USDA Agricultural Marketing Service
U.S. DEPARTMENT OF AGRICULTURE

Ukraine Grain Transportation

Published August 2022

Executive Summary

The 2022 Ukraine Grain Transportation report covers 2021 data trends as well as the current status of transportation following the 2022 Russian invasion. In recent years, the Black Sea region–Kazakhstan, Russia, and Ukraine–has emerged as a strong player in the global wheat and corn markets. Black Sea wheat successfully competes based on lower prices, favorable exchange rates, and the region's advantageous location. Ports on the Black Sea have easy access to the rapidly growing markets in the Middle East and North Africa where wheat and feed demand has grown. The U.S. share of the global wheat market has been declining as the European Union (EU) and Russia have risen in prominence. In the corn market, the United States is still the leading exporter, but faces strong competition from Brazil, Argentina, and Ukraine. U.S. corn prices are still competitive, but Black Sea prices are declining, and production is increasing.

Because of challenges obtaining specific data out of the entire Black Sea region, the U.S. Department of Agriculture publishes the annual Ukraine Grain Transportation report to evaluate grain transportation costs as an indicator for the entire Black Sea Region. The Ukraine Grain Transportation report analyzes the major changes and events in the total cost of shipping grain from Ukraine to major export markets, which also affect the overall competitiveness of the United States in serving global grain markets. The Agricultural Marketing Service (AMS) has published the Ukraine Grain Transportation report annually since 2020.

In 2021, Ukraine's transportation costs more than doubled from 2020 due to larger wheat and soybean crops, higher truck operating costs, disrupted preparation of hoppers, and higher ocean rates. In 2021, more than 95 percent of Ukrainian grain exports were shipped via the Black Sea ports, and rail handled 60 percent of domestic grain movements destined to ports for export.

In 2022, the crop harvest for all major grains and oilseeds is expected to decline by around 40 percent because of Russia's occupation of eastern and southern Ukraine. The occupation has closed all traditional export routes, forcing the Ukrainian government and exporters to seek alternatives. In addition, Ukraine has two new laws that would increase Ukraine's cost competitiveness in the world market: (1) "On Inland Water Transport" and (2) Multimodal transportation, which are discussed in the report.

Overview of Ukrainian Grain Transportation in 2021[1]

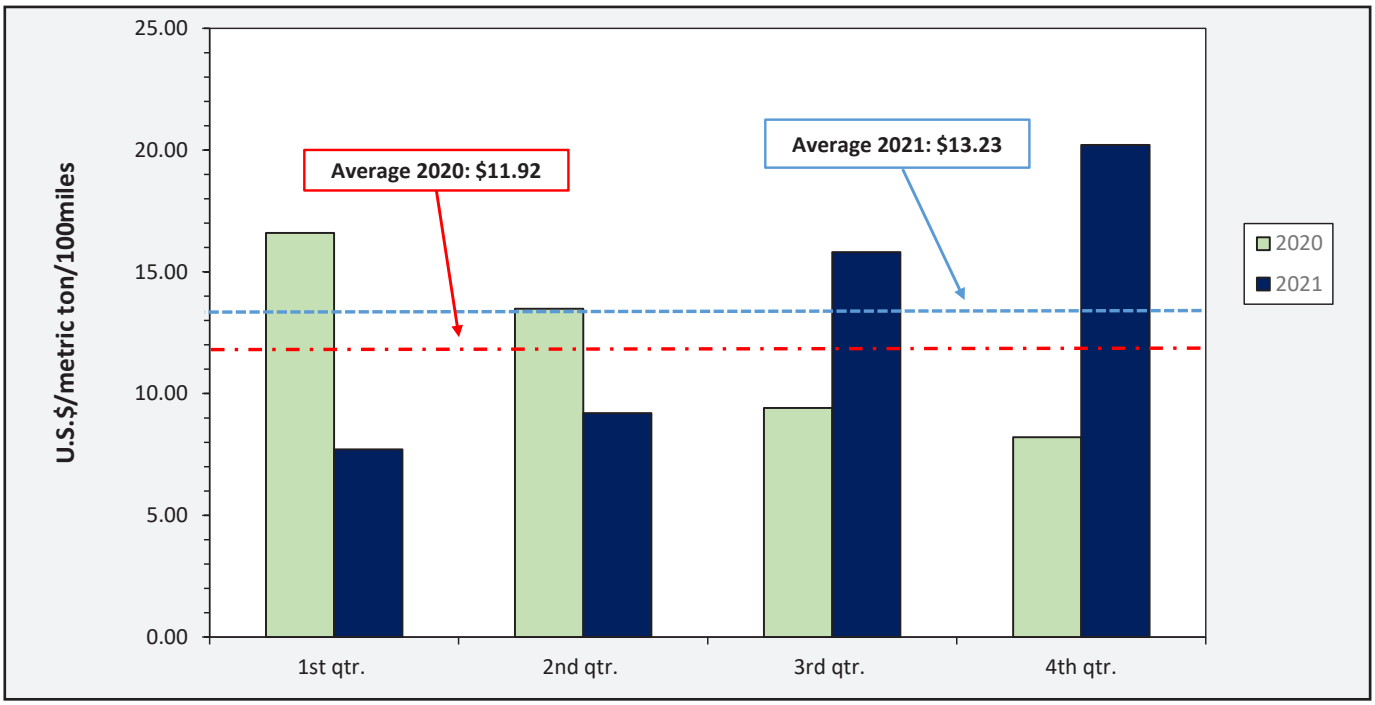
In 2021, Ukraine exported 20.1 million metric tons (mmt) of wheat, nearly 11 percent more than 2020's total of 18.1 mmt. Corn exports declined by 12 percent—from 27.9 mmt in 2020 to 24.7 mmt in 2021. The drop was mainly a result of 16 percent less harvested corn in 2020 than in 2019 (State Statistics Service of Ukraine).[2] During the first 9 months of 2021, Ukraine exported about 60 percent of 2020's grain harvest (Centre for Transport Strategies (CFTS)). The cost of shipping a metric ton (mt) of grain 100 miles by truck rose 11 percent,

1 Andrii Shkliar (andrii.shkliar@cfts.org.ua), Andrey Isayev (andrey.isayev@cfts.org.ua), and Pavlo Rudenko (pavlo.rudenko@cfts.org.ua), gathered all of the Ukraine data in this report and ensured its accuracy.

2 Ukrainian grain, especially corn, is usually exported in the spring and summer of the calendar year after the year the grain was harvested, depending on market price and port capacity. Thus, 2021 corn export volumes reflected 2020's low harvested volumes.

from $11.92 per mt in 2020 to $13.23 per mt in 2021 (fig. 1a) (Zernovoz). The increase stemmed from two main reasons: first, larger wheat and soybean crops raised transportation demand, and second, truck rates rose with higher operating costs, including those for fuel and spare parts.

Figure 1a. Ukrainian grain export truck cost index, 2020-21



*Grain refers to wheat, corn, and soybeans. qtr. = quarter.

Source: Centre for Transport Strategies, Kyiv, Ukraine; Zernovoz Kyiv, Ukraine; JIT+ Kyiv, Ukraine; and USDA, Agricultural Marketing Service.

From 2020 to 2021, rail rates rose in response to several factors: disrupted preparation of hoppers for the 2021 harvest and significantly rising rental fees for private grain hoppers from July to December 2021. The private hopper rental fees increased from $3 per day in April 2021 to $59.70 per day in December 2021 (Promgruz).[3]

Ukrainian Railways increased the rent for grain hoppers from $4.10 per day in June 2021 to $69.80 per day in December 2021 (CFTS).[4] From 2020 to 2021, market share of trucking rose from 28 percent to nearly 31 percent, mostly at the expense of river transportation (which fell by 3.1 percent) (table 1a). Of the Ukrainian grain shipped to major export facilities in 2021, the largest share (60 percent) went by rail, followed by truck (31 percent), and barge (9 percent) (Ukranian Railways, Ukrainian Sea Ports Authorities, and CFTS). In 2021, more than 95 percent of Ukrainian grain exports were shipped via the Black Sea ports (table 1.a) (Ukrainian Sea Ports Authorities, and CFTS).[5] From the United States, the largest share of grain exports (47 percent) went by barge, followed by rail (38 percent), and finally truck (14 percent) (fig. 1b) (Chang et al., 2021).

