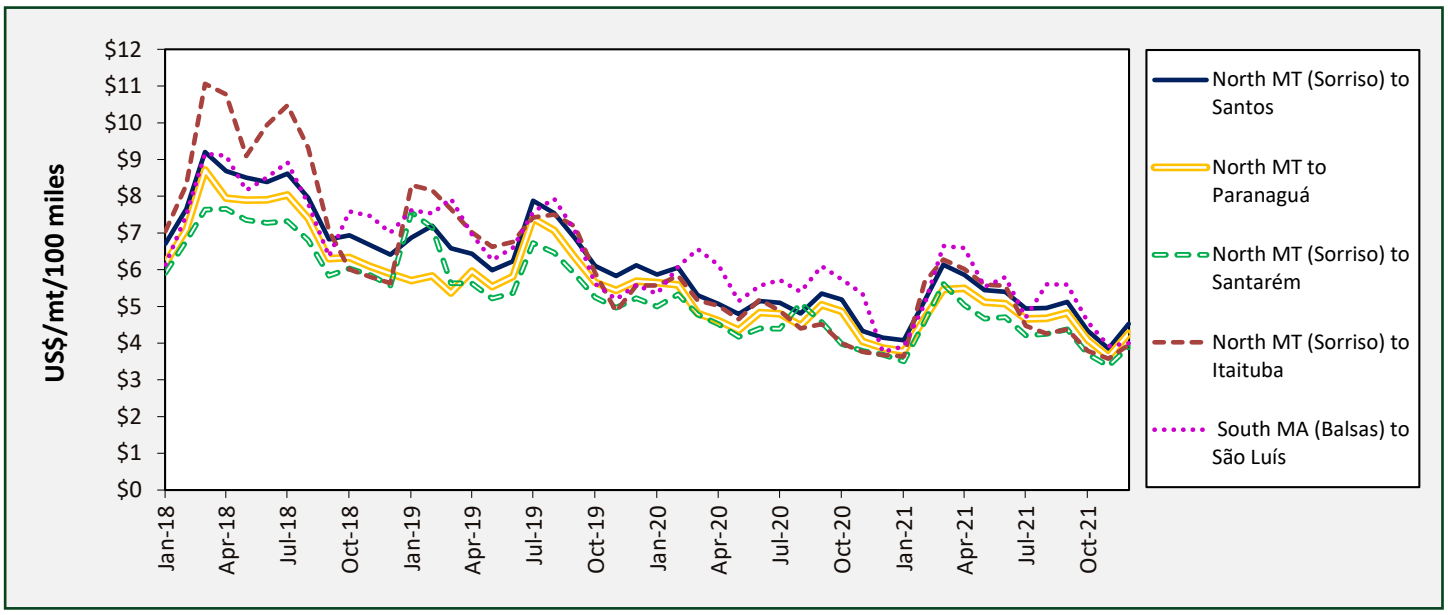
Source: University of São Paulo, Escola Superior de Agricultura "Luiz de Queiroz," Brazil (ESALQ/USP) and USDA, Agricultural Marketing Service.

Truck rates for selected southern Brazilian soybean export transportation routes, 2018-21



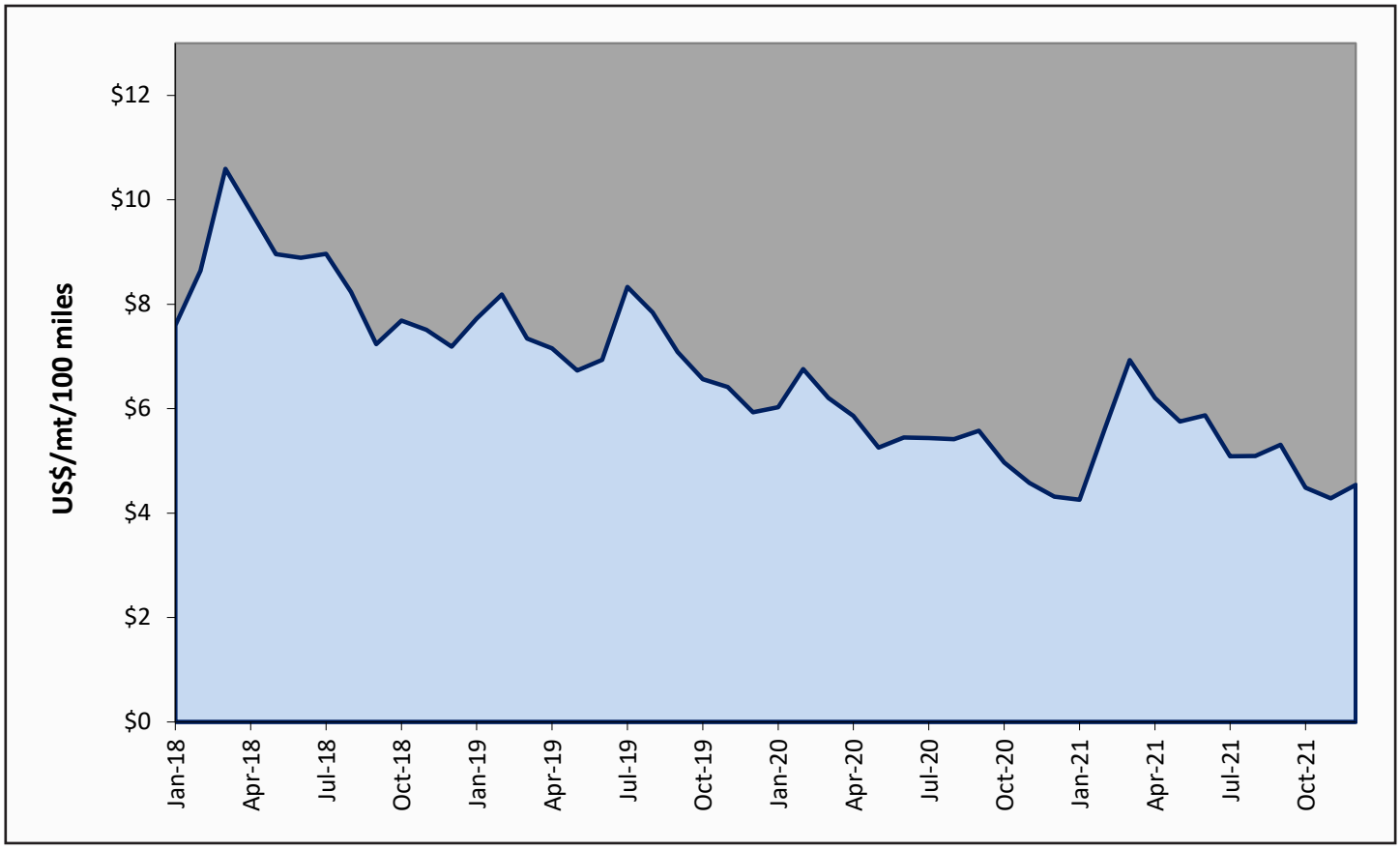
Note: mt=metric ton. PR=Paraná, MT=Mato Grosso, and MS=Mato Grosso do Sul.
Source: University of São Paulo, Escola Superior de Agricultura "Luiz de Queiroz," Brazil (ESALQ/USP) and USDA, Agricultural Marketing Service.

Truck rates for selected north, south, and northeastern Brazilian soybean export transportation routes, 2018-21



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, 2018-21



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, 2014-21

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-14	8.86	-0.6	152.73	Jan-18	7.59	5.0	130.90
Feb-14	10.34	16.7	178.24	Feb-18	8.65	13.9	149.04
Mar-14	11.61	12.3	200.13	Mar-18	10.59	22.5	182.61
Apr-14	11.35	-2.2	195.65	Apr-18	9.78	-7.7	168.59
May-14	10.90	-4.0	187.89	May-18	8.96	-8.4	154.45
Jun-14	10.34	-5.1	178.24	Jun-18	8.89	-0.8	153.24
Jul-14	10.16	-1.7	175.21	Jul-18	8.97	0.9	154.58
Aug-14	10.10	-0.6	174.08	Aug-18	8.24	-8.1	142.00
Sep-14	9.66	-4.3	166.54	Sep-18	7.24	-12.1	124.78
Oct-14	8.77	-9.3	151.13	Oct-18	7.69	6.2	132.55
Nov-14	8.36	-4.6	144.16	Nov-18	7.51	-2.3	129.44
Dec-14	7.96	-4.9	137.15	Dec-18	7.19	-4.3	123.87
Jan-15	8.01	0.7	138.15	Jan-19	7.72	7.5	133.13
Feb-15	8.02	0.1	138.29	Feb-19	8.19	6.0	141.15
Mar-15	8.32	3.7	143.44	Mar-19	7.34	-10.3	126.61
Apr-15	9.00	8.2	155.13	Apr-19	7.16	-2.6	123.35
May-15	8.39	-6.8	144.58	May-19	6.73	-5.9	116.02
Jun-15	8.01	-4.5	138.12	Jun-19	6.94	3.1	119.56
Jul-15	7.56	-5.7	130.25	Jul-19	8.33	20.1	143.60
Aug-15	7.38	-2.4	127.15	Aug-19	7.85	-5.8	135.23
Sep-15	6.60	-10.5	113.78	Sep-19	7.09	-9.7	122.17
Oct-15	6.70	1.5	115.43	Oct-19	6.57	-7.4	113.19
Nov-15	7.08	5.8	122.08	Nov-19	6.41	-2.3	110.54
Dec-15	6.76	-4.5	116.56	Dec-19	5.93	-7.5	102.21
Jan-16	6.42	-5.1	110.63	Jan-20	6.03	1.7	103.90
Feb-16	6.73	4.8	115.98	Feb-20	6.76	12.2	116.52
Mar-16	7.79	15.8	134.33	Mar-20	6.20	-8.2	106.95
Apr-16	8.30	6.5	143.05	Apr-20	5.86	-5.5	101.09
May-16	7.28	-12.3	125.43	May-20	5.26	-10.4	90.58
Jun-16	7.16	-1.5	123.51	Jun-20	5.45	3.7	93.95
Jul-16	7.46	4.2	128.64	Jul-20	5.44	-0.2	93.74
Aug-16	7.33	-1.7	126.41	Aug-20	5.41	-0.4	93.34
Sep-16	6.35	-13.3	109.53	Sep-20	5.58	3.0	96.14
Oct-16	5.88	-7.5	101.35	Oct-20	4.97	-10.8	85.71
Nov-16	5.00	-14.9	86.21	Nov-20	4.58	-7.9	78.95
Dec-16	5.47	9.4	94.32	Dec-20	4.32	-5.8	74.39
Jan-17	7.32	33.8	126.20	Jan-21	4.26	-1.3	73.39
Feb-17	9.85	34.6	169.85	Feb-21	5.60	31.5	96.50
Mar-17	10.38	5.3	178.90	Mar-21	6.93	23.8	119.49
Apr-17	9.52	-8.3	164.05	Apr-21	6.20	-10.5	106.96
May-17	8.75	-8.0	150.90	May-21	5.76	-7.2	99.22
Jun-17	8.18	-6.5	141.04	Jun-21	5.87	2.0	101.22
Jul-17	8.74	6.8	150.66	Jul-21	5.09	-13.4	87.70
Aug-17	9.85	12.7	169.76	Aug-21	5.09	0.1	87.81
Sep-17	8.97	-9.0	154.55	Sep-21	5.31	4.2	91.53
Oct-17	8.64	-3.6	148.93	Oct-21	4.49	-15.5	77.36
Nov-17	8.36	-3.2	144.11	Nov-21	4.28	-4.6	73.80
Dec-17	7.23	-13.5	124.63	Dec-21	4.54	6.0	78.26

*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).

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

Quarterly ocean freight rates for shipping soybeans from selected Brazilian ports to Shanghai, China, 2015-21 (US$/metric ton)*

Port	1st qtr 2015	2nd qtr 2015	3rd qtr 2015	4th qtr 2015	2015 Average
Santos	29.50	22.50	23.25	20.00	23.81
Paranaguá	31.50	23.50	24.18	20.50	24.92
Rio Grande	29.50	25.00	25.75	21.00	25.31
Santarém	32.00	25.00	25.75	23.50	26.56
São Luís	32.00	25.00	25.75	23.50	26.56
Barcarena	32.00	25.00	25.75	23.50	26.56
Port	**1st qtr 2016**	**2nd qtr 2016**	**3rd qtr 2016**	**4th qtr 2016**	**2016 Average**
Santos	17.50	16.50	12.50	20.00	16.63
Paranaguá	18.00	18.50	14.50	21.50	18.13
Rio Grande	18.50	17.00	13.00	20.50	17.25
Santarém	22.00	21.00	19.40	23.75	21.54
São Luís	20.00	18.40	17.50	22.00	19.48
Barcarena	22.50	21.50	20.00	23.75	21.94
Port	**1st qtr 2017**	**2nd qtr 2017**	**3rd qtr 2017**	**4th qtr 2017**	**2017 Average**
Santos	18.50	29.00	30.00	30.00	26.88
Paranaguá	20.50	30.50	31.00	31.50	28.38
Rio Grande	18.00	29.50	31.00	30.70	27.30
Santarém	24.00	33.50	31.00	34.50	30.75
São Luís	23.50	30.25	31.00	33.50	29.56
Barcarena	24.00	33.50	31.00	34.50	30.75
Port	**1st qtr 2018**	**2nd qtr 2018**	**3rd qtr 2018**	**4th qtr 2018**	**2018 Average**
Santos	32.50	31.00	27.75	30.00	30.31
Paranaguá	32.00	32.00	28.75	31.00	30.94
Rio Grande	33.00	31.50	28.25	31.00	30.94
Santarém	38.50	35.50	31.25	34.00	34.81
São Luís	37.00	34.80	30.75	33.00	33.89
Barcarena	37.50	33.80	32.25	35.00	34.64
Port	**1st qtr 2019**	**2nd qtr 2019**	**3rd qtr 2019**	**4th qtr 2019**	**2019 Average**
Santos	32.25	30.92	33.25	38.17	33.65
Paranaguá	33.75	31.42	34.75	39.50	34.86
Rio Grande	31.58	30.25	30.58	39.67	33.94
Santarém	32.25	30.58	38.25	39.17	35.06
São Luís	31.00	30.58	38.25	39.42	34.81
Barcarena	32.25	29.92	38.25	39.42	34.96
Port	**1st qtr 2020**	**2nd qtr 2020**	**3rd qtr 2020**	**4th qtr 2020**	**2020 Average**
Santos	35.50	27.08	31.33	31.67	31.40
Paranaguá	37.25	28.83	33.08	33.42	33.15
Rio Grande	37.00	28.58	32.83	33.17	32.90
Santarém	36.50	28.08	34.83	35.21	33.66
São Luís	36.75	28.33	35.33	35.67	34.02
Barcarena	38.50	28.33	36.33	36.67	34.96
Port	**1st qtr 2021**	**2nd qtr 2021**	**3rd qtr 2021**	**4th qtr 2021**	**2021 Average**
Santos	37.00	50.60	64.00	62.00	53.40
Paranaguá	38.75	52.40	66.00	64.00	55.29
Rio Grande	37.25	51.00	64.75	62.75	53.94
Santarém	40.54	55.60	67.50	65.60	57.31
São Luís	41.00	56.60	68.00	66.00	57.90
Barcarena	42.00	58.20	70.00	68.00	59.55

