



# Brazil Modal Share for Corn and Soybeans: An Updated Analysis from 2010-23 (Summary)

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This is an updated summary of “Brazil Modal Share for Corn and Soybeans: An Updated Analysis from 2010-19” by Thiago Guilherme Péra, José Vicente Caixeta-Filho, professor at the University of Sao Paulo, Luiz de Queiroz College of Agriculture, Department of Economics, Administration and Sociology ESALQ-LOG Group, Brazil, and Delmy L. Salin Ph.D. at USDA. This paper received funding from USDA’s Agricultural Marketing Service (AMS) through cooperative agreement number 20-TMTSD-BZ-0001 and 23-TMTSD-BZ-0003. The opinions and conclusions expressed are the authors’ and do not necessarily reflect the views of USDA or AMS. The full report is available online at <https://esalqlog.esalq.usp.br/modalshareusdaesalq2024>.

## WHAT IS THE ISSUE?

Historically, grain exports from Brazil have relied heavily on road transportation to bridge long distances between major production regions and Brazilian ports. However, the expansion and consolidation of new transport corridors, as well as the addition of new railways and waterways, have made exporting corn and soybeans much more efficient.

Over the past decade, Brazil has continuously increased grain production through rising productivity, an expansion of cultivated areas, and an increased number of harvests, particularly corn harvests. As a result, combined corn and soybean production more than doubled between 2010 and 2023, from 124 million tons to 287 million tons.

Over the same period, booming production and exports led to congestion on traditional export corridors. The need to reduce congestion and cut transport costs spurred construction of new corridors. The rising demand for transportation infrastructure is especially pronounced in major agriculture-producing regions. As a result of this expansion, today’s Brazilian transportation system is a more balanced system—markedly transformed from what it was in 2010. Similar to the U.S. system in its complexity, Brazil’s system leverages all major modes (truck, barge, rail, and ocean vessel).

This study analyzes the most recent modal share changes for Brazil’s corn and soybean exports and chronicles improvements in transportation infrastructure, from 2010 to 2023.

## **HOW WAS THE STUDY CONDUCTED?**

This report updates the previous 2021 version, [Brazil Modal Share Analysis for Corn and Soybeans: 2010-19](#). The modal share study used a comprehensive logistics module to analyze Brazil's infrastructure development in great detail. The study developed a longitudinal (2010-23) database that quantifies Brazil's corn and soybean movements by mode (rail, truck, and barge) from the production regions to export ports.

Furthermore, the study accounted for exports of corn and soybeans from a consolidated database that generated three modal indicators—truck, rail, and barge—related to corn and soybean transport movements in Brazil. We broke down the modal shares by total tonnage and by export and domestic market destinations. This study also incorporated secondary data from the Brazilian National Land Transport (ANTT); National Water Transport Agency (ANTAQ); National Supply Company (CONAB); COMEX-STAT; and the Ministry of Development, Industry, Trade and Services (MDIC).

## **WHAT DID THE STUDY FIND?**

Despite Brazil's infrastructure advances, a number of challenges persist, including long distances from major production regions to barge and rail terminals, as well as a shortage of rail and inland waterway infrastructure capacity.<sup>1</sup> While grappling with these challenges, Brazil continues to depend heavily on trucking to ship grain to major destinations.

Most corn and soybeans for domestic consumption are shipped by truck, with an average distance of 388 miles (625 km) from farms to any destination other than rail and barge terminals. As determined by the analysis, Brazilian soybeans and corn are trucked an average distance of 538 miles (865 km) (encompassing both domestic and export routes).

Because upgrades to Brazil's railway infrastructure did not keep pace with the rise in soybean and corn exports, shippers' reliance on trucking increased. If not for the growth of barge transportation (particularly in the northern region of the country), the dependence on trucking would have intensified even more. In the last decade, the use of barge transportation rose for shipping corn and soybean exports to major ports. On average, barged corn shipments travel 581 nautical miles (nm) and barged soybeans, 535 nm.

The main results for Brazilian corn, are as follows:

### *In 2023*

- Truck shipments from the farm to major destinations accounted for 76 percent of total movements, followed by rail (16 percent) and barge (8 percent).
- Of all the modes, trucks shipped the most corn to major export facilities. Trucking handled 45 percent of total corn exports, followed by rail (39 percent) and barge (16 percent).

### *From 2010 to 2023*

- Truck market shares for all corn movements (domestic and exports) declined by 8.0 percentage points (pp), from 84 to 76 percent; rail increased nearly 2 pp, from 15 to 17 percent; and barge increased 7 pp, from 1 percent to 8 percent.
- Barge gained a significant market share for corn exports, rising from 3 percent to 16 percent—at the expense of rail, which fell from 78 percent to 39 percent. Truck also gained market share, rising from 20 to 45 percent.
- Brazil's increased reliance on trucks for exports is a result of the significant growth in corn exports.
- The ports of Paranaguá, Rio Grande, and São Luís significantly increased their reliance on trucks shipments, at the expense of rail. In 2023, of the ports evaluated, Santos had the lowest dependence on trucks—with 33 percent of shipments handled by truck and 67 percent by rail.

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<sup>1</sup> In this study, short-haul trucks are not considered to be part of the trucking modal share, to avoid double counting. In Brazil, these shipments refer to the average distance of 388 miles (625 kilometers (km)) from the farm to rail and barge terminals.

The main results for Brazilian *soybeans* are as follows:

*In 2023*

- Truck shipments of soybeans from the farm to major destinations accounted for 69 percent of total movements, followed by rail (22 percent) and barge (9 percent).
- Of all modes, trucks shipped the most soybeans to major export facilities. Trucks handled 54 percent of total soybean exports, followed by rail (34 percent) and barge (12 percent).
- Truck freight costs represented 15-40 percent of the product price delivered at port.

*From 2010 to 2023*

- Truck market shares declined 6 pp, from 75 to 69 percent; rail increased 2 pp, from 20 to 22 percent; and barge increased 4 pp from 5 to 9 percent.
- Barge and truck gained market share at the expense of rail, which fell 13 pp—from 47 percent in 2010 to 34 percent in 2023. Barge shipments increased 4 pp, from 8 percent to 12 percent. Truck shipments increased 9 pp, from 45 percent to 54 percent.
- For the port of Paranaguá, trucks' modal share rose from 76 percent to 78 percent. Even sharper increases occurred for the port of Rio Grande, where truck's share rose from 57 percent to 90 percent, and the port of São Luís, where trucks' share rose from 10 percent to 48 percent. Trucks' share declined only at the port of Santos, where rail's share rose from 52 percent to 57 percent.

## **PREFERRED CITATION**

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