3 Rental hopper prices (cited here and in the next paragraph) do not include the value-added tax.

4 The Ukrainian rail freight market is under Government control. The Government-held company, Ukrainian Railways (Ukrzaliznytsia), owns the rail infrastructure and provides services. Tariff rates are not published. Ukrainian Railways uses the former Soviet Union's railway-tariff-setting model.

5 The Ukrainian Black Sea region includes the ports of Odesa, Chornomorsk, Yuzhnyi, Bilhorod-Dnistrovskyi, Izmail, Reni, Ust-Dunaisk, Skadovsk, Olvia, Mykolaiv, and Kherson. The region excludes the ports in occupied Crimea (Yevpatoriia, Kerch, Sevastopol, Feodosiia, and Yalta).

Ukraine Grain Transportation

From 2020 to 2021, both rising transport costs and farm prices raised landed costs for Ukrainian wheat and corn exported to Alexandria, Egypt; Ciwandan/Cigading, Indonesia; and Shanghai, China.[6] As a share of total landed costs of wheat, transportation costs increased 2-19 percent for the route from Central Ukraine through the ports of Odesa and increased 2-22 percent through Mykolaiv to the same ports (tables 2a and 2b). Ocean freight rates rose for all routes—from Odesa and Mykolaiv to Alexandria, Egypt; Ciwandan/Cigading, Indonesia; and the southern ports of China. The rates rose in response to the global shortage of freight tonnage that occurred with the post-pandemic recovery of global trade.

Table 1a. Tonnages and modal shares for Ukrainian grain and oilseed exports, 2018-21

Year & Type of Movement	Rail		Barge*		Truck	
	1,000 Tons	Percent	1,000 Tons	Percent	1,000 Tons	Percent
2018	30,083	76%	3,700	9%	5,850	15%
2019	36,707	69%	5,650	11%	10,667	20%
2020	29,406	64%	4,030	9%	12,694	28%
2021	28,495	60%	4,300	9%	14,500	31%

* 2018-19 barge volumes included those for the Southern Bug River, and 2020-21 volumes include those for the Dnipro and Southern Bug Rivers.

Source: Ukranian Railways, Ukrainian Sea Ports Authorities, and Centre for Transport Strategies.

Table 1b. Ukrainian grain exports by port, 2021

Black Sea Ports	1,000 Tons	Percentage
Chornomorsk	14,484	30.6
Mykolaiv	12,282	26.0
Pivdennyi	9,643	20.4
Odesa	5,741	12.1
Olvia	2,450	5.2
Berdyansk*	1,408	3.0
Mariupol*	868	1.8
Kherson	359	0.8
Ust-Dunaisk	60	0.1
Total	**47,295**	**100**

Note: "Grain" refers to wheat, corn, barley, and oats—but not soybeans.

*The Azov ports include Berdyansk and Mariupol.

Source: Ukrainian Sea Ports Authorities.

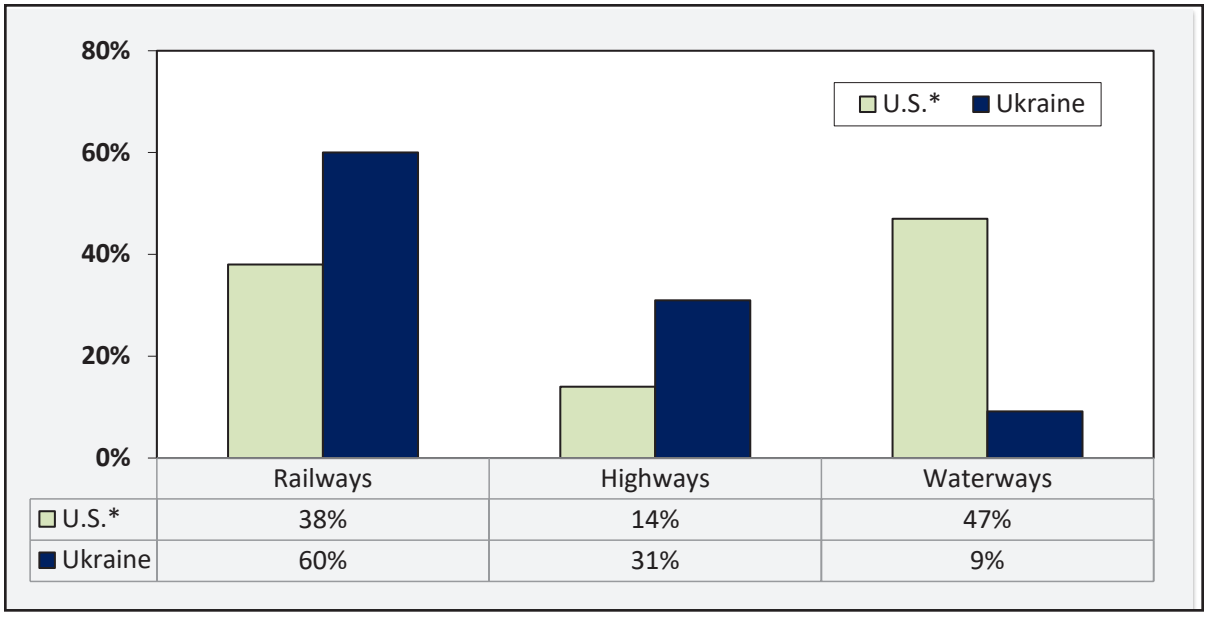
According to the Food and Agricultural Organization of United Nations (FAO), from 2020 to 2021, average Ukrainian free-on-board (FOB) wheat prices for mills increased 22 percent, from $286.54 per mt to $361 per mt. Also, from 2020 to 2021, Ukrainian corn FOB prices increased 42 percent, from $193.10 per mt to $274.89 per mt. Over the same period, Ukrainian average wheat farm prices increased 20 percent, from $227.60 per mt to $273.08 per mt (table 2a). Average farm prices for corn increased 39 percent, from $193.72 per mt in 2020 to $270.12 per mt in 2021 (table 2b).

6 Landed costs = total transportation costs + farm price.

Ukraine Grain Transportation

In 2021, Ukraine exported about 7.9 mmt of corn to China, 3 percent more than 2020's total (7.7 mmt), accounting for 32 percent of Ukraine's total exports (24.7 mmt). The next highest shares of Ukrainian corn exports (in declining order) went to Spain, the Netherlands, Egypt, and the Islamic Republic of Iran. Ukraine exported 3.3 mmt of wheat to Egypt, accounting for 17 percent of Ukraine's total exports (20.1 mmt). The next highest shares of Ukrainian wheat exports (in declining order) went to Indonesia, Turkey, Pakistan, and Bangladesh.

Figure 1b. U.S. vs. Ukrainian grain and oilseed exports by mode, 2021



	Railways	Highways	Waterways
U.S.*	38%	14%	47%
Ukraine	60%	31%	9%

*Because of rounding, the United States shares do not sum exactly to 100.

Source: USDA. Agricultural Marketing Service, 2021 Ukrainian Railways, and Ukrainian Sea Ports Authorities, 2021.

Current Status

Infrastructure conditions after the Russian invasion. In 2022, the crop harvest for all major grains and oilseeds is expected to decline by around 40 percent as a result of Russia's occupation of eastern and southern Ukraine—the Kharkiv, Donetsk, and Kherson regions (U.S. Department of Agriculture and CNN). Russia targeted critical civilian infrastructure, such as bridges, railways, power generation, gas supply and storage, food warehouses, roads, silos, and ports. Industrial-scale looting of farms' grain stocks and machinery has occurred in the occupied regions (Ministry of Economy of Ukraine and *Financial Times*). Since late February to early June 2022, Russia has seized between 400,000 and 500,000 tons of grain from occupied territories. Some Ukrainian farms have been hit by air strikes and artillery fire (*Financial Times* and CNN).

On July 22, 2022, under the Black Sea Grain Initiative, Russia and Ukraine signed separate accords with the United Nations (UN) and Turkey to reopen Ukraine's Black Sea ports. The agreements were able to release grain exports to help ease the international food crisis caused by Russia's invasion of Ukraine. In addition to grain, the deal to release exports covers grain-related products, including foodstuffs and fertilizers. Russia also signed a separate memorandum of understanding with the UN to facilitate the export of Russian fertilizer. On August 1, 2022, after Russia relaxed the Black Sea blockade, Ukraine's first grain ship sailed carrying 26,000 tons of corn destined to Tripoli, Lebanon (*Financial Times*).