*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, 2015-21 (US$/metric ton)*

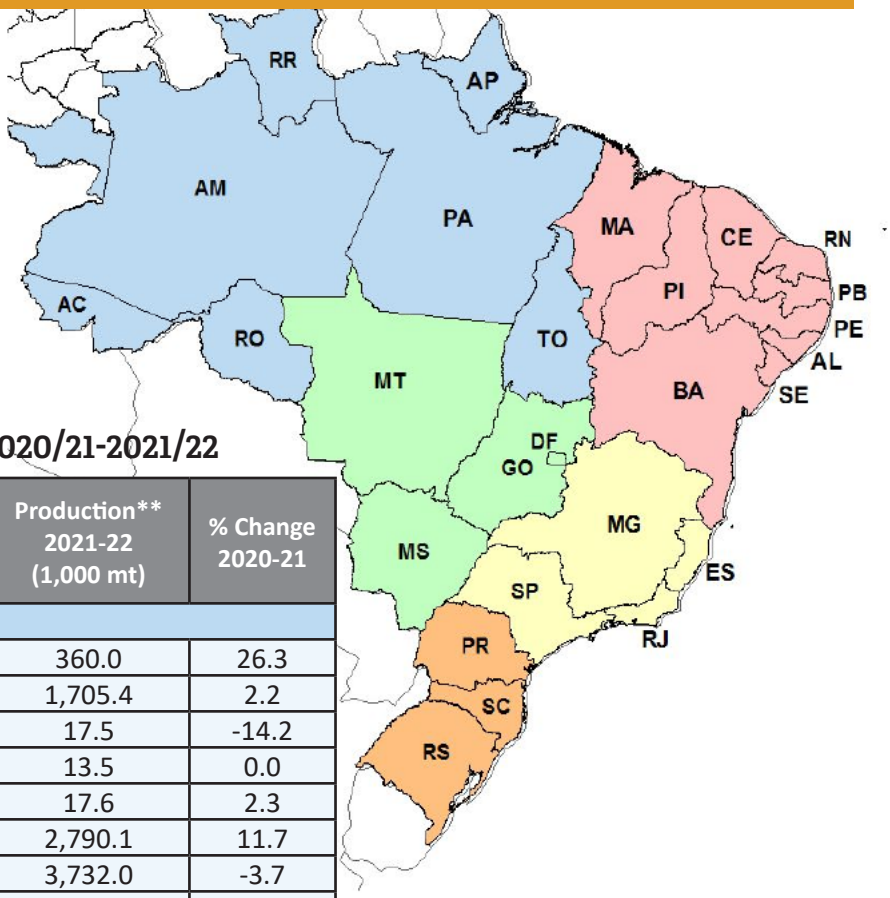
Port	1st qtr 2015	2nd qtr 2015	3rd qtr 2015	4th qtr 2015	2015 Average
Santos	22.00	21.00	19.00	17.00	19.75
Paranaguá	22.00	21.00	19.00	17.00	19.75
Rio Grande	22.00	21.00	19.00	17.00	19.75
Santarém	20.00	14.50	13.50	20.00	17.00
São Luís	20.00	18.25	16.38	20.50	18.78
Barcarena	20.00	16.00	15.20	21.00	18.05
Port	**1st qtr 2016**	**2nd qtr 2016**	**3rd qtr 2016**	**4th qtr 2016**	**2016 Average**
Santos	16.00	17.00	16.50	23.00	18.13
Paranaguá	16.00	17.00	16.50	24.00	18.38
Rio Grande	16.00	17.00	16.50	23.00	18.13
Santarém	11.03	14.13	15.00	19.80	14.99
São Luís	8.25	11.00	11.80	15.80	11.71
Barcarena	9.60	12.45	13.20	17.35	13.15
Port	**1st qtr 2017**	**2nd qtr 2017**	**3rd qtr 2017**	**4th qtr 201**	**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

*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, 2020/21-2021/22

Region/State	Production* 2020-21 (1,000 mt)	Production** 2021-22 (1,000 mt)	% Change 2020-21
NORTH			
Roraima (RR)	285.0	360.0	26.3
Rondônia (RO)	1,668.8	1,705.4	2.2
Acre (AC)	20.4	17.5	-14.2
Amazonas (AM)	13.5	13.5	0.0
Amapá (AP)	17.2	17.6	2.3
Pará (PA)	2,497.9	2,790.1	11.7
Tocantins (TO)	3,877.1	3,732.0	-3.7
Total	**8,379.9**	**8,636.1**	**3.1**
NORTHEAST			
Maranhão (MA)	3,573.6	3,759.7	5.2
Piauí (PI)	3,014.0	3,137.7	4.1
Alagoas (AL)	6.2	9.1	46.8
Bahia (BA)	7,283.1	7,488.7	2.8
Total	**13,876.9**	**14,395.2**	**3.7**
CENTER-WEST			
Mato Grosso (MT)	41,490.20	41,146.00	-0.8
Mato Grosso do Sul (MS)	8,932.7	13,145.1	47.2
Goiás (GO)	17,389.9	17,673.6	1.6
Distrito Federal (DF)	313.2	318.5	1.7
Total	**68,126.0**	**72,283.2**	**6.1**
SOUTHEAST			
Minas Gerais (MG)	7,590.5	7,607.5	0.2
São Paulo (SP)	4,176.5	4,427.1	6.0
Total	**11,767.0**	**12,034.6**	**2.3**
SOUTH			
Paraná (PR)	12,250.3	20,783.6	69.7
Santa Catarina (SC)	2,038.7	2,604.5	27.8
Rio Grande do Sul (RS)	9,111.0	21,615.0	137.2
Total	23,400.0	45,003.1	92.3
TOTAL PRODUCTION	**125,549.8**	**152,352.2**	**21.3**

*Data based on calendar year, January-December

**Forecast, October 2022

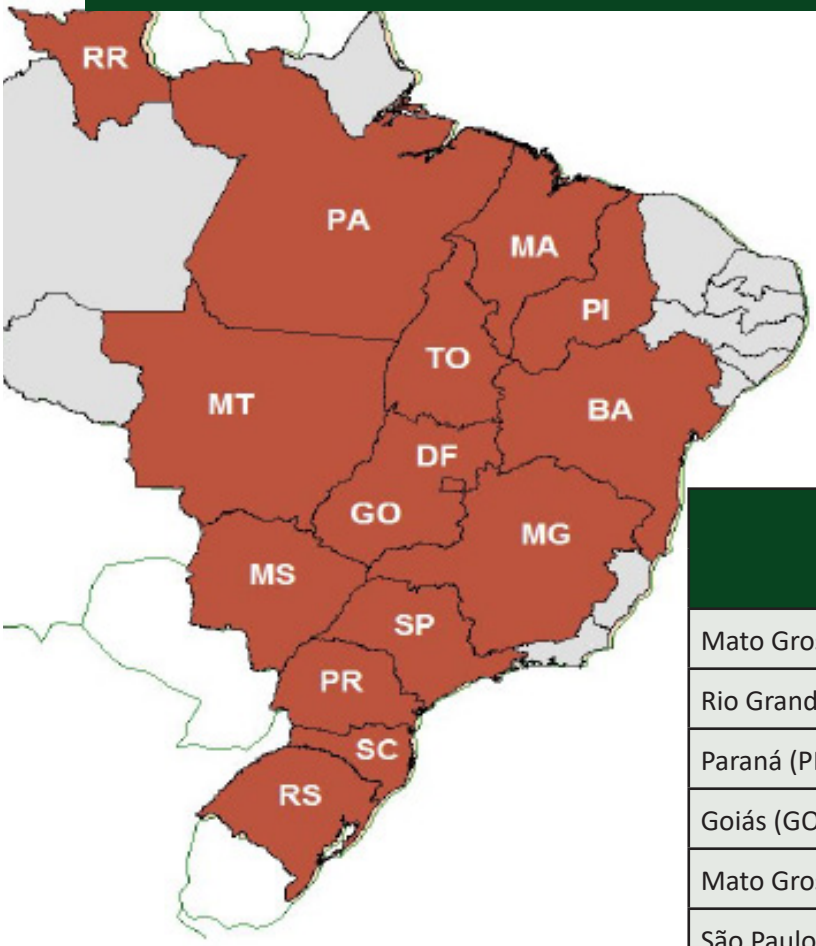
Source: Companhia Nacional de abastecimento (CONAB).

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							
2009/10	23,500	5,877	69,000	150	75,027	29,188	35,700	38,100	7,739
2010/11	24,200	7,739	75,300	40	83,079	33,789	37,264	39,664	9,626
2011/12	25,000	9,626	66,500	298	76,424	31,905	36,230	38,630	5,889
2012/13	27,700	5,889	82,000	240	88,129	42,826	36,432	38,807	6,496
2013/14	30,100	6,496	86,200	579	93,275	45,747	38,195	40,745	6,783
2014/15	32,100	6,783	97,100	329	104,212	54,635	40,339	42,989	6,588
2015/16	33,300	6,588	95,700	362	102,650	52,099	39,967	42,642	7,909
2016/17	33,900	7,909	114,900	267	123,076	68,806	42,161	44,936	9,334
2017/18	35,150	9,334	123,400	190	132,924	83,728	43,389	46,224	2,972
2018/19	35,900	2,972	120,500	145	123,617	73,436	43,495	46,410	3,771
2019/20	36,900	3,771	128,500	884	133,155	81,626	46,473	49,568	1,961
2020/21	39,500	1,961	139,500	791	142,252	88,512	48,285	51,490	2,250
2021/22	41,500	2,250	127,000	550	129,800	73,500	50,000	53,245	3,055
2022/23**	42,900	3,055	152,000	750	155,805	96,500	52,000	55,600	3,705

*Data based on Brazil's local February/January Marketing Year (MY). Where February 2021-January 2022 is the 2020/21 MY.
**Forecast, October 12, 2022.
Source: USDA/Foreign Agricultural Service/Market and Trade Data/Reports/Oilseeds

Exports

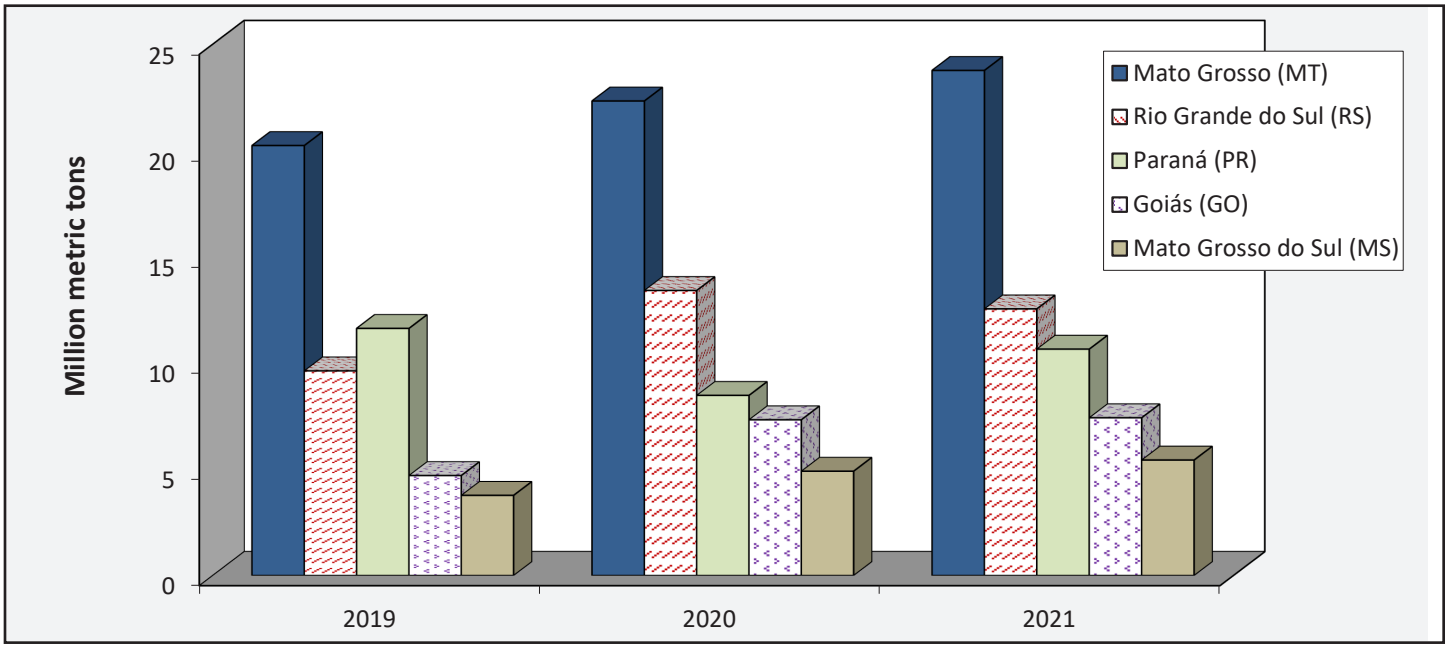


Top 15 Brazilian soybean exporting states, 2019-21

State	2019	2020	2021	Rank
	1,000 metric ton			
Mato Grosso (MT)	20,228	22,326	23,766	1
Rio Grande do Sul (RS)	9,620	13,404	12,538	2
Paraná (PR)	11,619	8,466	10,644	3
Goiás (GO)	4,696	7,318	7,414	4
Mato Grosso do Sul (MS)	3,765	4,901	5,426	5
São Paulo (SP)	3,279	4,796	4,959	6
Minas Gerais (MG)	3,285	4,560	4,668	7
Bahia (BA)	3,253	3,761	3,990	8
Tocantins (TO)	2,214	2,554	2,904	9
Maranhão (MA)	2,306	2,299	2,794	10
Pará (PA)	1,509	2,227	1,961	11
Rondônia (RO)	1,176	1,188	1,539	12
Piauí (PI)	1,115	1,244	1,501	13
Santa Catarina (SC)	1,861	1,935	1,455	14
Roraima (RR)	120	100	146	15
Others	4,018	1,890	397	
Total	**74,064**	**82,968**	**86,100**	

