

Ukraine Agriculture and Trade in Wartime: Results of 2023 and Prospects for 2024

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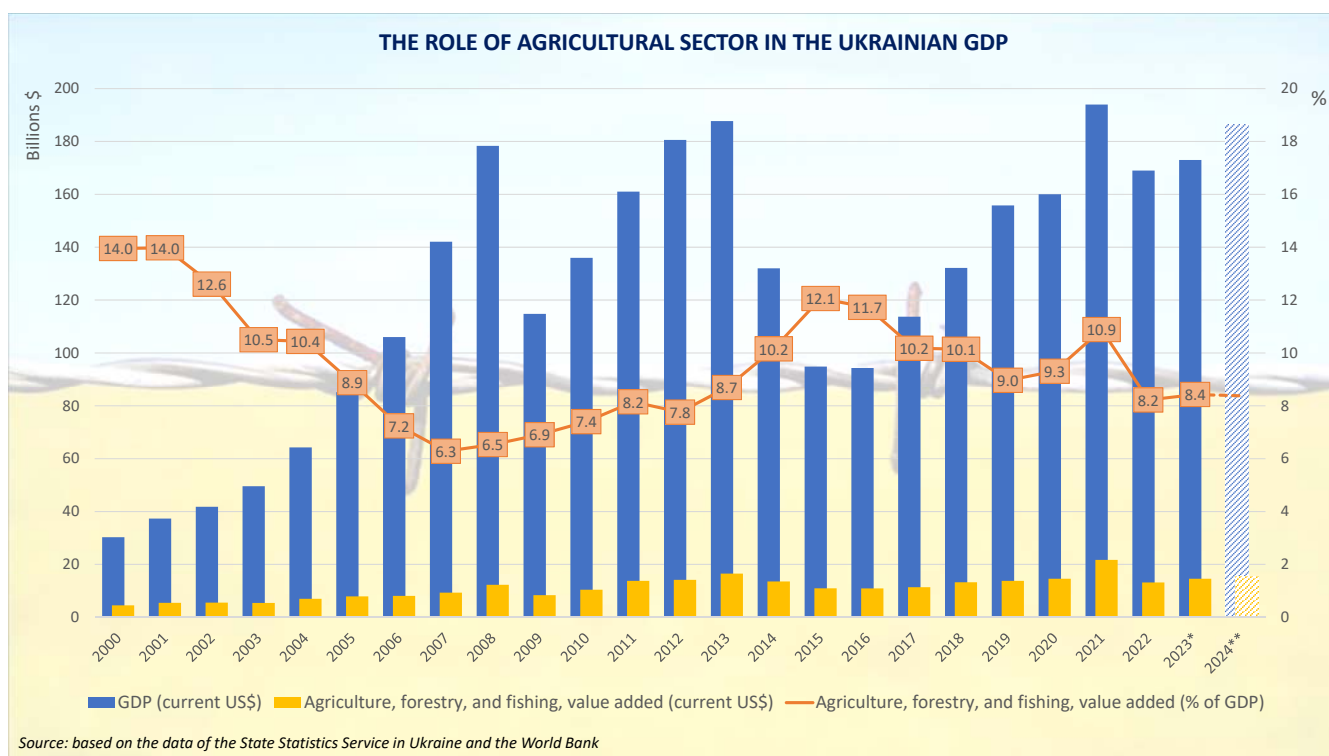
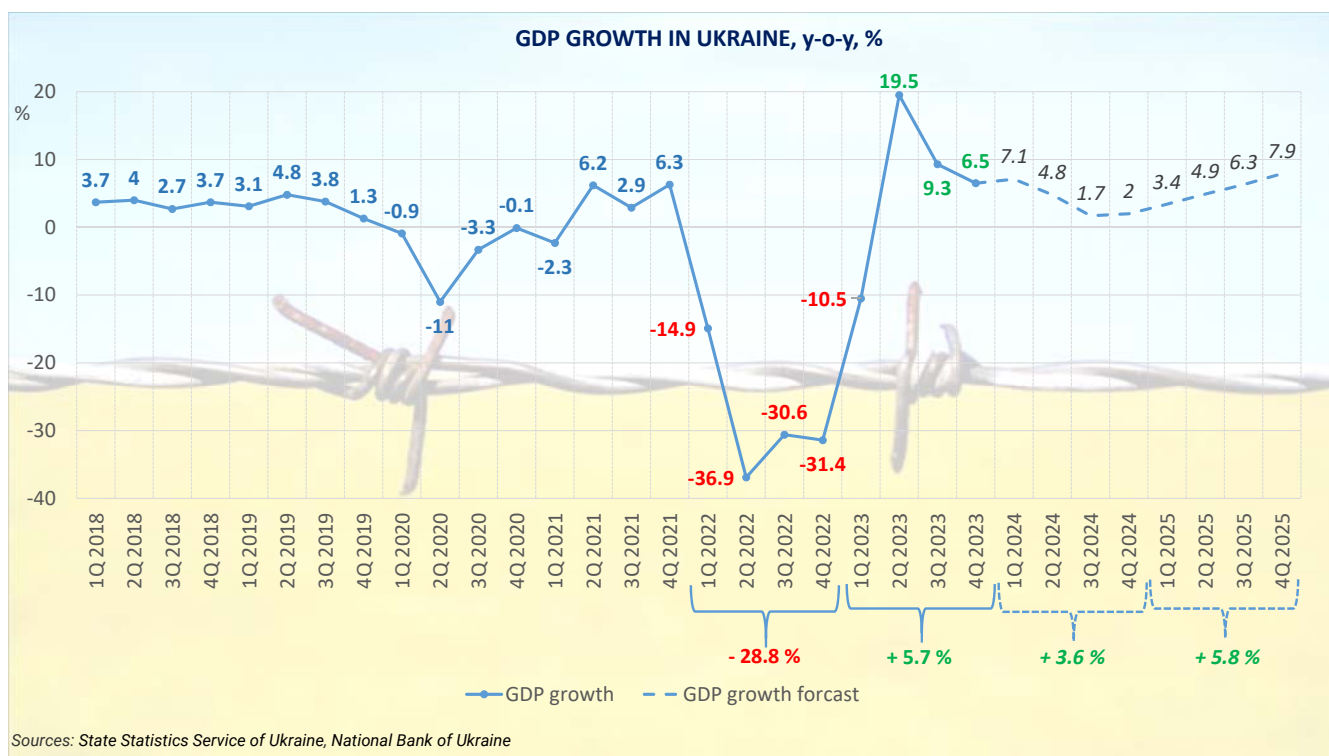
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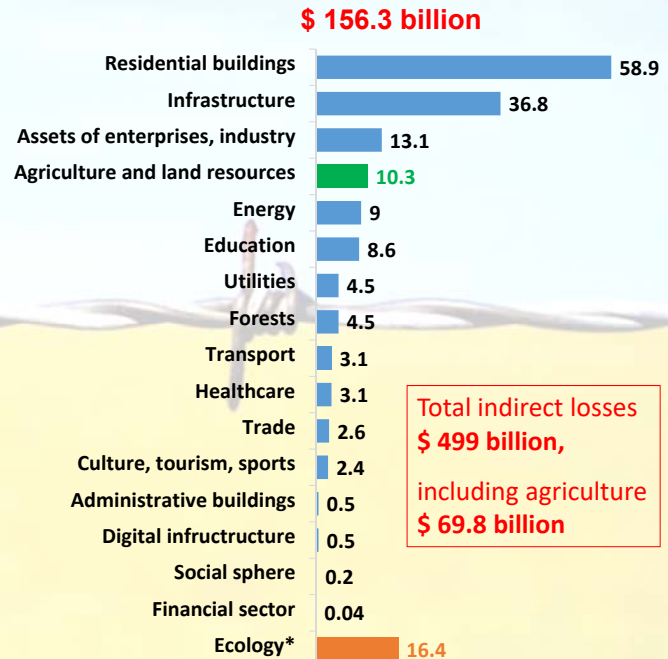
OUTLINE:

- Impact of the war on Ukrainian economy and agriculture
- Current state of grain export from Ukraine
- Market prices, freight rates and production costs of main crops in Ukraine
- Forecast of grain production and export from Ukraine





DIRECT DAMAGES TO UKRAINIAN ECONOMY, \$ billion

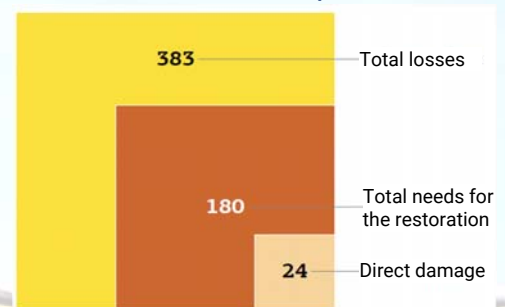


Source: based on data of the Kyiv School of Economics and the World Bank, February 2024

NEEDS FOR RESTORATION AND RECONSTRUCTION OF UKRAINIAN AGRICULTURE, \$ billions

| Category | Type of activities / investments | Total needs (2024–2033) | |
|---|--|-------------------------|-------------------------|
| | | as of February 24, 2023 | as of December 31, 2023 |
| Reconstruction needs | Reconstruction and replacement of damaged assets, machinery, inputs, and outputs | 9.321 | 9.402 |
| Service delivery restoration needs | Support for immediate agriculture production recovery | 1.870 | 6.122 |
| | Support for longer-term recovery of the agriculture sector | 14.500 | 35.513 |
| | Support for agricultural public institutions and programs to accelerate recovery, including for EU accession | 4.010 | 5.020 |
| Total | | 29.701 | 56.057 |