Ukraine Grain Transportation

Alternative export routes to Black Sea Ports. Alternative routes may still be needed to export an estimated 30-40 mmt of Ukrainian grain in 2022. This estimation is based on the 49.5 mmt of grain (including wheat, corn, barley, oats, and soybeans) exported via Ukrainian sea ports in 2021. Prior to the signing of the Black Sea Grain initiative, the Russian occupation had closed all traditional Ukrainian export routes, forcing the Ukrainian Government and exporters to seek alternatives. Ukraine lost access to four of its ports in the Black and Azov seas—Mariupol, Berdyansk, Kherson, and Skadovsk—which accounted for 5.6 percent of Ukraine's total grain exports in 2021. Additionally, the other Black Sea ports in the Mykolaiv basin (Mykolaiv and Olvia) are also inaccessible. Under the Black Sea Grain Initiative, three ports—Odesa, Chornomorsk, and Pivdennyi—have now reopened, but alternative routes may still be required given ongoing uncertainties in the region.

Since the invasion, most of the cargo-flow from Ukraine has shipped to major export markets by rail to Poland's Port of Gdansk or by barge to Romania's Port of Constanta (AgriCensus Daily Report). According to Ukraine's infrastructure minister, all the activities to export through the alternative routes will not cover even 20 percent of what Ukraine could do through the Black Sea ports. Russia has repeatedly bombed the alternative routes, including those leading to Romania by road or rail. From Romania, grain is loaded on barges that sail down the Danube and into the Black Sea (*Financial Times*).

Like shipping by sea, hauling grain by rail to western railroads presents its own challenges. Because the gauge, or gap between tracks, on Ukrainian railway lines is wider than that of its European neighbors, border crossings are laborious and time consuming: either cargo must be fully unloaded and reloaded on to a new train, or else each wagon must be transferred on to a different set of wheels (*Financial Times*). Although the cost of delivering Ukrainian grain has increased, shippers still need to offer a small discount to compete in the global market. Farmers absorb the cost of that discount (*AgriCensus Daily Report* and CFTS).

The European Commission is finalizing a plan called *EU-Ukraine Solidarity Lanes* to facilitate land exports of Ukraine's stocks of food to international markets and global supply chains. The plan's short-term, major components include the following:

- Adding freight rolling stock, vessels, and trucks;
- Increasing capacity of transport networks and transshipment terminals;
- Enhancing flexibility of customs operations and other inspections;
- Storing goods in EU countries;
- Securing bilateral trade; and
- Implementing technical and bureaucratic initiatives to expedite the shipping of some of Ukraine's key exports: vegetable oils, corn, and wheat. (European Commission, European Sources Online and Bloomberg).

In the medium to long-term time periods, the Commission will also work on establishing new infrastructure connections whenever the reconstruction of Ukraine is able to begin.

For Ukrainian grain, three key alternative routes considered so far are as follows:

- Danube River transportation and roads toward the ports of the western Black Sea coast (ports of Romania and Bulgaria);
- Rail transportation for the western border crossings to the EU ports of the Baltic, North, and Mediterranean Seas—despite the fact these will involve time-consuming maneuvers at the borders where track gauges change;

- Outer road transshipment from truck to barge to vessels at the estuary ports of Danube River (ports of Izmail, Reni, and Ust-Dunaysk) or Constanta port in Romania (*Financial Times* and Interfax-Ukraine). As of May 4, 2022, more than 30,000 wagons were stuck at the borders with Romania, Moldova, and Poland. The average waiting time for border crossing is 19 days.

In general, each of the above mentioned alternative supply routes are affected by military actions and limited by the factors in table 1c.

Table 1c. Alternative Ukrainian export route limitations

Factors	Challenges
Martial law and military actions	• Curfew stops of trucks in the middle of the country (checkpoints), as well as at transition points • Seizure of trucks for military purposes • Intentional air strikes against oil processing plants and petroleum warehouses, causing fuel deficits
Infrastructure and fleet	• Different standards of railway gauge in Ukraine and the European Union (EU) and the need for additional transshipment or wagon-buggy change • Deficit of railway grain hoppers in the EU • Low capacity of port infrastructure • Insufficient number of wagons and locomotives for transporting agricultural products • Danube ports' lack of barges • Damage to railway infrastructure necessitating detours • Damaged and destroyed depos and wagon-repair facilities, which complicate maintenance and repair of the fleet
Procedures and rules	• Prolonged customs clearance and inspection of goods at the border • Quotas limiting entry of trucks into EU countries • High environmental standards for trucks (Euro-5, Euro-6) • Prolonged phytosanitary and veterinary inspection procedures in EU countries during transit of goods

Source: Prepared by Centre for Transport Strategies with data compiled from Ministry of Agriculture of Ukraine, Ministry of Infrastructure of Ukraine, and Ukrainian Railways (Ukrzaliznytsia).

Ukraine's Ministry of Agriculture states that 75 percent of throughput capacity over the western border is related to railways. According to Ukrainian Railways data, the western border has 13 railway border-crossing facilities: four with Poland, two with Hungary, two with Slovakia, two with Romania, and three with Moldova. Under good conditions, these facilities could potentially handle a throughput of 1.3 mmt of grain cargo per month. However, under recent conditions, according to Ukraine's data, these facilities processed less than 600,000 mt of grain in April—less than half of their potential capacity.

Most of the shortfall reflects the limitations of European railways. Currently, the railways lack the operations and infrastructure needed to process more than the volumes of bulk cargo the railways handled in the past. More specifically, European carriers lack locomotives and wagons. Some haulages are overloaded, and not enough transshipment terminals on the borders are ready to reload from wider (1,520 milimiters (mm)-gauge) wagons onto narrower (1,435 mm-gauge) wagons. European ports have limited warehouse availability, channel depths, and terminal capacities. All of these logistical constraints have played a role in lowering Ukraine's grain exports since Russia's invasion. In June 2022, Ukraine exported only 1.79 mmt of grain—a sharp decline from the country's 5 mmt monthly average in 2021.

Nonetheless, several signs indicate alternative logistics are already beginning to fall into place. At the end of April, the first Panamax vessel was loaded with Ukrainian corn in the Port of Constanta. Likewise, at the beginning of May, a grain unit train completed the first rail delivery of grain to Austria. Additionally, Ukrainian Railways recently launched strategic cooperation projects with European partners: as part of a railway "Grain Bridge" project, German DB Cargo AG will replace maritime transport to ports blocked by Russia. The project will redirect from maritime to rail transport the deliveries of Ukrainian grain and other commodities to ports. It will also backhaul EU agricultural machinery to Ukraine (Railway Supply). Ukrainian Railways has also launched a partnership with Polish PKP.

Market Developments in Ukraine

"On Inland Water Transport" law (number 1054). Effective January 1, 2022, the "On Inland Water Transport" law (law 1054) provides for the creation of the State Fund for the Development of Inland Water Ways (IWW) to ensure the Dnipro River navigable locks are kept in good working order for transporting international cargo. Currently, more than 75 percent of the locks are deteriorated.

- The IWW are not subject to maritime regulations, such as International Security Management (ISM), The International Convention for the Prevention of Pollution from Ships (MARPOL), etc.
- New training and education in inland shipping will be conducted on three levels:
  - Level 1: vocational for the operational nautical crew (boatman and helmsman)
  - Level 2: college for assistant boatmasters (1st and 2nd officers)
  - Level 3: academy for management (boatmaster/captain full license)

    In accord with European Union (EU) Directives on professional qualifications, the educational programs will be changed to competency-based training. Furthermore, experience-level equivalents will be specified for nautical operational and management functions on board, special authorization for radar, waterways with maritime character, liquefied natural gas (LNG), and passenger transport/river cruise. The new EU directive, including the certification process, has been introduced into Ukrainian national legislation and is pending government approval.
- Law 1054 provides for domestic shipbuilding incentives and the recovery of Ukrainian enterprises.
- The Inland Water Ways (IWW) freight market has been liberalized to allow river passage of vessels under a foreign flag, including cabotage.[7]
- Inland navigation vessels have been granted free passage through locks and partial exemption from taxes in seaports. According to law 1054, the use of IWW is free of charge for IWW vessels. Also, when in cabotage in the seaports, the IWW vessels with a draft of up to 4.5 meters do not pay administrative channel, tonnage, and sanitary fees. They also do not pay Dnipro channel fees when taking international routes.