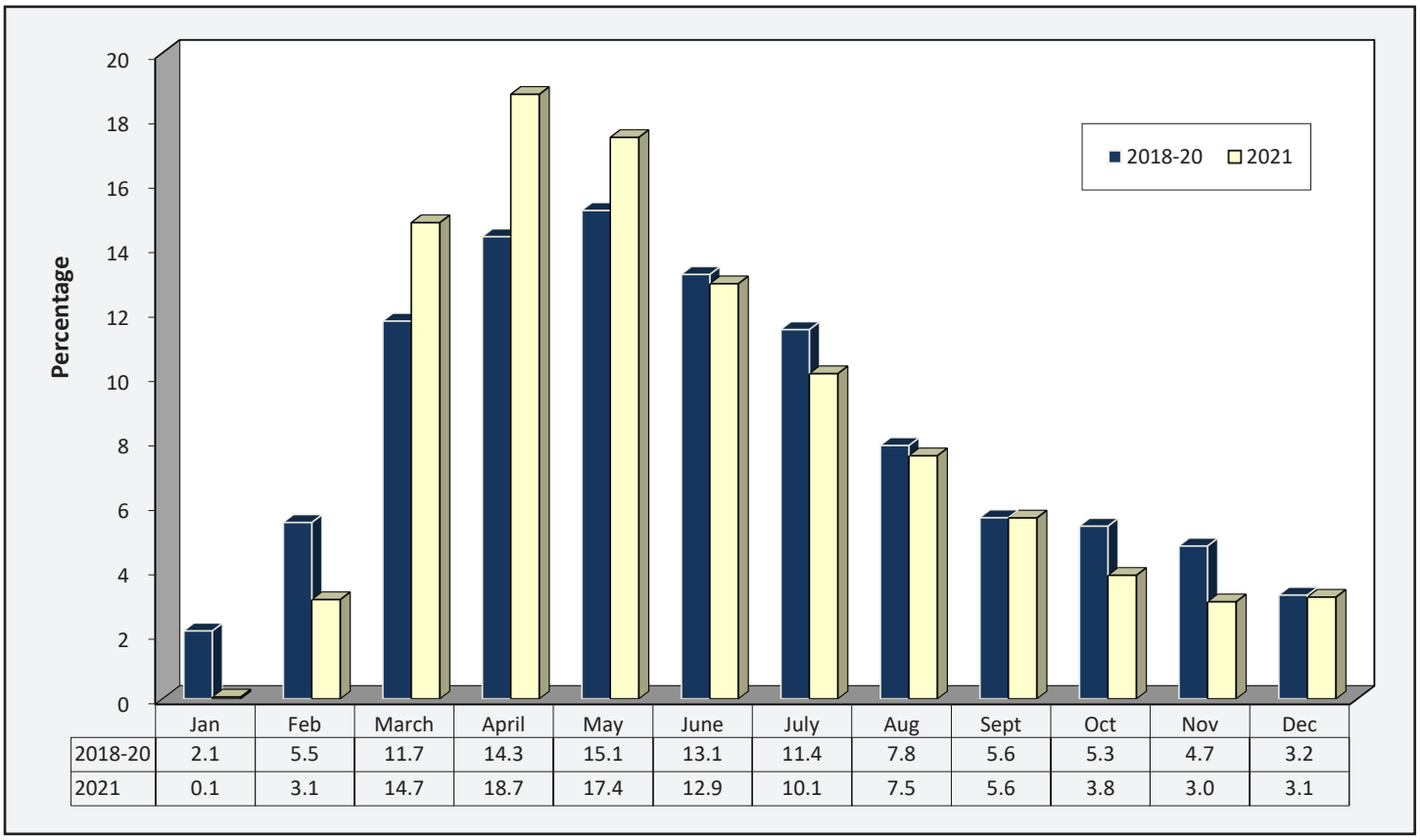
Source: Comex Stat, Ministério da Economia.

Top five Brazilian soybean exporting states, 2019-21



Source: Comex Stat, Ministério da Economia.

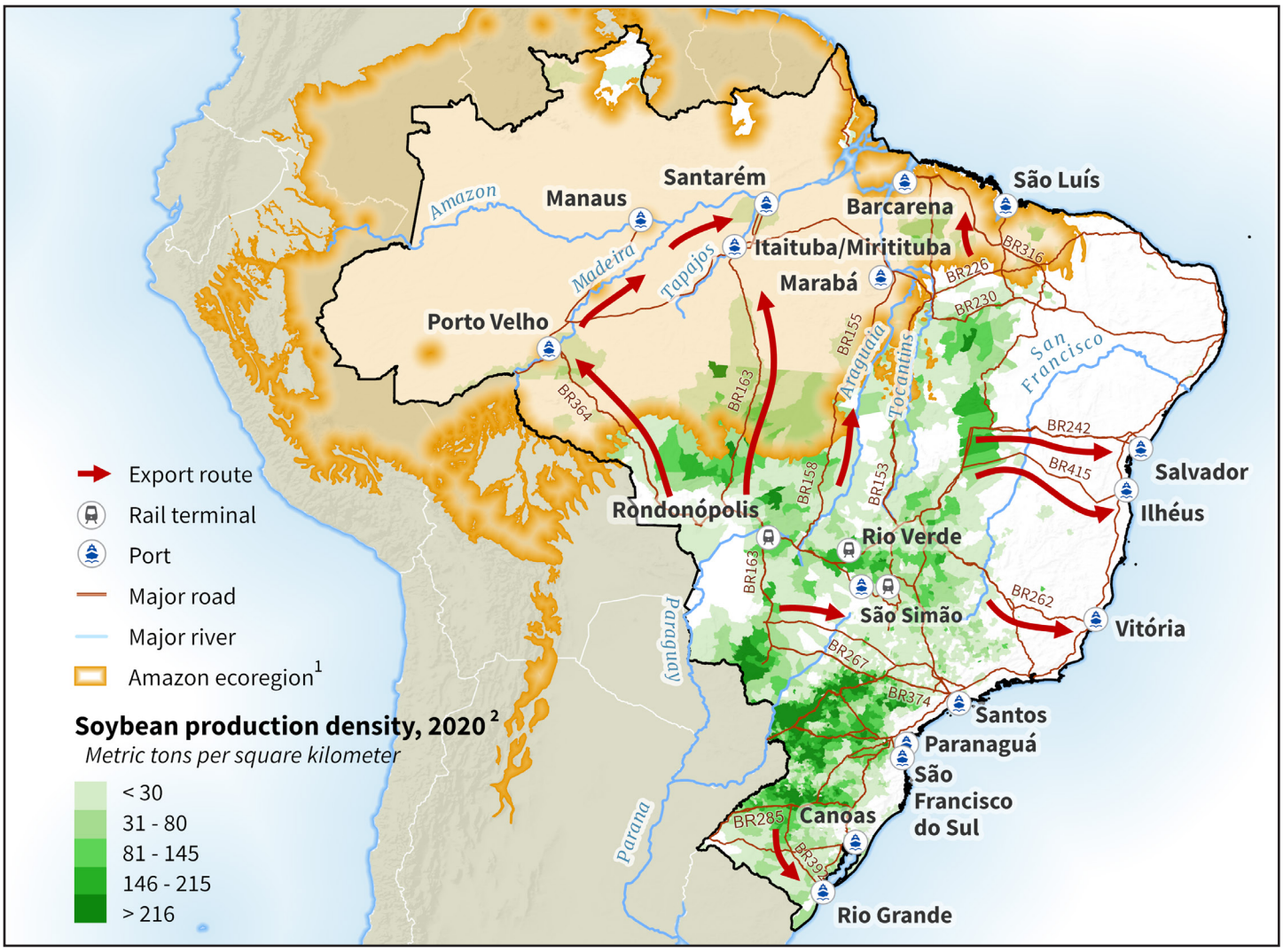
Brazil average monthly soybean exports, 2018-21



	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
2018-20	2.1	5.5	11.7	14.3	15.1	13.1	11.4	7.8	5.6	5.3	4.7	3.2
2021	0.1	3.1	14.7	18.7	17.4	12.9	10.1	7.5	5.6	3.8	3.0	3.1

Source: Comex Stat, Ministério da Economia.

Main export routes for soybeans

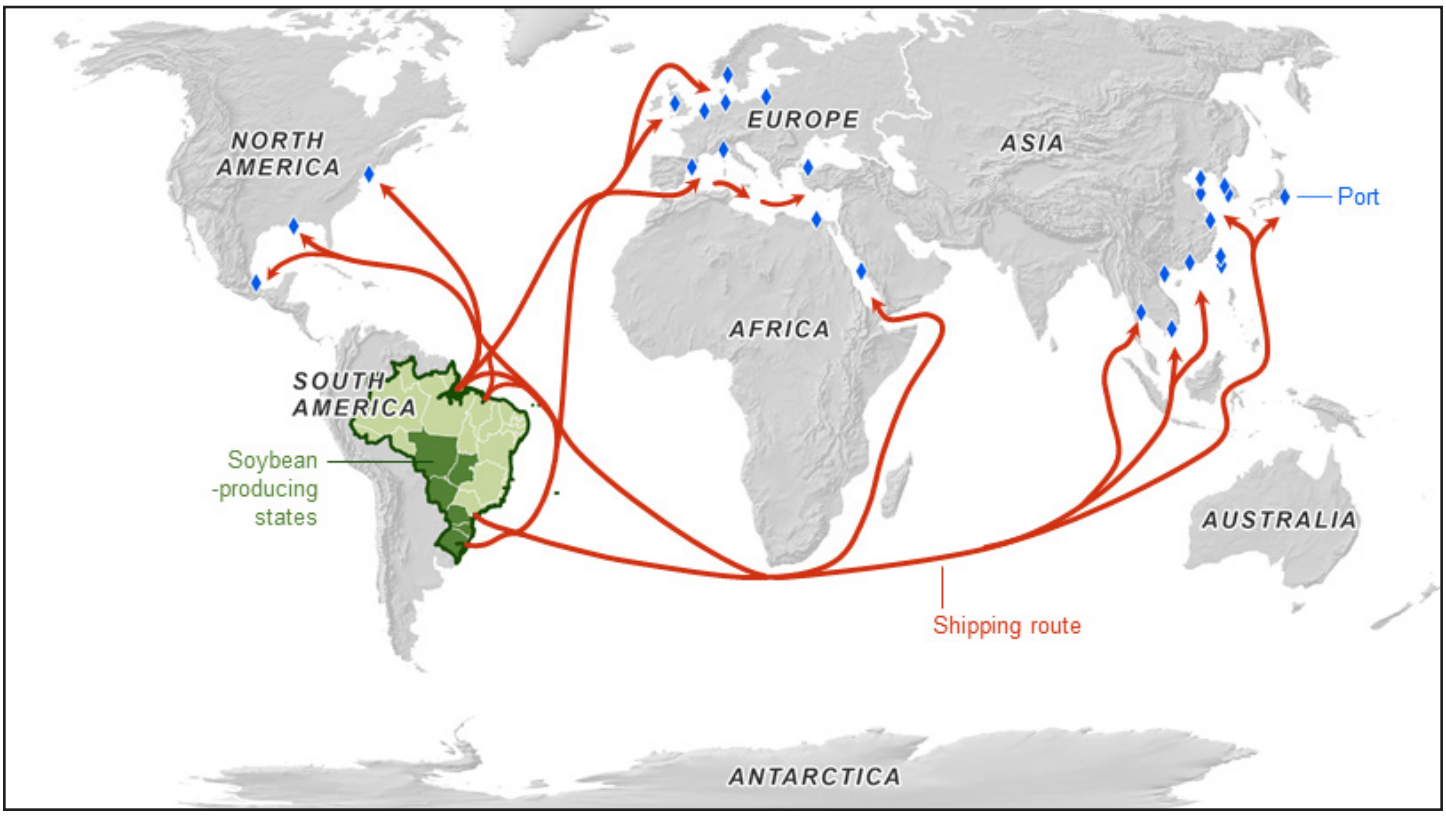


[1]World Wildlife Fund.

[2]Brazilian Institute of Geography and Statistics—Produção Agricola Municipal.

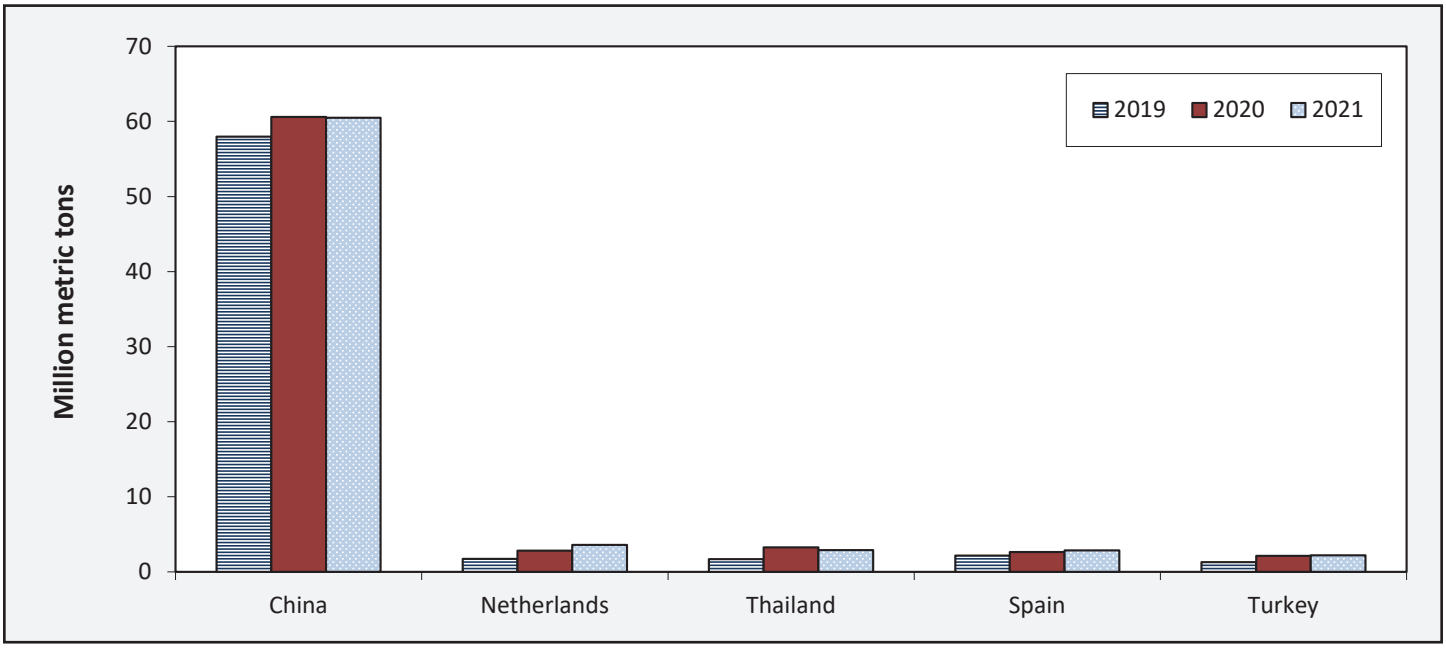
Source: USDA/Agricultural Marketing Service (AMS) and USDA/Foreign Agricultural Service (FAS).

World export routes for Brazilian soybeans



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

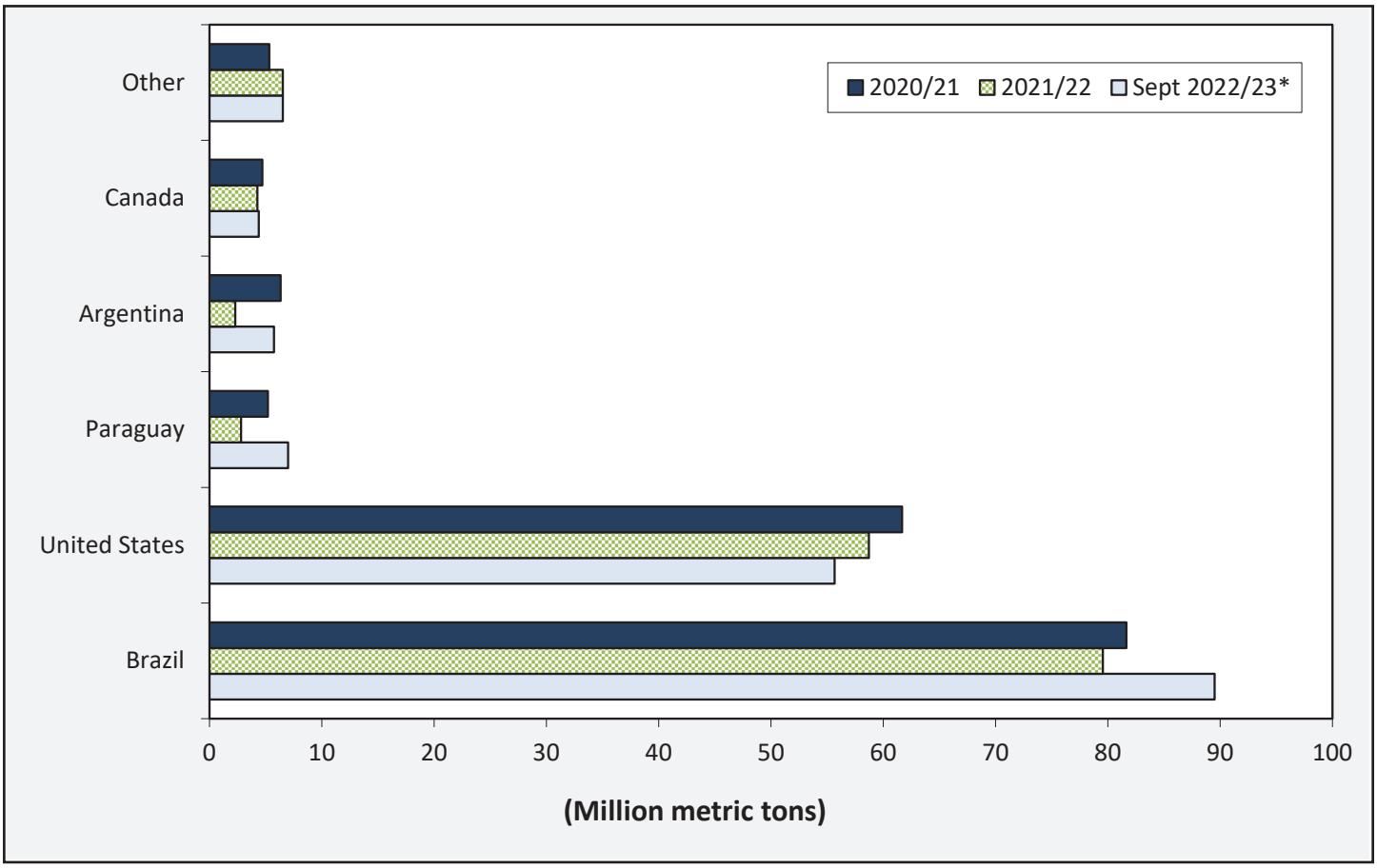
Top five Brazilian soybean-export destinations, 2019-21



Source: Comex Stat, Ministério da Economia.

In 2021, 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 2022.

Top five world soybean-exporting countries, 2020/21-2022/23*



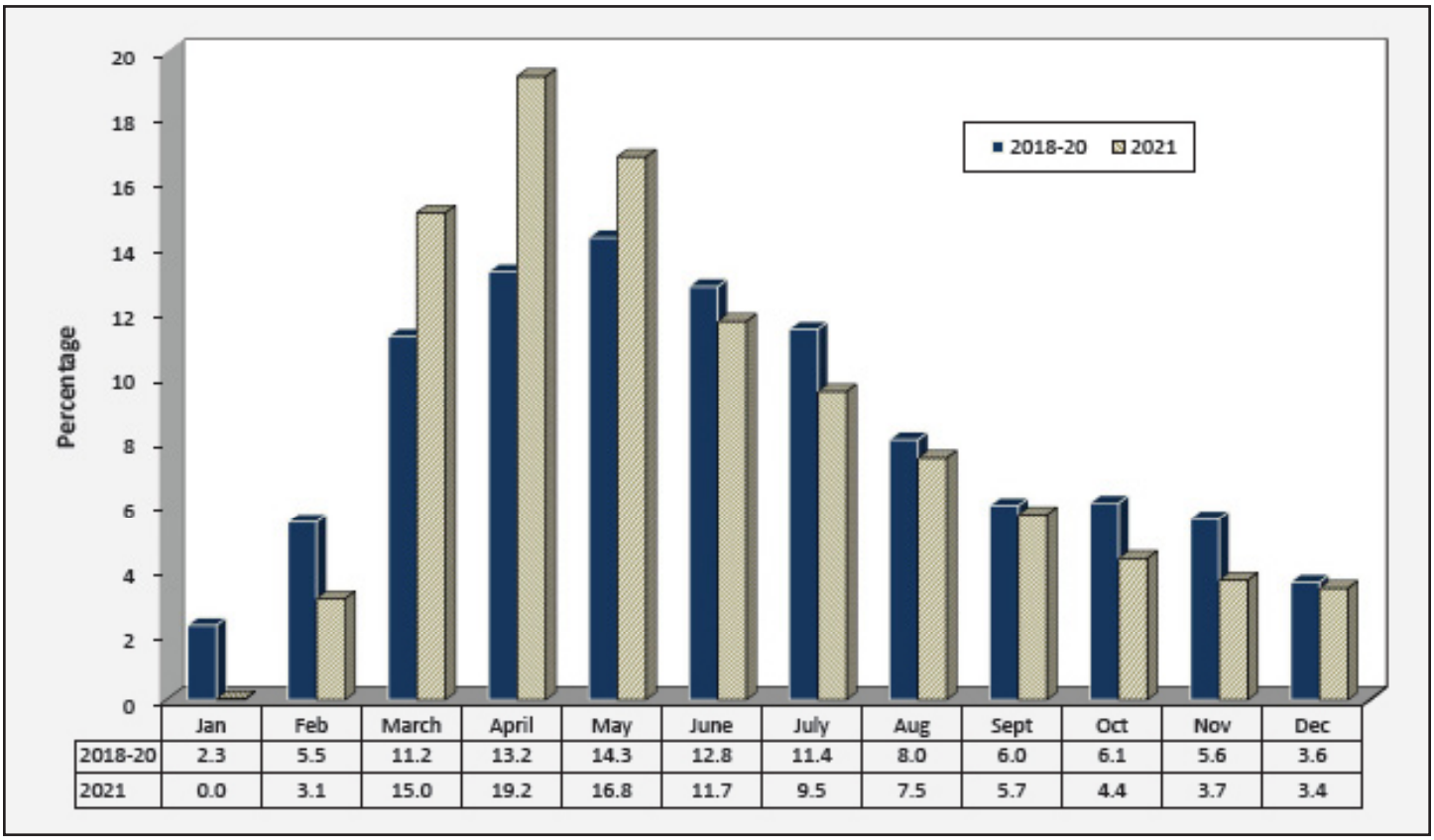
*Forecast October 12, 2022.

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

Exports to China

In 2021, Brazil exported 60.5 mmt of soybeans to China, valued at $27.2 billion, slightly less than 2020's total (60.6 mmt), accounting for 70 percent of Brazil's total exports (86.1 mmt). Over 90 percent of Brazilian soybean exports to China in 2021 originated from Mato Grosso, Rio Grande do Sul, Paraná, Goiás, Mato Grosso do Sul, São Paulo, Minas Gerais, Bahia, Tocantins, and Maranhão.

Brazil average monthly soybean exports to China, 2018-21



	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
2018-20	2.3	5.5	11.2	13.2	14.3	12.8	11.4	8.0	6.0	6.1	5.6	3.6
2021	0.0	3.1	15.0	19.2	16.8	11.7	9.5	7.5	5.7	4.4	3.7	3.4

Source: Comex Stat, Ministério da Economia.

Top 15 Brazilian soybean exporting states to China, 2019-21

State	2019	2020	2021	Rank
	1,000 metric ton			
Mato Grosso	12,487	11,466	12,326	1
Rio Grande do Sul	11,177	8,102	11,733	2
Paraná	8,554	12,123	8,860	3
Goiás	3,910	6,264	6,036	4
Mato Grosso do Sul	2,491	3,917	4,411	5
São Paulo	3,282	3,842	4,001	6
Minas Gerais	2,569	3,545	3,704	7
Bahia	2,699	2,801	2,776	8
Tocantins	1,692	1,707	1,920	9
Maranhão	1,747	1,565	1,680	10
Santa Catarina	1,636	1,776	1,258	11
Piauí	995	888	966	12
Pará	778	883	552	13
Distrito Federal	131	94	83	14
Rondônia	122	30	1	15
Others	3,695	1,594	168	
Brazil exports to China	**57,963**	**60,596**	**60,476**	
Brazil total exports	**74,064**	**82,968**	**86,100**	

Source: Comex Stat, Ministério da Economia.

Top 15 Mato Grosso soybean export destinations, 2019-21

State	2019	2020	2021	% share	Rank
	metric ton				
China	12,487,191	11,465,981	12,325,965	51.9	1
Spain	1,146,825	1,603,747	1,918,123	8.1	2
Turkey	875,285	1,336,095	1,276,784	5.4	3
Netherlands	1,010,715	2,095,566	1,472,851	6.2	4
Mexico	497,229	645,568	895,521	3.8	5
Thailand	551,291	848,095	818,667	3.4	6
Italy	185,594	433,328	580,995	2.4	7
Russia	595,929	353,948	512,512	2.2	8
Pakistan	224,425	341,444	511,298	2.2	9
Portugal	160,391	145,895	370,583	1.6	10
Iran	747,222	315,435	337,003	1.4	11
Bangladesh	137,558	127,125	308,091	1.3	12
Vietnam	137,621	215,653	297,167	1.3	13
Algeria	326	205,340	271,435	1.1	14
Norway	346,394	300,565	232,422	1.0	15
Others	1,124,384	1,892,450	1,636,255	6.9	
Mato Grosso total	**20,228,380**	**22,326,237**	**23,765,673**	**100.0**	

	2019	2020	2021
MT % share of Brazil exports to China	21.5	18.9	20.4
Brazil exports to China	57,963,480	60,595,851	60,476,116
Brazil total exports	74,063,633	82,968,242	86,100,404
China % share of Brazil total exports	78.3	73.0	70.2

Source: Comex Stat, Ministério da Economia.