Law on multimodal transportation (law 4258). On November 11, 2021, the Verkhovna Rada (Ukraine's unicameral parliament) approved law 4258 on multimodal transportation.[8] Before then, there had been no official regulation of multimodal transportation. The main points of the law are as follows:

- The law introduces, in Ukraine, the legal structures needed to facilitate the seamless multimodal transportation of goods. The law will regulate multimodal terminals and multimodal transportation, as well as the relationship between multimodal operators and customers. Providing a basis for official documents, the law also defines the multimodal transportation

7 Cabotage laws govern foreign maritime activity in domestic coastal trades.

8 Verkhovna Rada is or just called Rada, is the Ukranian unicameral parliament.

agreement, its essential conditions, rights and obligations of its parties, and basic principles regarding this type of transportation.
- Use of a single transportation agreement is established among the participants of multimodal transportation governing all stages of transportation. As accepted by all parties, the agreement allows use of only one transportation contract document, regardless of changing modes of transport.
- When providing a multimodal freight service, the multimodal freight operator must accept liability for the cargo from the moment the operator accepts the goods on the multimodal transport until the moment of delivery.
- To receive compensation for lost, damaged, or late cargo, the customer does not need to define at what stage of transport the damage, loss, or delay occurred or which carrier did not fulfill its obligation to deliver undamaged goods on time.

Labor market. As of July 2022 when this report was published, data on the number of employees in the agricultural sector for 2021 were not yet available. Yet because the country managed to reap a record harvest and road traffic increased from 2020 to 2021, it appears the sector did not suffer from a substantial worker shortage as it did in 2020.

Although Russia's war on Ukraine has led to a certain shortage of agricultural workers, industry sources indicate the shortage was not significant and did not affect the planting. Unfortunately, accurate data cannot be collected at this time.

For more information, contact Delmy L. Salin at delmy.salin@usda.gov.

Ukraine Grain Transportation

Table 2a. Average costs of transporting Ukrainian wheat from the Black Sea ports to Egypt and Indonesia, 2020-21

	To Alexandria, Egypt					
	Central Ukraine[1] - Odesa[2]			Central Ukraine[1] - Mykolaiv[2]		
	—US$/mt—		% Change	—US$/mt—		% Change
	2020	2021	2020-21	2020	2021	2020-21
Truck	6.37	7.09	11.3	6.37	7.09	11.3
Rail[3]	12.82	11.89	-7.2	9.63	8.89	-7.6
Ocean	11.92	25.88	117.1	13.71	28.63	108.8
Total transportation	31.11	44.86	44.2	29.71	44.61	50.1
Farm price[4]	227.60	273.08	20.0	227.60	273.08	20.0
Landed cost	258.72	317.94	22.9	257.31	317.69	23.5
Transport % of landed cost	12.1	14.0	15.6	11.6	14.0	20.1

	To Ciwandan/Cigading, Indonesia					
	Central Ukraine[1] - Odesa[2]			Central Ukraine[1] - Mykolaiv[2]		
	—US$/mt—		% Change	—US$/mt—		% Change
	2020	2021	2020-21	2020	2021	2020-21
Truck	6.37	7.09	11.3	6.37	7.09	11.3
Rail[3]	12.82	11.89	-7.2	9.63	8.89	-7.6
Ocean	29.71	54.92	84.9	31.50	57.67	83.1
Total transportation	48.90	73.90	51.1	47.50	73.65	55.0
Farm price[4]	227.60	273.08	20.0	227.60	273.08	20.0
Landed cost	276.51	346.98	25.5	275.10	346.73	26.0
Transport % of landed cost	17.8	21.3	19.3	17.4	21.2	21.9

[1]Central Ukraine producing regions are as follows = Cherkasy, Chernihiv, Kherson, Kirovohrad, Kyiv, Mykolaiv, Odesa, Poltava, and Sumy provinces.
[2]Export ports.
[3]Rail rates include the cost of delivery to the railway station and the cost of renting a grain hopper. However, rail rates do not include the cost of moving and positioning rail cars at the elevator and port, railway station fees, security service from loading to discharging port, or freight-forwarding service. (Any or all of these items could exceed the rail tariff rate.) Rail rates are estimated by using specialized software "TM-Karta" in accordance with Ukrainian Railways (Ukrzaliznytsia) tariff regulation.
[4]Farm price = elevator price − handling costs − farm-to-elevator transportation.
Note: mt = metric ton.
Source: Centre for Transport Strategies (CFTS) Kyiv, Ukraine, and USDA, Agricultural Marketing Service.

Ukraine Grain Transportation

Table 2b. Average costs of transporting Ukrainian corn from the Black Sea ports to Egypt and China, 2020-21

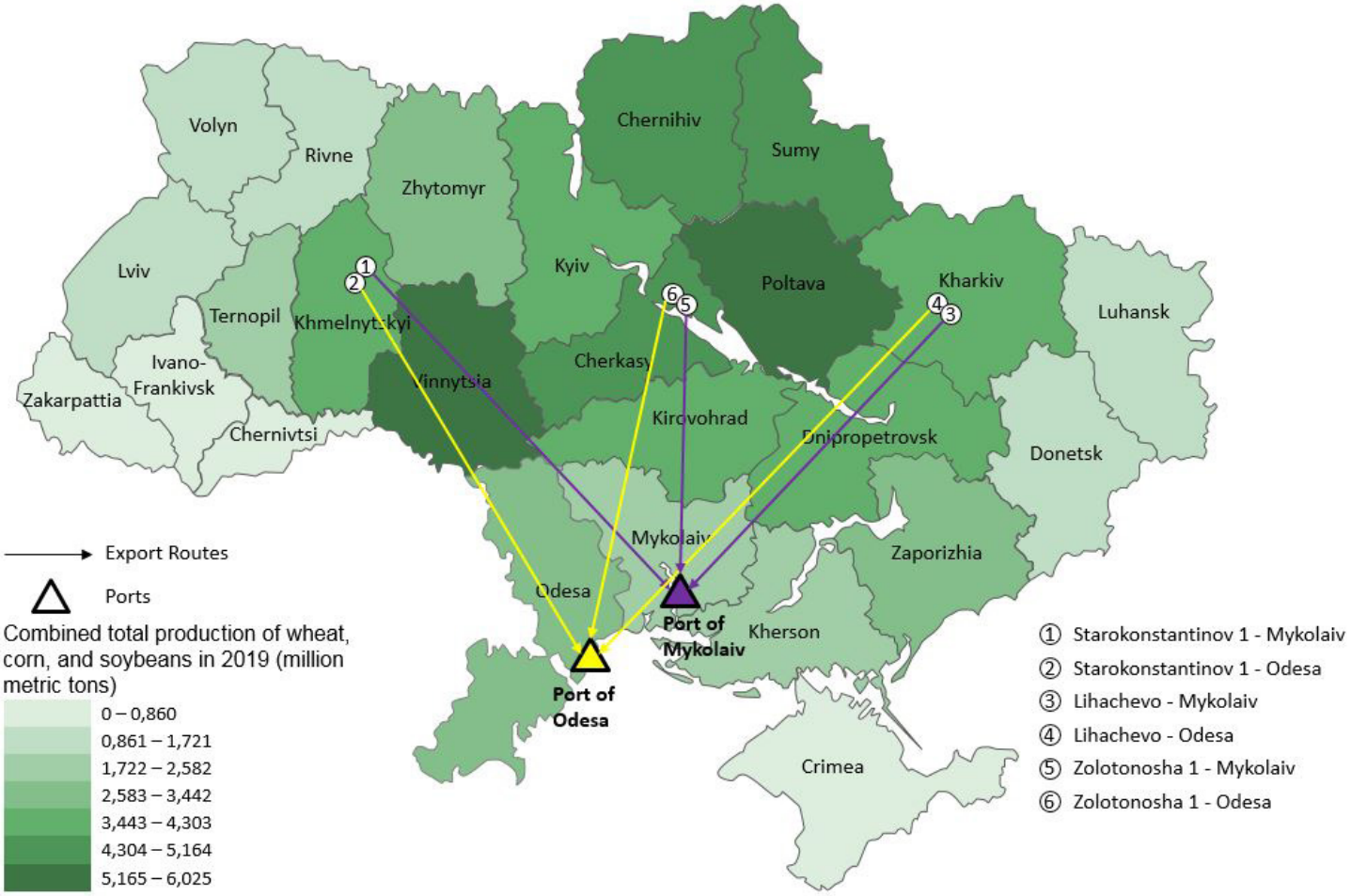
	To Alexandria, Egypt					
	Central Ukraine[1] - Odesa[2]			Central Ukraine[1] - Mykolaiv[2]		
	—US$/mt—		% Change	—US$/mt—		% Change
	2020	2021	2020-21	2020	2021	2020-21
Truck	6.37	7.09	11.3	6.37	7.09	11.3
Rail[3]	12.82	11.89	-7.2	9.63	8.89	-7.6
Ocean	11.92	25.88	117.1	13.71	28.63	108.8
Total transportation	31.11	44.86	44.2	29.71	44.61	50.1
Farm price[4]	193.72	270.12	39.4	193.72	270.12	39.4
Landed cost	224.83	314.98	40.1	223.43	314.72	40.9
Transport % of landed cost	14.0	14.3	1.7	13.5	14.2	5.4