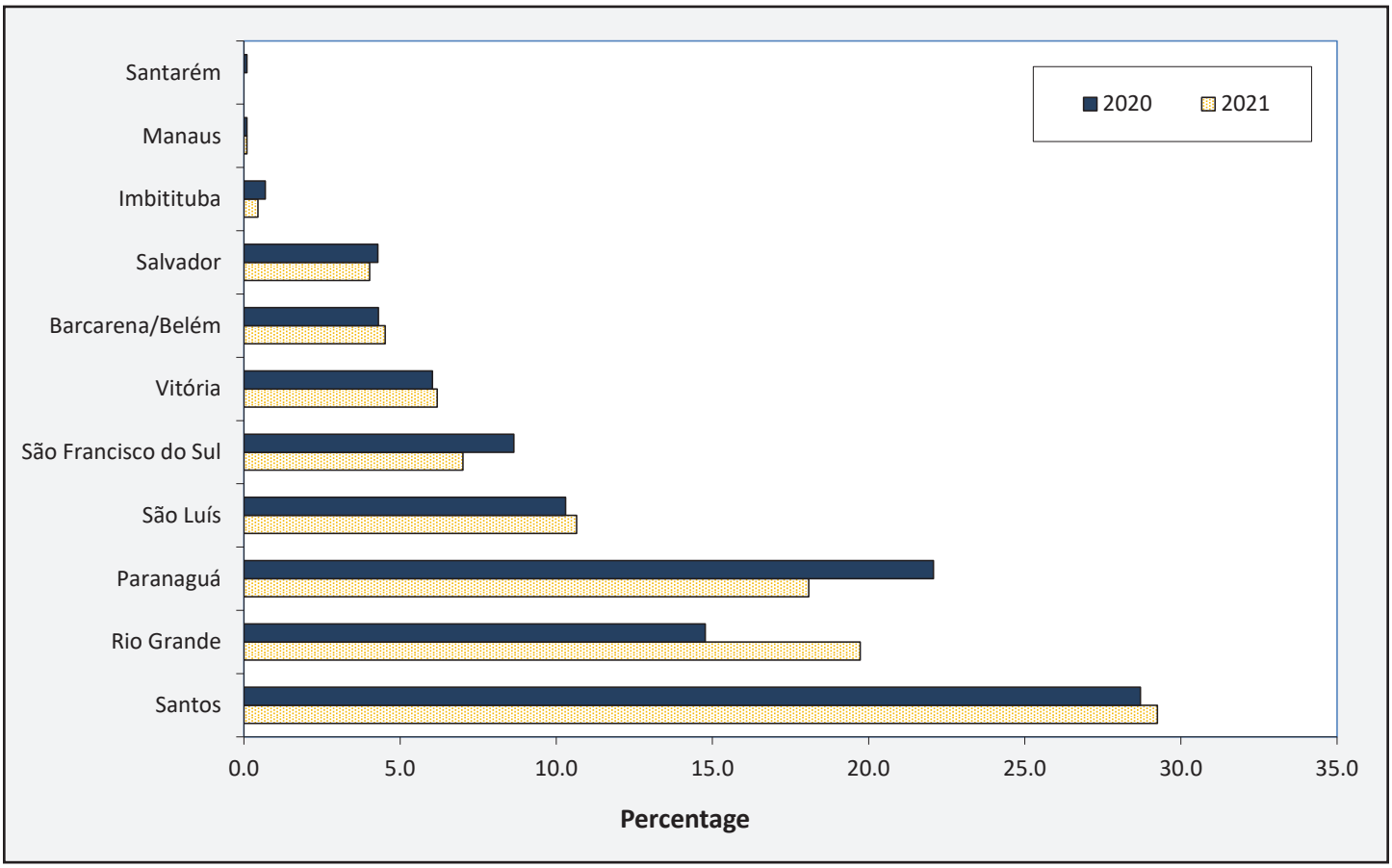
The southern ports of Santos, Rio Grande, Paranaguá, and São Francisco do Sul still dominate Brazil's soybean trade to China, accounting for 74 percent of Brazil's soybean exports to China. The northeastern ports of São Luís, Vitória, Salvador, and Barcarena accounted for 25 percent of soybean exports to China in 2021. The Amazon River port of Manaus accounted for 0.1 percent of soybean exports to China in 2021.

Total Brazilian soybean exports by port to China, 2019-21

Ports	2019	2020	2021
	metric ton		
Santos	14,433,778	17,392,177	17,688,345
Rio Grande	12,764,079	8,949,582	11,931,608
Paranaguá	10,542,592	13,378,303	10,934,936
São Luís	6,271,719	6,239,866	6,441,382
São Francisco do Sul	3,852,101	5,239,528	4,239,712
Subtotal	**47,864,269**	**51,199,456**	**51,235,984**
Others	10,099,210	9,396,395	9,240,132
Total exports to China	**57,963,480**	**60,595,851**	**60,476,116**
Brazil total exports	**74,063,633**	**82,968,242**	**86,100,404**
Ports	**2019**	**2020**	**2021**
	% share of exports to China		
Santos	24.9	28.7	29.2
Rio Grande	22.0	14.8	19.7
Paranaguá	18.2	22.1	18.1
São Luís	10.8	10.3	10.7
São Francisco do Sul	6.6	8.6	7.0
Subtotal	**82.6**	**84.5**	**84.7**
Others	17.4	15.5	15.3
Total exports to China	**100.0**	**100.0**	**100.0**
Ports	**2019**	**2020**	**2021**
	% share of Brazil total exports		
Santos	19.5	21.0	20.5
Rio Grande	17.2	10.8	13.9
Paranaguá	14.2	16.1	12.7
São Luís	8.5	7.5	7.5
São Francisco do Sul	5.2	6.3	4.9
Subtotal	**64.6**	**61.7**	**59.5**
Others	13.6	11.3	10.7
Total exports to China	**78.3**	**73.0**	**70.2**

Source: Comex Stat, Ministério da Economia.

Brazil soybean exports to China by port, 2020-21



Source: Comex Stat, Ministério da Economia.

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	32.22
Santos, São Paulo	South	Direct	Hamburg, Germany	5,683	16.22
Rio Grande, Rio Grande do Sul	South	Good Hope	Shanghai, China	11,129	33.03
Rio Grande, Rio Grande do Sul	South	Panama Canal	Shanghai, China	13,564	40.09
Rio Grande, Rio Grande do Sul	South	Cape Horn	Shanghai, China	11,397	33.22
Rio Grande, Rio Grande do Sul	South	Direct	Hamburg, Germany	6,204	18.11
Paranaguá, Paraná	South	Good Hope	Shanghai, China	11,111	33.02
Paranaguá, Paraná	South	Panama Canal	Shanghai, China	13,165	39.04
Paranaguá, Paraná	South	Direct	Hamburg, Germany	5,805	17.07
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	32.08
Vitória, Espírito Santo	Southeast	Panama Canal	Shanghai, China	12,587	37.11
Vitória, Espírito Santo	Southeast	Direct	Hamburg, Germany	5,227	15.13
Salvador, Bahia	Northeast	Good Hope	Shanghai, China	10,997	32.18
Salvador, Bahia	Northeast	Panama Canal	Shanghai, China	12,170	36.05
Salvador, Bahia	Northeast	Direct	Hamburg, Germany	4,811	14.08
Aratu, Bahia	Northeast	Good Hope	Shanghai, China	10,997	32.18
Aratu, Bahia	Northeast	Panama Canal	Shanghai, China	12,170	36.05
Aratu, Bahia	Northeast	Direct	Hamburg, Germany	4,811	14.08
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
Itaquí/São Luís - Ponta de Madeira, Maranhão	Northeast	Direct	Hamburg, Germany	4,361	13
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	14.18
Manaus, Amazonas	North	Good Hope	Shanghai, China	12,880	38.04
Manaus, Amazonas	North	Panama Canal	Shanghai, China	10,926	32.12
Manaus, Amazonas	North	Direct	Hamburg, Germany	5,283	15.17
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

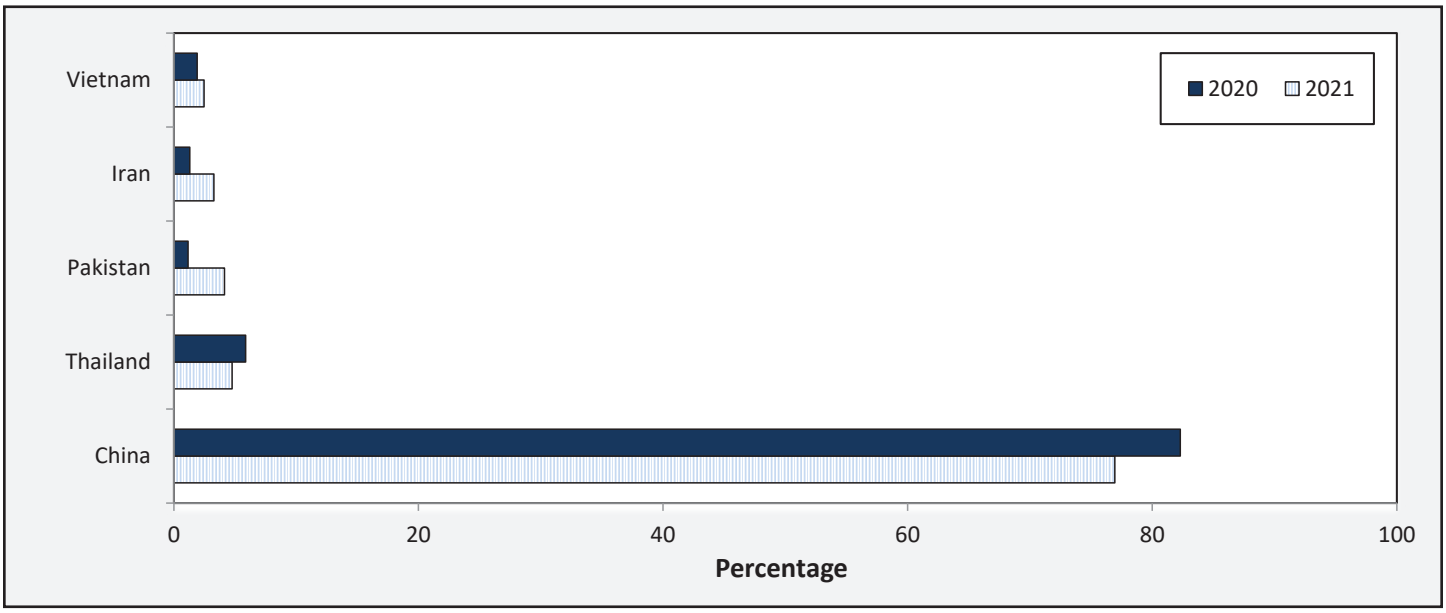
*Vessel speed: 14 knots.

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

Source: http://sea-distances.com/ and 1Ports.com.

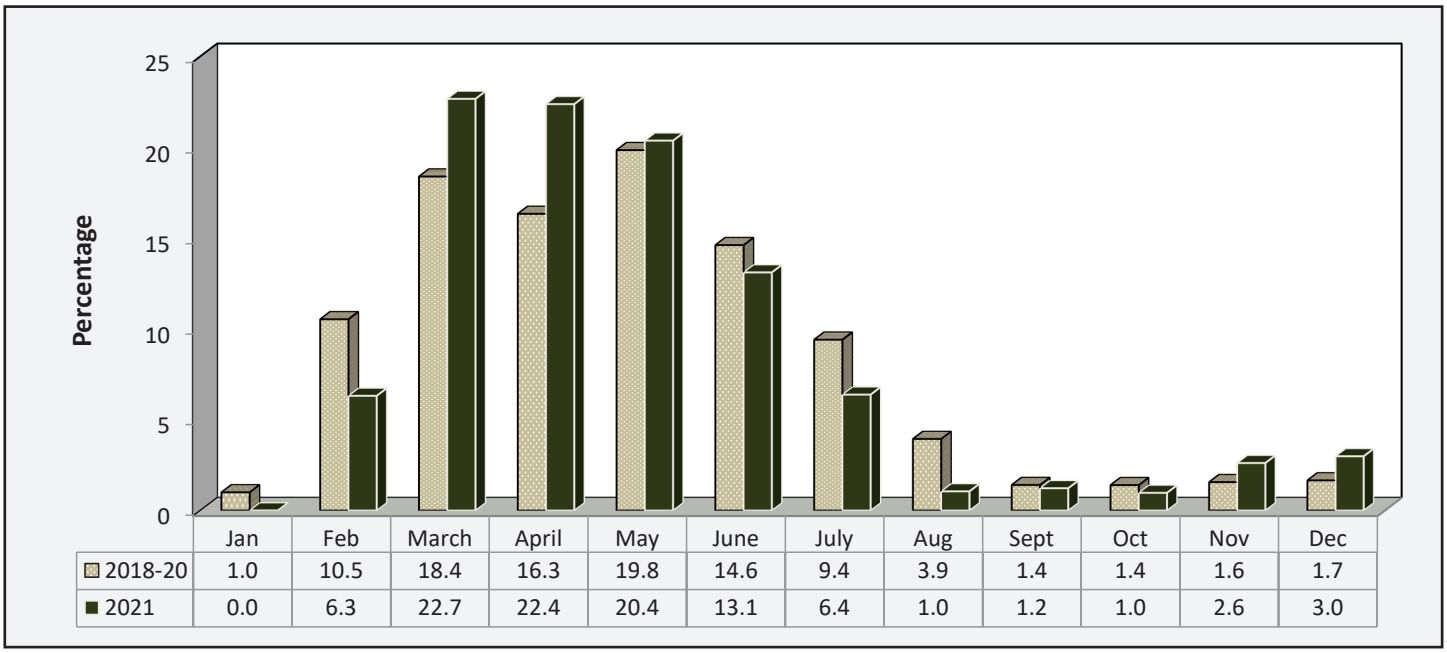
In 2021, China was the major destination for Brazilian soybeans through the port of Santos, Brazil's largest soybean-exporting port. The next-largest destinations (in descending order) were Thailand, Pakistan, Iran, and Vietnam. The peak of soybean shipments to China from Santos usually occurs from March to May. Nearly 44 percent of the soybean exports through Santos originated from Mato Grosso, followed (in descending order) by the origins of Goiás, São Paulo, Minas Gerais, and Mato Grosso do Sul.

Port of Santos soybean exports by country, 2020-21



Source: Comex Stat, Ministério da Economia.

Port of Santos average monthly soybean exports to China, 2018-21

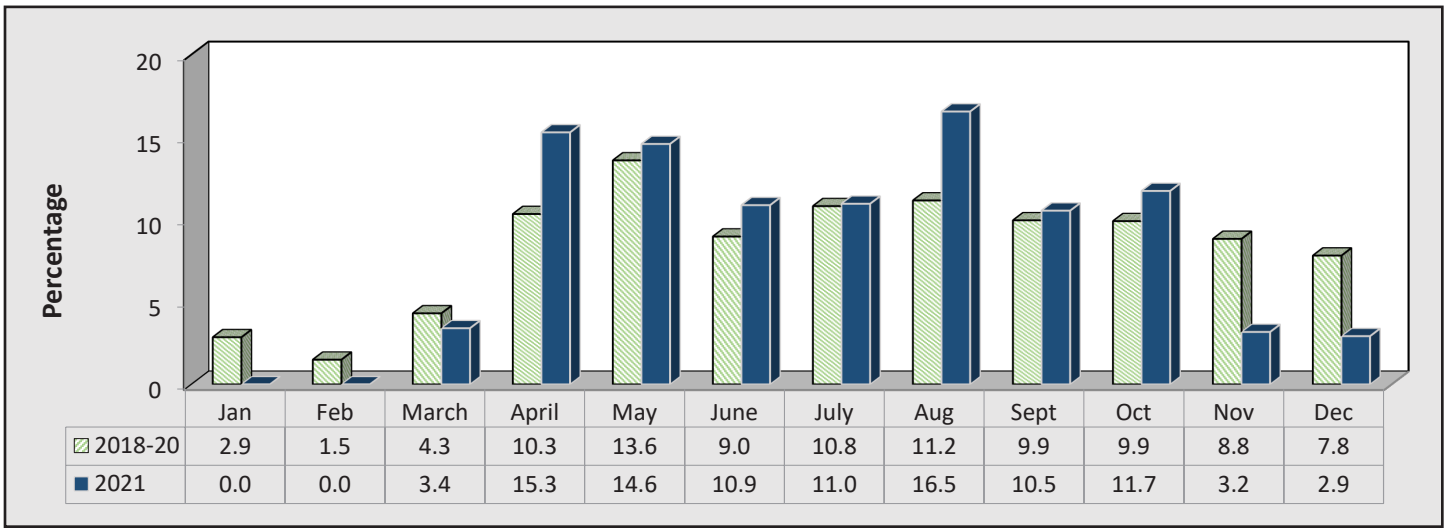


	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
2018-20	1.0	10.5	18.4	16.3	19.8	14.6	9.4	3.9	1.4	1.4	1.6	1.7
2021	0.0	6.3	22.7	22.4	20.4	13.1	6.4	1.0	1.2	1.0	2.6	3.0

Source: Comex Stat, Ministério da Economia.

China was the major destination for Brazilian soybeans via the port of Rio Grande, accounting for 96 percent of exports, followed by Vietnam, Taiwan, Iran, and Thailand. Typically, soybean shipments to China through the port of Rio Grande peak from April to July. About 97 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: Paraná, São Paulo, Mato Grosso do Sul, and Minas Gerais.

Port of Rio Grande average monthly soybean exports to China, 2018-21

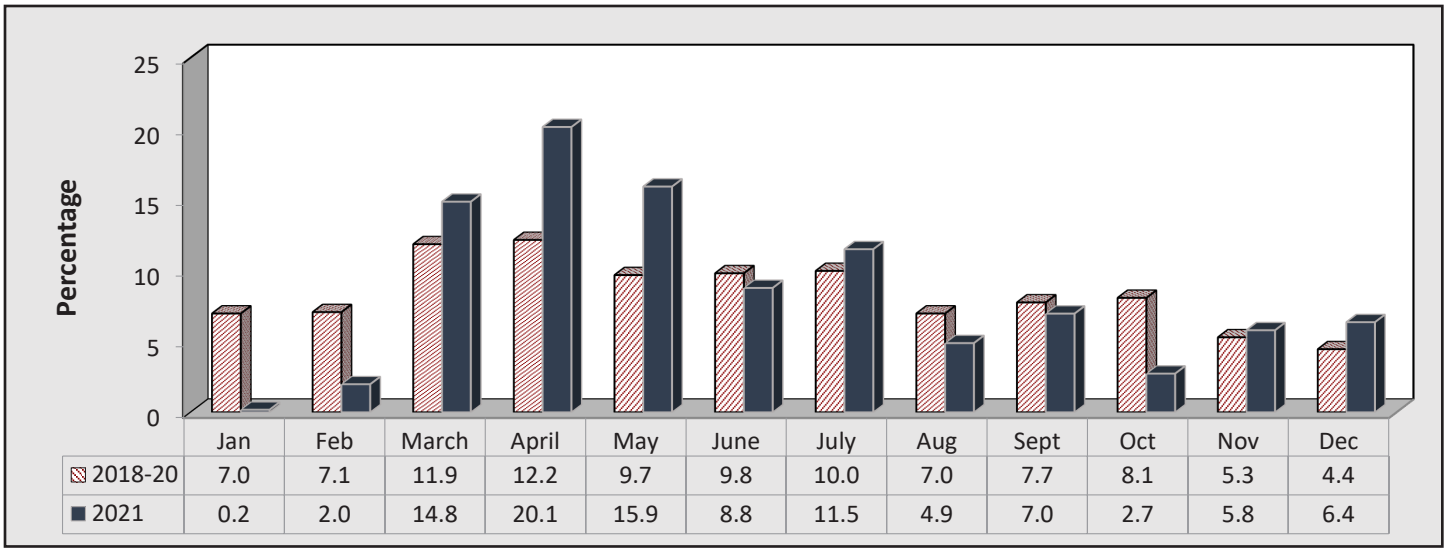


	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
2018-20	2.9	1.5	4.3	10.3	13.6	9.0	10.8	11.2	9.9	9.9	8.8	7.8
2021	0.0	0.0	3.4	15.3	14.6	10.9	11.0	16.5	10.5	11.7	3.2	2.9

Source: Comex Stat, Ministério da Economia.

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

Port of Paranaguá average monthly soybean exports to China, 2018-21

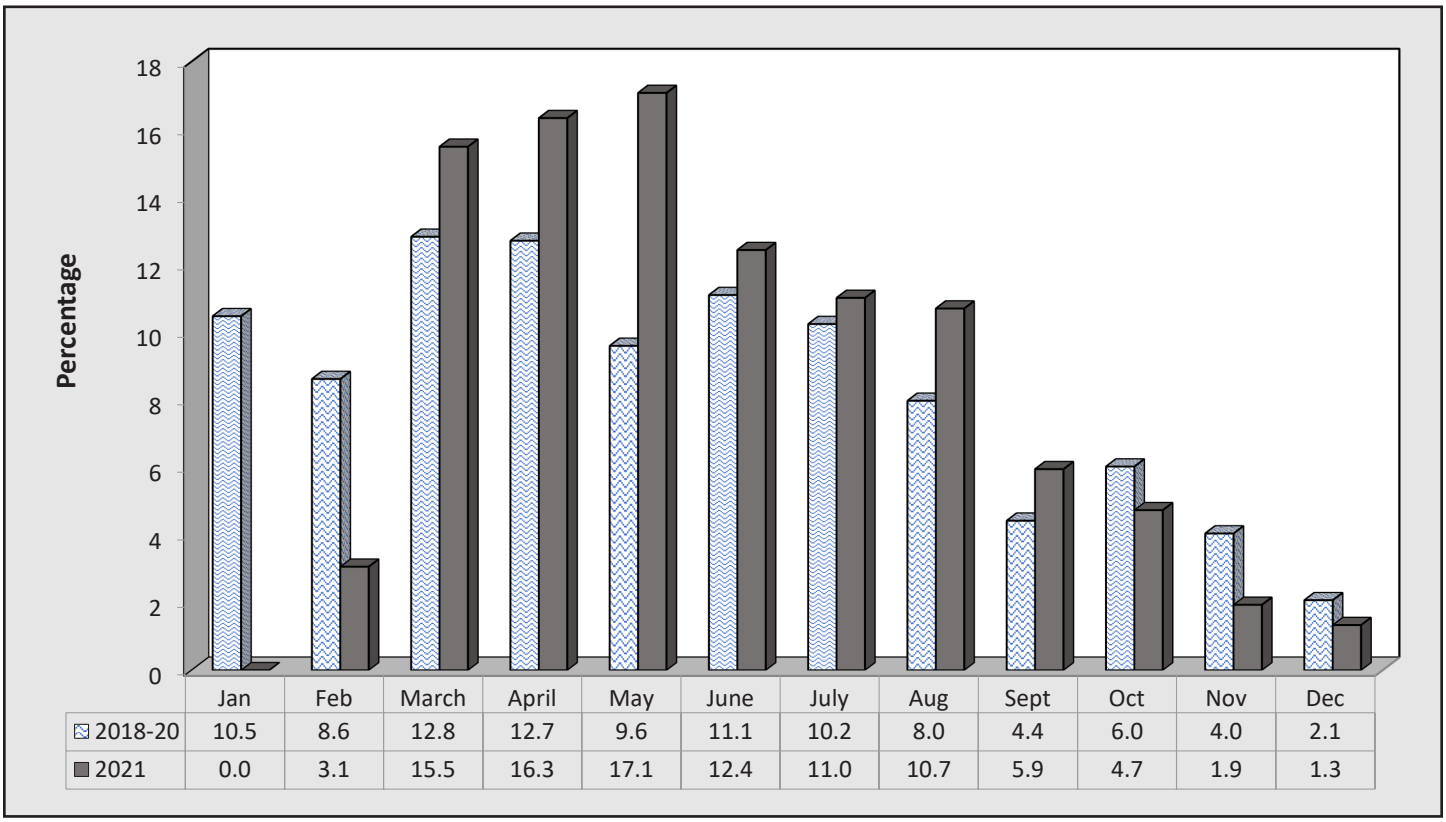


	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
2018-20	7.0	7.1	11.9	12.2	9.7	9.8	10.0	7.0	7.7	8.1	5.3	4.4
2021	0.2	2.0	14.8	20.1	15.9	8.8	11.5	4.9	7.0	2.7	5.8	6.4

Source: Comex Stat, Ministério da Economia.

China was the top Brazilian soybean export destination through the Port of São Luís, accounting for nearly 64 percent of exports. The next-largest export destinations (in descending order) were Spain, Thailand, Turkey, and Japan. Typically, soybean shipments to China from the Port of São Luís peak from March to July. São Luís is Brazil's top soybean-exporting port in the northeast, accounting for nearly 11 percent of Brazil's total soybean exports and 10 percent of exports to China. The next-highest levels of exports in the northeast (in descending order) were from the following three ports: Barcarena, Vitória, and Salvador. The top four ports accounted for nearly 25 percent of the total exports to China. About 54 percent of exports through the port of São Luís originated from Tocantins and Maranhão. The next-highest levels of São Luís exports (in descending order) originated from Mato Grosso, Piauí, Bahia, and Pará.

Port of São Luís average monthly soybean exports to China, 2018-21



	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
2018-20	10.5	8.6	12.8	12.7	9.6	11.1	10.2	8.0	4.4	6.0	4.0	2.1
2021	0.0	3.1	15.5	16.3	17.1	12.4	11.0	10.7	5.9	4.7	1.9	1.3

Source: Comex Stat, Ministério da Economia.

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 has 39,146 miles of river-lake surface water and 27,340 miles of navigable rivers, but only 12,094 miles are commercially navigated.

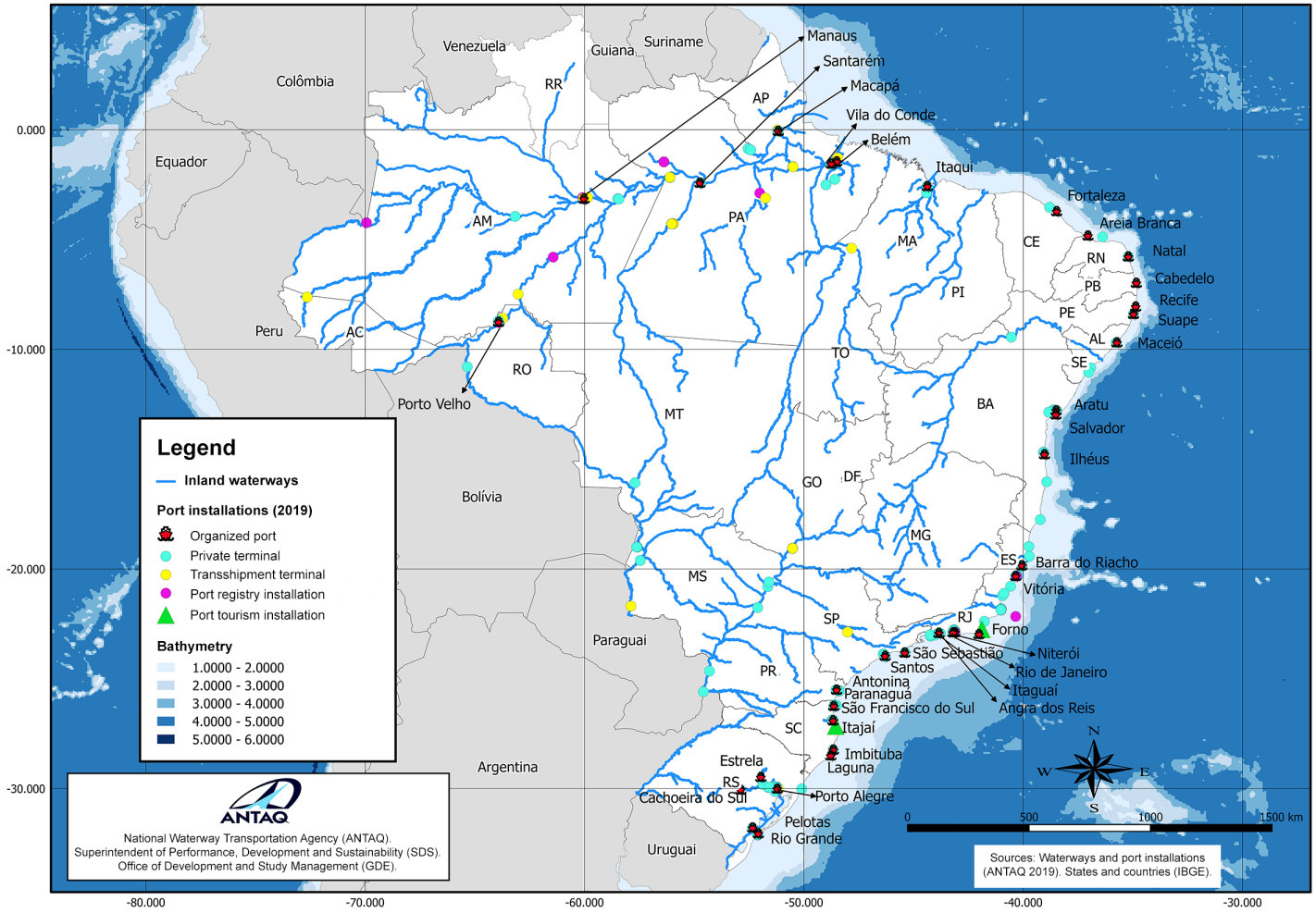
Brazil waterway system

Extension	Miles
River-lake surface water	39,146
National river network	27,340
Naturally navigable waterways	25,970 (100%)
Commercial navigations	12,094 (47%)

Sources: Confederação Nacional do Transporte (CNT 2019) and National Agency for Waterway Transporation (ANTAQ 2016).