	To Shanghai, China					
	Central Ukraine[1] - Odesa[2]			Central Ukraine[1] - Mykolaiv[2]		
	—US$/mt—		% Change	—US$/mt—		% Change
	2020	2021	2020-21	2020	2021	2020-21
Truck	6.37	7.09	11.3	6.37	7.09	11.3
Rail[3]	12.82	11.89	-7.2	9.63	8.89	-7.6
Ocean	29.25	50.96	74.2	32.00	53.71	67.8
Total transportation	48.45	69.94	44.4	48.00	69.69	45.2
Farm price[4]	193.72	270.12	39.4	193.72	270.12	39.4
Landed cost	242.16	340.06	40.4	241.72	339.81	40.6
Transport % of landed cost	20.3	20.6	1.6	20.1	20.5	2.2

[1]Central Ukraine producing regions are as follows = Cherkasy, Chernihiv, Kherson, Kirovohrad, Kyiv, Mykolaiv, Odesa, Poltava, and Sumy provinces.
[2]Export ports.
[3]Rail rates include the cost of delivery to the railway station and the cost of renting a grain hopper. However, rail rates do not include the cost of moving and positioning rail cars at the elevator and port, railway station fees, security service from loading to discharging port, or freight-forwarding service. (Any or all of these items could exceed the rail tariff rate.) Rail rates are estimated by using specialized software "TM-Karta" in accordance with Ukrainian Railways (Ukrzaliznytsia) tariff regulation.
[4]Farm price = elevator price − handling costs − farm-to-elevator transportation.
Note: mt = metric ton.
Source: Centre for Transport Strategies (CFTS) Kyiv, Ukraine, and USDA, Agricultural Marketing Service.

Ukraine Grain Transportation

Figure 2. Routes[1] and wheat, corn, and soybean regions considered in the Ukrainian grain export transportation indicator[2]

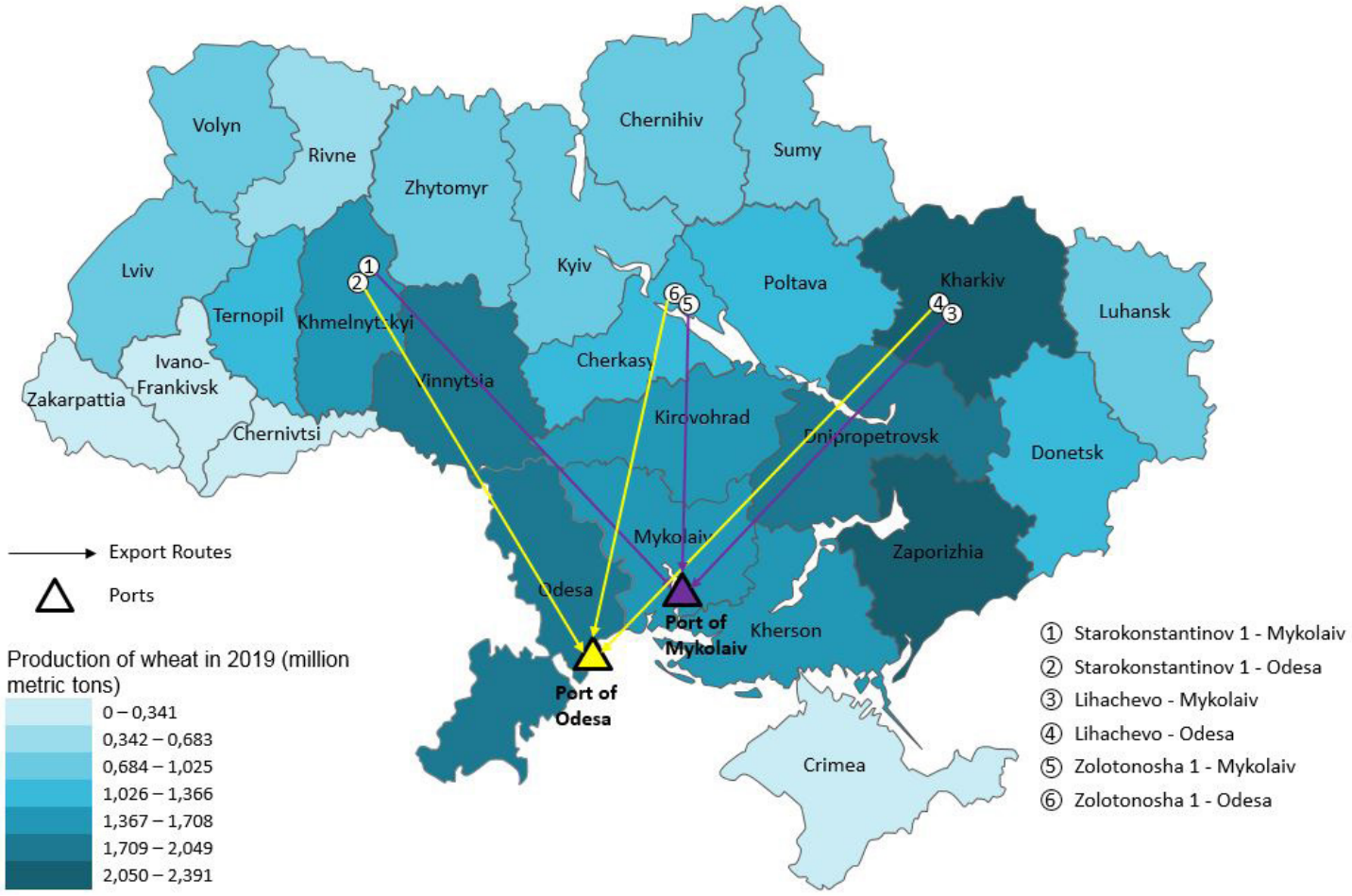


[1]Table 5 on page 17 provides additional information for routes 1-6.

[2]Regions comprised roughly 100 percent of wheat, corn, and soybean production, 2019.

Source: Centre for Transport Strategies (CFTS) Kyiv, Ukraine, and USDA, Agricultural Marketing Service.