Brazilian port installations

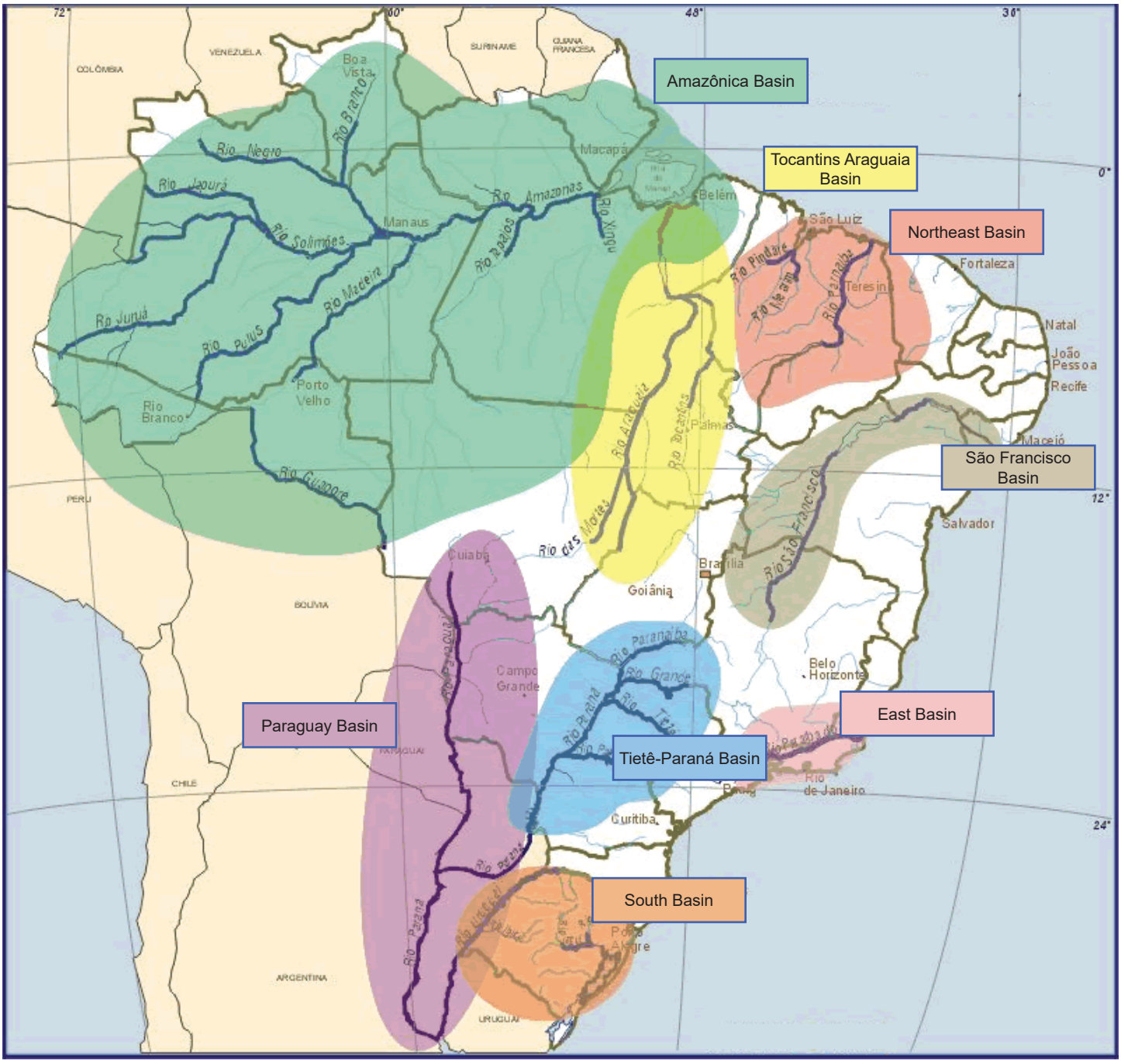
The Port of Manaus access channel is 1,640 ft wide and 114.8 ft deep. Porto Velho's access channel depth varies from 8.2 to 57.4 ft. The Port of Santarém's access channel is 5,904 ft wide and 49.2 ft deep.



Sources: Agência Nacional de Transportes Aquaviários (ANTAQ).

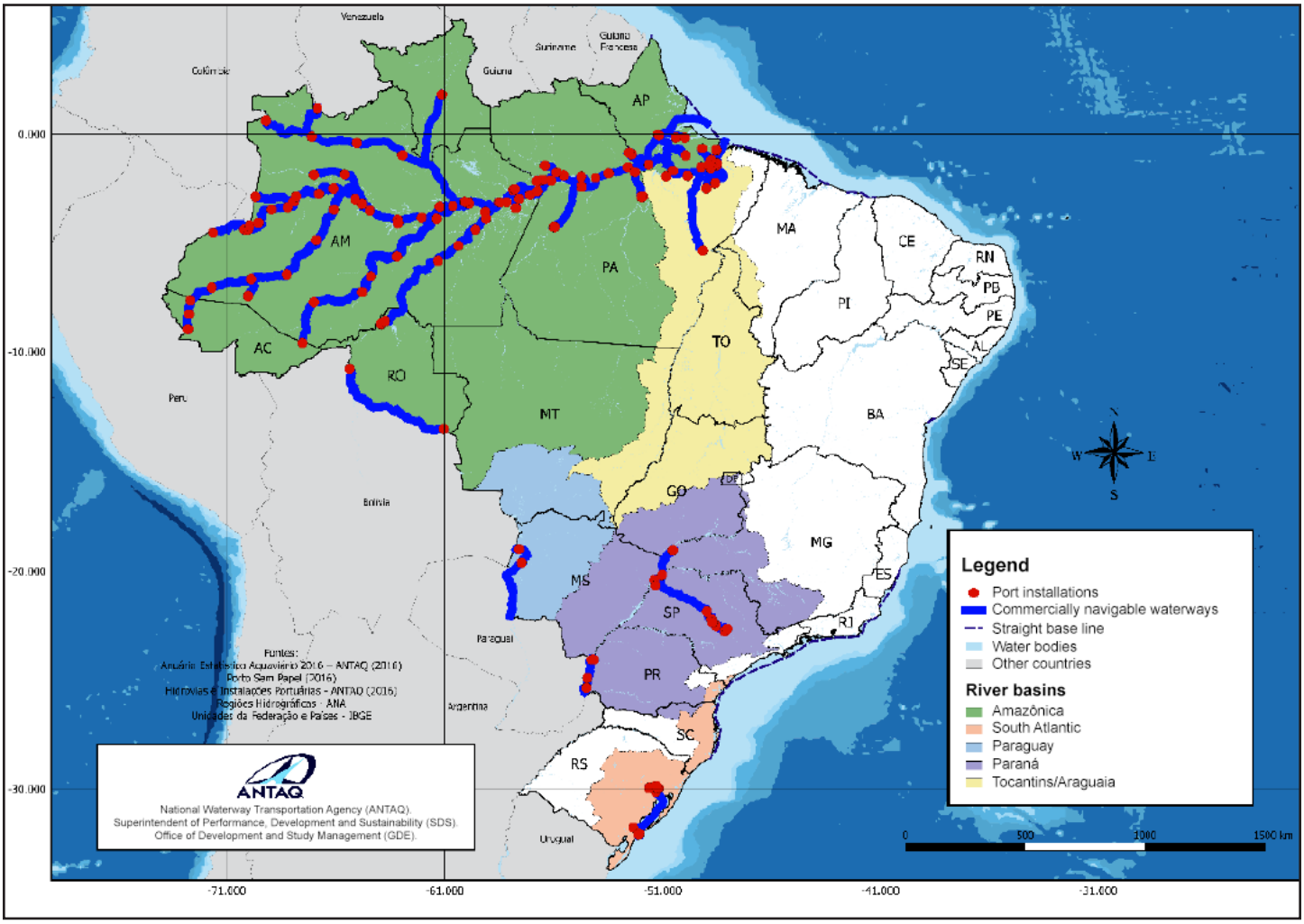
Brazilian river basins

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 968,863 miles (1,562,682 kilometers), with nearly 14 percent paved. The U.S. highway system consists of 4,129,486 miles (6,645,747 kilometers), with 68 percent paved.

Brazil highway system, 2019

	Miles	% Paved	% Unpaved
Federal	46,961	86	14
State and county	921,902	10	90
Total (federal + state and county)	**968,863**		
All roads		**14**	**86**

Source: Confederação Nacional do Transporte (CNT).

U.S. highway system, 2020

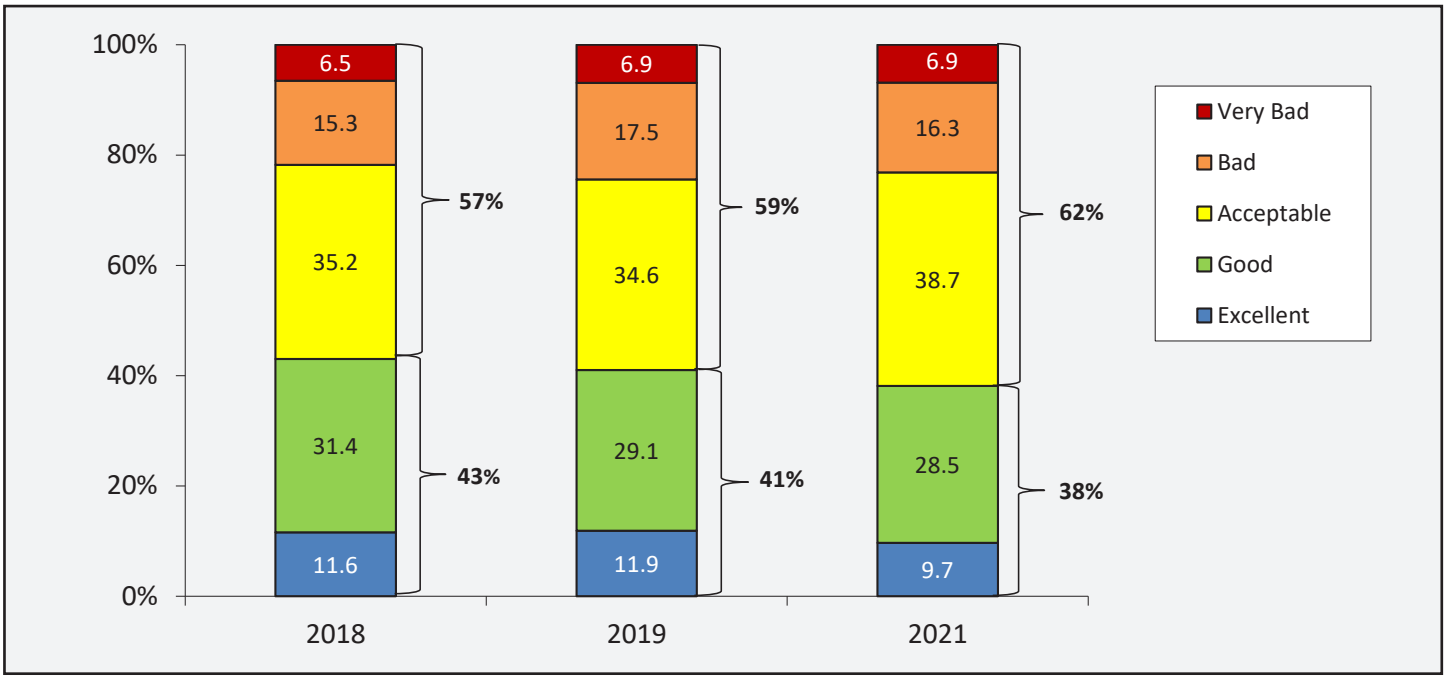
	Extension[1] (in miles)	% Paved[2]	% Unpaved[2]
Rural	2,907,358	56	44
Urban	1,222,128	97	3
Total	**4,129,486**	**68**	**32**

[1]Includes the 50 States, Puerto Rico (data may be incomplete), and the District of Columbia. Some differences from other tables may be noted because these are estimated from sample and summary data; some States may have missing/incomplete data.
[2]Paved includes the following categories: Bituminous (bituminous asphalt-concrete (AC) overlaid on existing AC pavement); Concrete (jointed plain concrete pavement (JPCP), jointed reinforced concrete pavement (JRCP), continuously reinforced concrete pavement (CRCP); unbonded jointed concrete overlaid on PCC pavement, bonded PCC overlaid on PCC pavement, other (includes "whitetopping")); and Composite (AC overlaid on jointed concrete pavement, AC (bituminous overlaid on existing CRCP).
Source: U.S. Department of Transportation, Federal Highway Administration, Highway Statistics (Washington, DC: Annual Issues); Highway Statistics 2020.

Brazilian highways

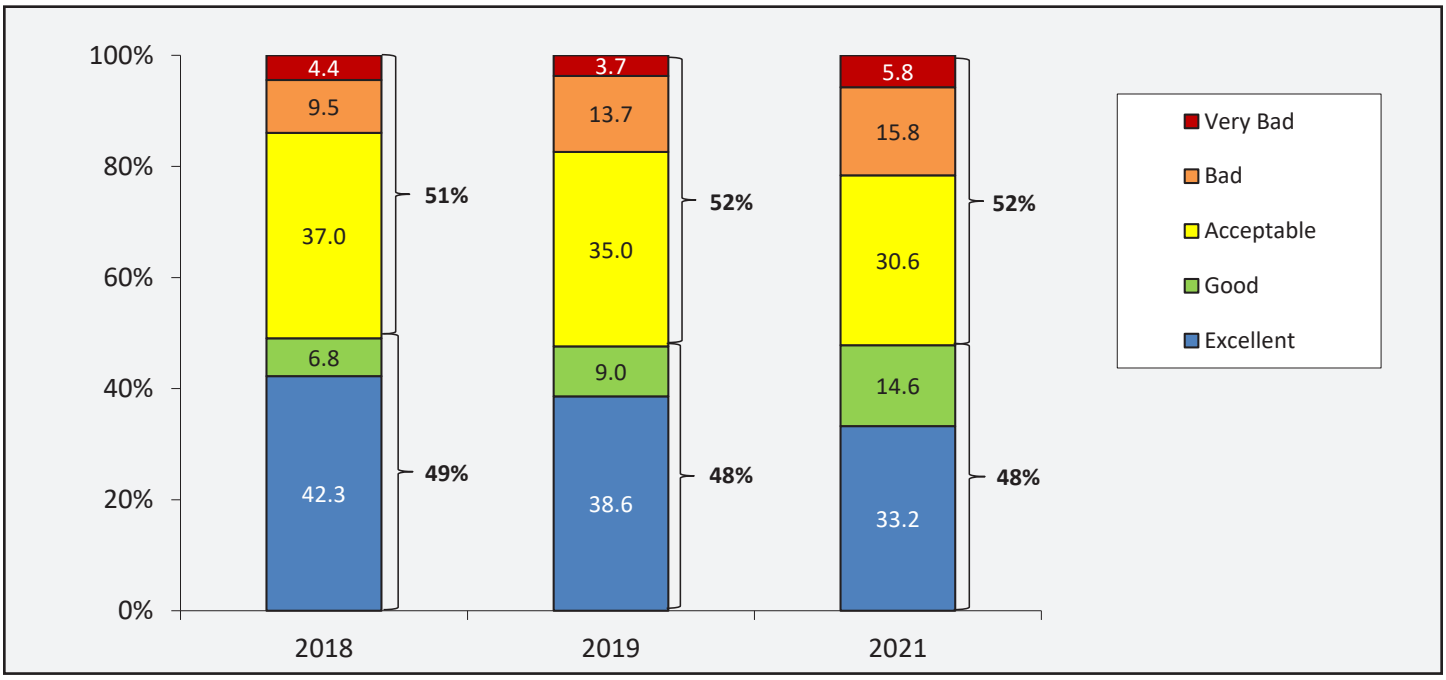
According to the 2021 Confederação Nacional do Transporte (CNT) survey of the overall highway conditions in Brazil, 38 percent of the roads ranged from good to excellent in 2021 (versus 41 percent in that range in 2019). The remaining 62 percent ranged from acceptable to very bad. Also, in 2021, 48 percent of the paved roads were in good to excellent condition; 59 percent of traffic road signs had problems; and 85 percent of the paved roads had only two lanes. The survey sample of paved roads slightly increased from 67,495 miles in 2019 to 67,644 miles in 2021.