Figure 3. Routes[1] and wheat regions considered in the Ukrainian grain export transportation indicator[2]

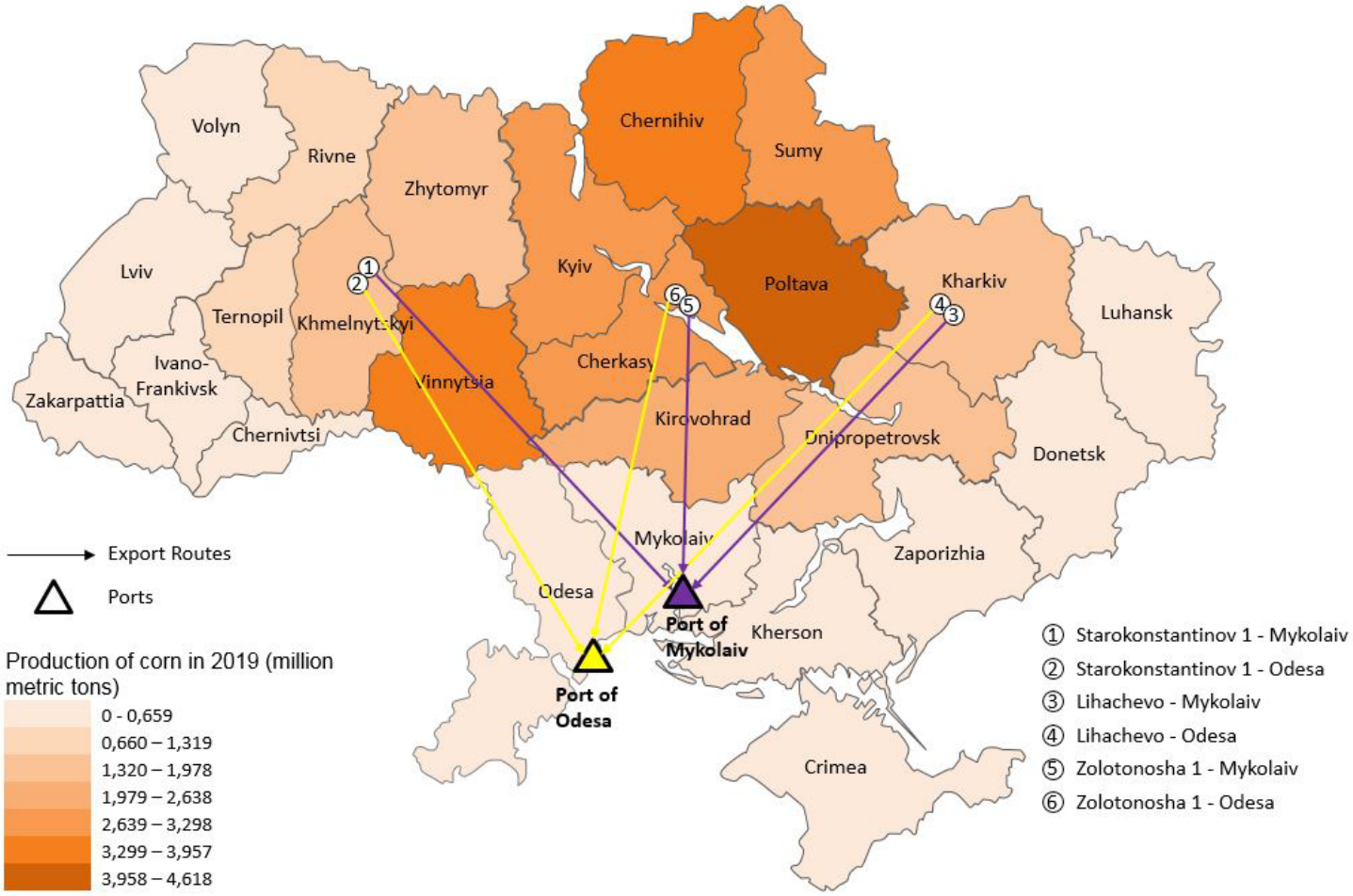


[1]Table 5 on page 17 provides additional information for routes 1-6.

[2]Regions comprised roughly 100 percent of wheat, corn, and soybean production, 2019.

Source: Centre for Transport Strategies (CFTS) Kyiv, Ukraine, and USDA, Agricultural Marketing Service.

Figure 4. Routes[1] and corn regions considered in the Ukrainian grain export transportation indicator[2]

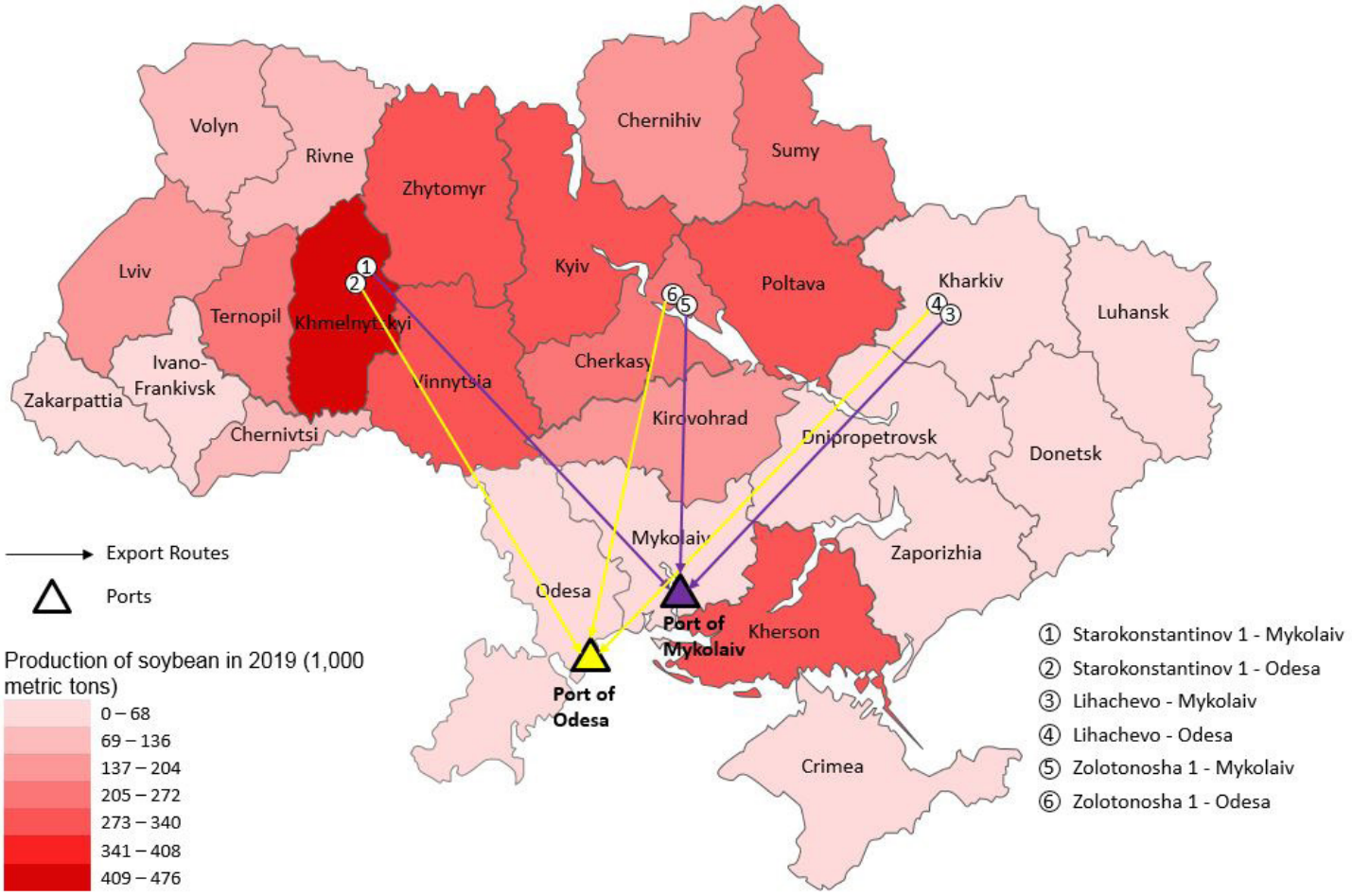


[1]Table 5 on page 17 provides additional information for routes 1-6.

[2]Regions comprised roughly 100 percent of wheat, corn, and soybean production, 2019.

Source: Centre for Transport Strategies (CFTS) Kyiv, Ukraine, and USDA, Agricultural Marketing Service.

Figure 5. Routes[1] and soybean regions considered in the Ukrainian grain export transportation indicator[2]



[1]Table 5 on page 17 provides additional information for routes 1-6.
[2]Regions comprised roughly 100 percent of wheat, corn, and soybean production, 2019.
Source: Centre for Transport Strategies (CFTS) Kyiv, Ukraine, and USDA, Agricultural Marketing Service.

Ukraine Grain Transportation

Table 3. Quarterly costs of transporting Ukrainian wheat from the Black Sea ports to Egypt and Indonesia, 2021

	To Alexandria, Egypt									
	Central Ukraine[1] - Odesa[2] —US$/mt—					Central Ukraine[1] - Mykolaiv[2] —US$/mt—				
	1st qtr. 2021	2nd qtr. 2021	3rd qtr. 2021	4th qtr. 2021	Average 2021	1st qtr. 2021	2nd qtr. 2021	3rd qtr. 2021	4th qtr. 2021	Average 2021
Truck	6.13	6.65	6.71	8.88	7.09	6.13	6.65	6.71	8.88	7.09
Rail[3]	10.09	8.98	11.76	16.76	11.89	7.54	6.70	8.79	12.54	8.89
Ocean	19.50	21.50	31.50	31.00	25.88	21.67	24.17	35.00	33.67	28.63
Total transportation	35.72	37.12	49.97	56.63	44.86	35.33	37.52	50.50	55.08	44.61
Farm price[4]	279.55	240.32	263.81	308.63	273.08	279.55	240.32	263.81	308.63	273.08
Landed cost	315.27	277.44	313.78	365.27	317.94	314.88	277.83	314.31	363.72	317.69
Transport % of landed cost	11.3	13.4	15.9	15.5	14.0	11.2	13.5	16.1	15.1	14.0
	To Ciwandan/Cigading, Indonesia									
	Central Ukraine[1] - Odesa[2] —US$/mt—					Central Ukraine[1] - Mykolaiv[2] —US$/mt—				
	1st qtr. 2021	2nd qtr. 2021	3rd qtr. 2021	4th qtr. 2021	Average 2021	1st qtr. 2021	2nd qtr. 2021	3rd qtr. 2021	4th qtr. 2021	Average 2021
Truck	6.13	6.65	6.71	8.88	7.09	6.13	6.65	6.71	8.88	7.09
Rail[3]	10.09	8.98	11.76	16.76	11.89	7.54	6.70	8.79	12.54	8.89
Ocean	43.33	48.33	69.33	58.67	54.92	45.50	51.00	72.83	61.33	57.67
Total transportation	59.55	63.96	87.80	84.30	73.90	59.17	64.35	88.33	82.75	73.65
Farm price[4]	279.55	240.32	263.81	308.63	273.08	279.55	240.32	263.81	308.63	273.08
Landed cost	339.10	304.27	351.61	392.93	346.98	338.72	304.67	352.14	391.38	346.73
Transport % of landed cost	17.6	21.0	25.0	21.5	21.3	17.5	21.1	25.1	21.1	21.2

[1]Central Ukraine producing regions are as follows = Cherkasy, Chernihiv, Kherson, Kirovohrad, Kyiv, Mykolaiv, Odesa, Poltava, and Sumy provinces.
[2]Export ports.
[3]Rail rates include the cost of delivery to the railway station and the cost of renting a grain hopper. However, rail rates do not include the cost of moving and positioning rail cars at the elevator and port, railway station fees, security service from loading to discharging port, or freight-forwarding service. (Any or all of these items could exceed the rail tariff rate.) Rail rates are estimated by using specialized software "TM-Karta" in accordance with Ukrainian Railways (Ukrzaliznytsia) tariff regulation.
[4]Farm price = elevator price − handling costs − farm-to-elevator transportation.
Note: qtr = quarter. mt = metric ton.
Source: Centre for Transport Strategies (CFTS) Kyiv, Ukraine, and USDA, Agricultural Marketing Service.

Ukraine Grain Transportation

Table 4. Quarterly costs of transporting Ukrainian corn from the Black Sea ports to Egypt and China, 2021

	To Alexandria, Egypt									
	Central Ukraine[1] - Odesa[2] —US$/mt—					Central Ukraine[1] - Mykolaiv[2] —US$/mt—				
	1st qtr. 2021	2nd qtr. 2021	3rd qtr. 2021	4th qtr. 2021	Average 2021	1st qtr. 2021	2nd qtr. 2021	3rd qtr. 2021	4th qtr. 2021	Average 2021
Truck	6.13	6.65	6.71	8.88	7.09	6.13	6.65	6.71	8.88	7.09
Rail[3]	10.09	8.98	11.76	16.76	11.89	7.54	6.70	8.79	12.54	8.89
Ocean	19.50	21.50	31.50	31.00	25.88	21.67	24.17	35.00	33.67	28.63
Total transportation	35.72	37.12	49.97	56.63	44.86	35.33	37.52	50.50	55.08	44.61
Farm price[4]	276.68	290.51	250.97	262.30	270.12	276.68	290.51	250.97	262.30	270.12
Landed cost	312.40	327.64	300.93	318.93	314.98	312.01	328.03	301.47	317.38	314.72
Transport % of landed cost	11.4	11.3	16.6	17.8	14.3	11.3	11.4	16.8	17.4	14.2
	To Shanghai, China									
	Central Ukraine[1] - Odesa[2] —US$/mt—					Central Ukraine[1] - Mykolaiv[2] —US$/mt—				
	1st qtr. 2021	2nd qtr. 2021	3rd qtr. 2021	4th qtr. 2021	Average 2021	1st qtr. 2021	2nd qtr. 2021	3rd qtr. 2021	4th qtr. 2021	Average 2021
Truck	6.13	6.65	6.71	8.88	7.09	6.13	6.65	6.71	8.88	7.09
Rail[3]	10.09	8.98	11.76	16.76	11.89	7.54	6.70	8.79	12.54	8.89
Ocean	39.50	46.67	63.67	54.00	50.96	42.25	49.42	66.42	56.75	53.71
Total transportation	55.72	62.29	82.13	79.63	69.94	55.92	62.77	81.92	78.17	69.69
Farm price[4]	276.68	290.51	250.97	262.30	270.12	276.68	290.51	250.97	262.30	270.12
Landed cost	332.40	352.80	333.10	341.93	340.06	332.60	353.28	332.88	340.47	339.81
Transport % of landed cost	16.8	17.7	24.7	23.3	20.6	16.8	17.8	24.6	23.0	20.5

[1]Central Ukraine producing regions are as follows = Cherkasy, Chernihiv, Kherson, Kirovohrad, Kyiv, Mykolaiv, Odesa, Poltava, and Sumy provinces.
[2]Export ports.
[3]Rail rates include the cost of delivery to the railway station and the cost of renting a grain hopper. However, rail rates do not include the cost of moving and positioning rail cars at the elevator and port, railway station fees, security service from loading to discharging port, or freight-forwarding service. (Any or all of these items could exceed the rail tariff rate.) Rail rates are estimated by using specialized software "TM-Karta" in accordance with Ukrainian Railways (Ukrzaliznytsia) tariff regulation.
[4]Farm price = elevator price − handling costs − farm-to-elevator transportation.
Note: qtr = quarter. mt = metric ton.
Source: Centre for Transport Strategies (CFTS) Kyiv, Ukraine, and USDA, Agricultural Marketing Service.

Ukraine Grain Transportation

Table 5. Quarterly rail rates for selected Ukrainian grain and soybean export transportation routes, 2021

Route #	Origin (reference city)[1]	Destination	Distance (miles)	Share (%)[2]	Freight price (US$/mt/100 miles)[3]				
					1st qtr	2nd qtr	3rd qtr	4th qtr	Avg
1	Western Ukraine (Khmelnitskii, station Starokonstantinov 1)	Mykolaiv	501	29.7	2.81	2.48	3.30	4.78	3.34
2	Western Ukraine (Khmelnitskii, station Starokonstantinov 1)	Odesa	343		2.94	2.62	3.43	4.89	3.47
3	Eastern Ukraine (Kharkiv, station Lihachevo)	Mykolaiv	340	18.8	2.97	2.64	3.46	4.93	3.50
4	Eastern Ukraine (Kharkiv, station Lihachevo)	Odesa	521		2.81	2.49	3.20	4.59	3.27
5	Central Ukraine (Cherkasy, station Zolotonosha 1)	Mykolaiv	240	51.5	3.14	2.79	3.66	5.23	3.71
6	Central Ukraine (Cherkasy, station Zolotonosha 1)	Odesa	341		2.96	2.63	3.45	4.91	3.49

[1]Although each origin region comprises several cities, the major station at the center of each region is considered as a reference to establish the freight price. Western Ukraine producing regions are as follows = Chernivtsi, Ivano-Frankivsk, Khmelnitskii, Lviv, Rivne, Ternopil, Vinnytsia, Volyn, Zakarpattia, and Zhytomyr provinces. Eastern Ukraine producing regions are as follows = Dnipropetrovsk, Donetsk, Kharkiv, Luhansk, and Zaporizhia provinces. Central Ukraine producing regions are as follows = Cherkasy, Chernihiv, Kherson, Kirovohrad, Kyiv, Mykolaiv, Odesa, Poltava, and Sumy provinces.