Brazilian highway conditions, 2018-21



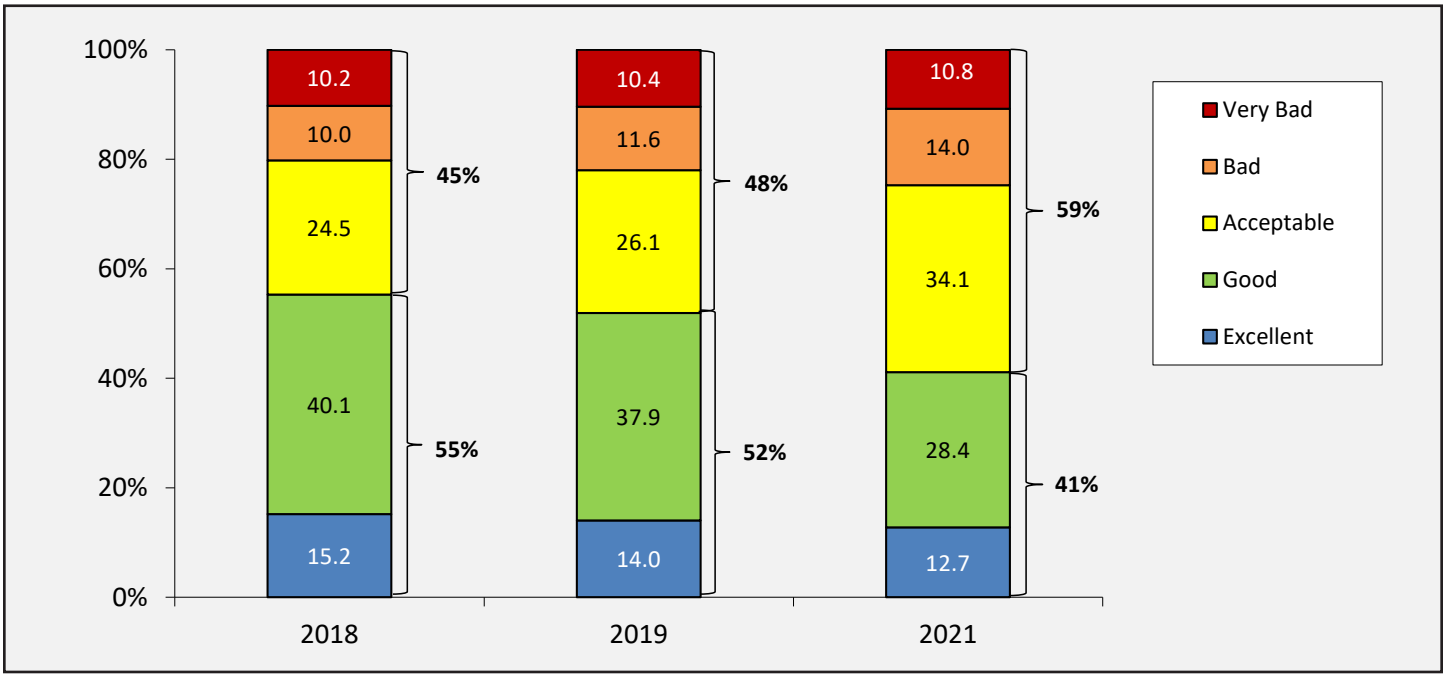
Note: Data for 2020 are not available.
Source: Confederação Nacional do Transporte (CNT).

Brazilian paved highway conditions, 2018-21



Note: Data for 2020 are not available.
Source: Confederação Nacional do Transporte (CNT).

Brazilian road sign conditions, 2018-21

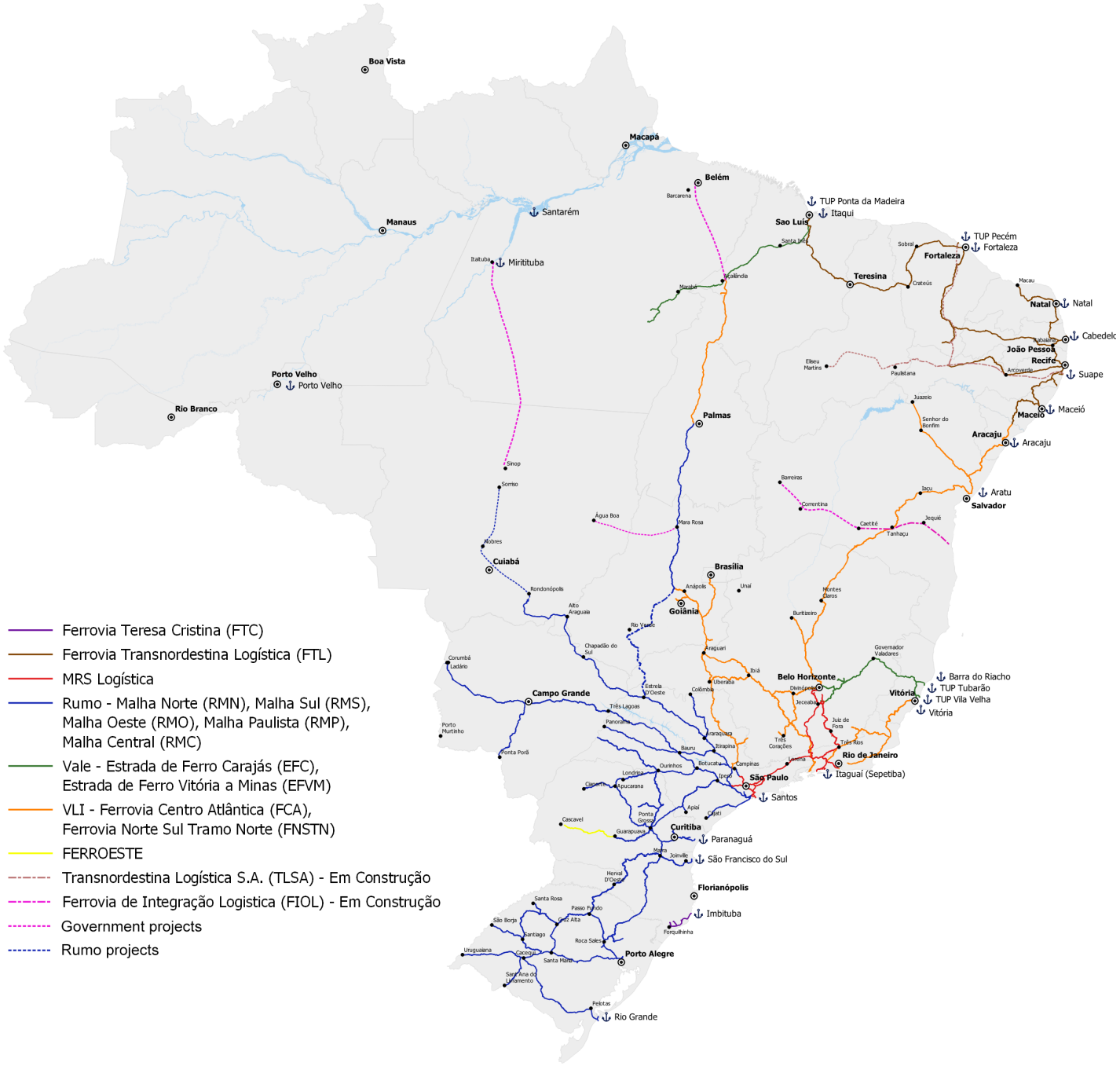


Note: Data for 2020 are not available.

Source: Confederação Nacional do Transporte (CNT).

Brazilian railway expansion: ongoing projects

The Brazilian railroad system consists of 12 railroads, with an extension of 18,943 miles, mostly concentrated in the South, Southeast, and Northeast.



Source: Agência Nacional de Transportes Terrestres (ANTT).

Brazilian rail system: gauge sizes

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

Source: Grupo de Pesquisa e Extensão em Logística Agroindustrial (ESALQ-LOG)/University of São Paulo, Brazil, based on data from the Agência Nacional de Transportes Terrestres (ANTT) 2018.

Reference Material

Quarterly costs of transporting U.S. soybeans to Hamburg, Germany, via U.S. Gulf, 2021

	Minneapolis, Minnesota (US$/mt)				
	2021 1st qtr	2021 2nd qtr	2021 3rd qtr	2021 4th qtr	2021 Average
Truck	13.66	13.99	13.18	13.50	13.58
Rail[1]	36.38	-	-	-	36.38
Barge[2]	12.49	29.61	32.62	35.21	27.48
Ocean[3]	19.75	23.19	28.21	30.09	25.31
Total transportation	82.28	66.79	74.01	78.80	75.47
Farm price[4]	465.42	529.11	483.79	448.27	481.65
Landed cost[5]	547.70	595.90	557.80	527.07	557.12
Transport % of landed cost	15.0	11.2	13.3	15.0	13.6
	Davenport, Iowa (US$/mt)				
	2021 1st qtr	2021 2nd qtr	2021 3rd qtr	2021 4th qtr	2021 Average
Truck	13.66	13.99	13.18	13.50	13.58
Rail[1]	33.33	-	-	-	33.33
Barge[2]	12.49	20.17	26.21	33.49	23.09
Ocean[3]	19.75	23.19	28.21	30.09	25.31
Total transportation	79.23	57.35	67.60	77.08	70.32
Farm price[4]	456.85	529.11	494.82	448.27	482.26
Landed cost[5]	536.08	586.46	562.42	525.35	552.58
Transport % of landed cost	14.8	9.8	12.0	14.7	12.8

[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; yr.=year; mt=metric ton; total may not add exactly due to rounding.

Source: Compiled by the USDA, Agricultural Marketing Service.

Quarterly costs of transporting U.S. soybeans to Shanghai, China, via U.S. Gulf, 2021

	Minneapolis, Minnesota (US$/mt)				
	2021 1st qtr	2021 2nd qtr	2021 3rd qtr	2021 4th qtr	2021 Average
Truck	13.66	13.99	13.18	13.50	13.58
Rail[1]	36.38	-	-	-	36.38
Barge[2]	12.49	29.61	32.62	35.21	27.48
Ocean[3]	50.88	64.88	80.83	77.72	68.58
Total transportation	113.41	108.48	126.63	126.43	118.74
Farm price[4]	465.42	529.11	483.79	448.27	481.65
Landed cost[5]	578.83	637.59	610.42	574.70	600.39
Transport % of landed cost	19.6	17.0	20.7	22.0	19.8
	Davenport, Iowa (US$/mt)				
	2021 1st qtr	2021 2nd qtr	2021 3rd qtr	2021 4th qtr	2021 Average
Truck	13.66	13.99	13.18	13.50	13.58
Rail[1]	33.33	-	-	-	33.33
Barge[2]	12.49	20.17	26.21	33.49	23.09
Ocean[3]	50.88	64.88	80.83	77.72	68.58
Total transportation	110.36	99.04	120.22	124.71	113.58
Farm price[4]	456.85	529.11	494.82	448.27	482.26
Landed cost[5]	567.21	628.15	615.04	572.98	595.85
Transport % of landed cost	19.5	15.8	19.5	21.8	19.1

[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; yr.=year; mt=metric ton; total may not add exactly due to rounding.
Source: Compiled by the USDA, Agricultural Marketing Service.

Quarterly costs of transporting U.S. soybeans to Shanghai, China, via PNW, 2021

	Fargo, North Dakota (US$/mt)				
	2021 1st qtr	2021 2nd qtr	2021 3rd qtr	2021 4th qtr	2021 Average
Truck	13.66	13.99	13.18	13.50	13.58
Rail[1]	57.10	57.10	57.76	59.09	57.76
Ocean[2]	28.60	37.60	43.98	42.01	38.05
Total transportation	99.36	108.69	114.92	114.60	109.39
Farm price[3]	439.70	518.09	462.97	440.92	465.42
Landed cost[4]	539.06	626.78	577.89	555.52	574.81
Transport % of landed cost	18.4	17.3	19.9	20.6	19.1
	Sioux Falls, South Dakota (US$/mt)				
	2021 1st qtr	2021 2nd qtr	2021 3rd qtr	2021 4th qtr	2021 Average
Truck	13.66	13.99	13.18	13.50	13.58
Rail[1]	58.09	58.09	58.76	60.08	58.76
Ocean[2]	28.60	37.60	43.98	42.01	38.05
Total transportation	100.35	109.68	115.92	115.59	110.39
Farm price[3]	442.15	525.43	483.79	447.05	474.61
Landed cost[4]	542.50	635.11	599.71	562.64	584.99
Transport % of landed cost	18.5	17.3	19.3	20.5	18.9

[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; yr.=year; mt=metric ton; total may not add exactly due to rounding.
Source: Compiled by the USDA, Agricultural Marketing Service.

Average quarterly exchange rate, 2015-21

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**
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**

Source:Banco Central do Brasil

Selected quarterly Brazilian farm prices, 2016-21 (US$/metric ton)

Quarter	Rio Grande do Sul	Mato Grosso	Goiás	Paraná	Piauí	Pará	Maranhão
1st	308.73	268.28	278.59	298.84	281.05	264.90	310.69
2nd	358.57	347.59	337.86	353.78	342.05	329.13	378.45
3rd	373.12	367.25	359.07	362.80	378.98	384.42	447.42
4th	352.69	344.51	341.08	347.53	377.05	355.82	370.99
2016 Avg	**348.28**	**331.91**	**329.15**	**340.74**	**344.78**	**333.57**	**376.89**
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**
Quarter	**Rio Grande do Sul**	**Mato Grosso**	**Goiás**	**Paraná**	**Piauí**	**Pará**	**Maranhão**
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**

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

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