[2]Share is measured as a percentage of total production and illustrates the production in the region.

[3]Rail rates include the cost of delivery to the railway station and the cost of renting a grain hopper. However, rail rates do not include the cost of moving and positioning rail cars at the elevator and port, railway station fees, security service from loading to discharging port, or freight-forwarding service. (Any or all of these items could exceed the rail tariff rate.) Rail rates are estimated by using specialized software "TM-Karta" in accordance with Ukrainian Railways (Ukrzaliznytsia) tariff regulation.

Average monthly exchange rate from the National Bank of Ukraine was used to convert Ukrainian Hryvnia to U.S. dollars.

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

Source: Centre for Transport Strategies (CFTS) Kyiv, Ukraine, and USDA, Agricultural Marketing Service.

Ukraine Grain Transportation

Table 6. Monthly Ukrainian grain and oilseeds export truck transportation cost index

Month	Freight price (US$/mt/100 miles)	Index variation (%) (Base: prior month)	Index value (Base: Jan. 05 = 100)
Jan-19	18.65	0.0	100.00
Feb-19	19.15	2.6	102.65
Mar-19	16.75	-12.5	89.81
Apr-19	14.92	-10.9	79.99
May-19	15.16	1.6	81.30
Jun-19	15.09	-0.5	80.93
Jul-19	15.53	2.9	83.28
Aug-19	15.84	2.0	84.94
Sep-19	16.15	1.9	86.58
Oct-19	16.12	-0.2	86.45
Nov-19	18.47	14.5	99.01
Dec-19	17.80	-3.6	95.42
Jan-20	17.41	-2.2	93.36
Feb-20	15.94	-8.5	85.45
Mar-20	16.43	3.1	88.10
Apr-20	13.58	-17.4	72.79
May-20	13.57	0.0	72.78
Jun-20	13.31	-1.9	71.39
Jul-20	10.74	-19.3	57.58
Aug-20	7.63	-29.0	40.91
Sep-20	9.87	29.4	52.92
Oct-20	7.77	-21.3	41.66
Nov-20	8.14	4.8	43.64
Dec-20	8.70	6.9	46.64
Jan-21	6.22	-28.5	33.35
Feb-21	6.99	12.4	37.48
Mar-21	9.90	41.6	53.08
Apr-21	8.70	-12.1	46.64
May-21	7.41	-14.8	39.73
Jun-21	11.47	54.8	61.50
Jul-21	13.84	20.7	74.22
Aug-21	14.91	7.7	79.92
Sep-21	18.67	25.3	100.12
Oct-21	20.94	12.1	112.26
Nov-21	22.83	9.0	122.40
Dec-21	16.87	-26.1	90.44

Source: Centre for Transport Strategies (CFTS) Kyiv, Ukraine, and USDA, Agricultural Marketing Service.

Ukraine Grain Transportation

Table 7. Quarterly ocean freight rates for shipping grain and soybeans from selected Ukrainian ports (US$/metric ton)

Cargo	Port	Destination	1st qtr 2020	2nd qtr 2020	3rd qtr 2020	4th qtr 2020
Wheat	Mykolaiv	Alexandria, Egypt[1]	13.08	10.58	15.00	16.17
Wheat	Mykolaiv	Ciwandan/Cigading, Indonesia[2]	32.42	25.25	34.75	33.58
Wheat	Odesa	Alexandria, Egypt[1]	11.33	8.83	13.08	14.42
Wheat	Odesa	Ciwandan/Cigading, Indonesia[2]	30.67	23.50	32.83	31.83
Corn	Mykolaiv	Alexandria, Egypt[1]	13.08	10.58	15.00	16.17
Corn	Mykolaiv	Southern ports, China[2]	31.92	27.58	34.25	34.25
Corn	Odesa	Alexandria, Egypt[1]	11.33	8.83	13.08	14.42
Corn	Odesa	Southern ports, China[3]	29.17	24.83	31.50	31.50
Soybeans	Mykolaiv	Southern ports, China[3]	30.92	26.58	33.25	33.25
Soybeans	Odesa	Southern ports, China[3]	29.17	24.83	31.50	31.50
Cargo	**Port**	**Destination**	**1st qtr 2021**	**2nd qtr 2021**	**3rd qtr 2021**	**4th qtr 2021**
Wheat	Mykolaiv	Alexandria, Egypt[1]	13.08	10.58	15.00	16.17
Wheat	Mykolaiv	Ciwandan/Cigading, Indonesia[2]	32.42	25.25	34.75	33.58
Wheat	Odesa	Alexandria, Egypt[1]	11.33	8.83	13.08	14.42
Wheat	Odesa	Ciwandan/Cigading, Indonesia[2]	30.67	23.50	32.83	31.83
Corn	Mykolaiv	Alexandria, Egypt[1]	13.08	10.58	15.00	16.17
Corn	Mykolaiv	Southern ports, China[2]	31.92	27.58	34.25	34.25
Corn	Odesa	Alexandria, Egypt[1]	11.33	8.83	13.08	14.42
Corn	Odesa	Southern ports, China[3]	29.17	24.83	31.50	31.50
Soybeans	Mykolaiv	Southern ports, China[3]	30.92	26.58	33.25	33.25
Soybeans	Odesa	Southern ports, China[3]	29.17	24.83	31.50	31.50

[1]Vessel size = 25,000-30,000 metric ton.
[2]Vessel size = 50,000-55,000 metric ton.
[3]Vessel size = 60,000-70,000 metric ton.
Note: China's main southern ports include Shanghai, Ningbo, Shenzhen, and Guangdong. na = not available.
Source: Centre for Transport Strategies (CFTS) Kyiv, Ukraine, and USDA, Agricultural Marketing Service.

Ukraine Grain Transportation

Acknowledgments:

For data, regional information, and maps of Ukraine, the author would like to thank the Centre for Transport Strategies in Kyiv, Ukraine. The author is, also, grateful for comments and critiques by USDA's Office of the Chief Economist, USDA's Foreign Agricultural Service in Washington, DC, and the Office of Agricultural Affairs in Kyiv, Ukraine. Thanks, also, to USDA, Agricultural Marketing Service employees Maria Williams, editor, and Jessica Ladd, graphic designer.

Contact Information:

Delmy L. Salin
Senior Economist, Project Manager
delmy.salin@usda.gov
202.720.0833

Jessica Ladd
Graphic Analyst
jessica.ladd@usda.gov
202.720.6494

Data Sets (XLS files):

- Figure 1a. Ukrainian grain export truck cost index, 2020-21
- Figure 1b. U.S. vs. Urkrainian grain and oilseed exports by mode, 2021
- Table 1a. Tonnages and modal shares for Ukrainian grain and oilseed exports, 2018-21
- Table 1b. Ukrainian grain exports by port, 2021
- Table 2a. Average costs of transporting Ukrainian wheat from the Black Sea ports to Egypt and Indonesia, 2020-21
- Table 2b. Average costs of transporting Ukrainian corn from the Black Sea ports to Egypt and China, 2020-21
- Table 3. Quarterly costs of transporting Ukrainian wheat from the Black Sea ports to Egypt and Indonesia, 2021
- Table 4. Quarterly costs of transporting Ukrainian corn from the Black Sea ports to Egypt and China, 2021
- Table 5. Quarterly rail rates for selected Ukrainian grain and soybean export transportation routes, 2021
- Table 6. Monthly Ukrainian grain and oilseeds export truck transportation cost index
- Table 7. Quarterly ocean freight rates for shipping grain and soybeans from selected Ukrainian ports (US$/metric ton)

Preferred Citation:

Delmy Salin. August 2022. *Ukraine Grain Transportation*, U.S. Department of Agriculture, Agricultural Marketing Service. Web <http://dx.doi.org/10.9752/TS260.08-2022>

Photo Credit: USDA

USDA is an equal opportunity provider, employer, and lender.