Losses and needs for the restoration of agriculture as a result of the Kakhovka HPP explosion, \$ million



Needs for demining farmland



\$1.8 thousand

the cost of complete demining of 1 hectare

274 thousand hectares demined in 2023,

208 thousand hectares returned to cultivation

Source: based on data of the World Bank, February 2024

TOTAL GRAIN STORAGE CAPACITY OF UKRAINE 2021 VS. 2023, thousand tonnes

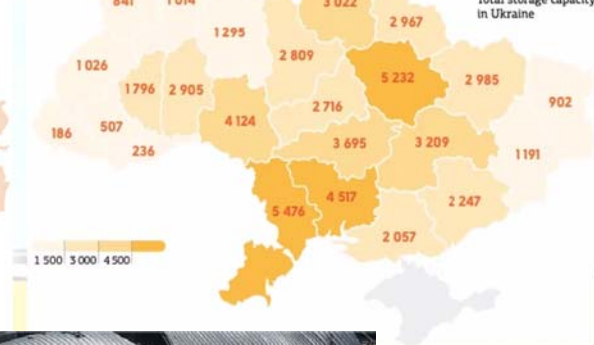
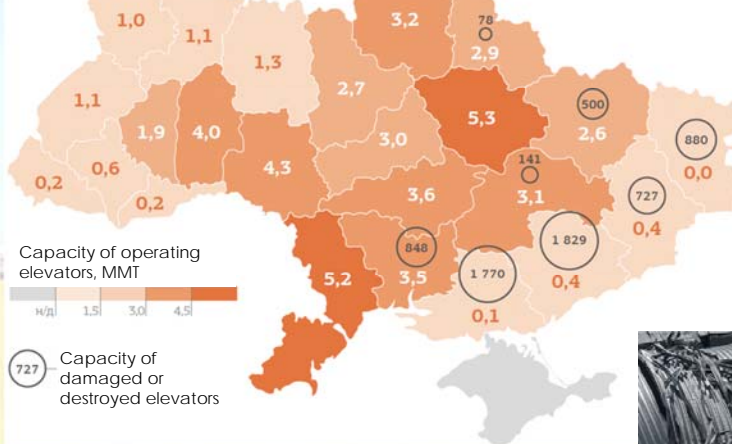
2023

49 257

2021

57 012

Total storage capacity in Ukraine



Source: Elevatorist

GRAIN ELEVATORS IN UKRAINE 2023 VS. 2021

2023

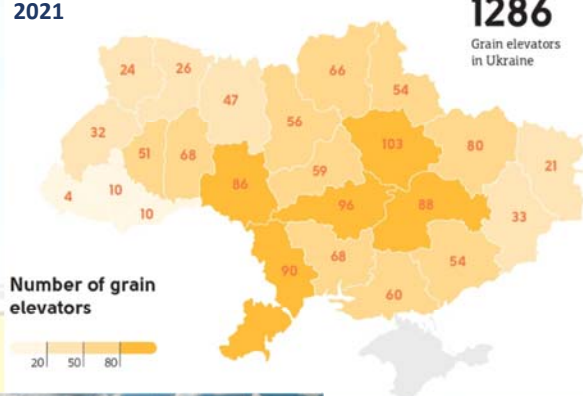
1171

Grain elevators in Ukraine

2021

1286

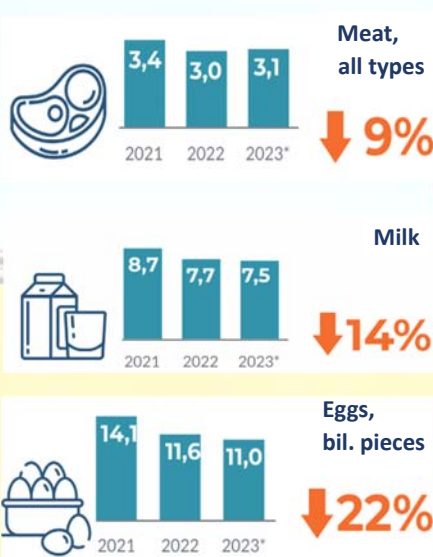
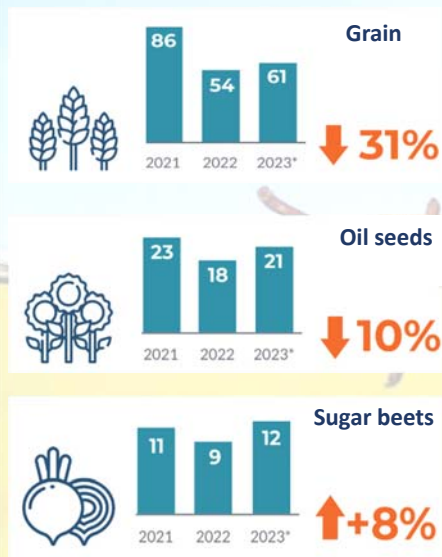
Grain elevators in Ukraine



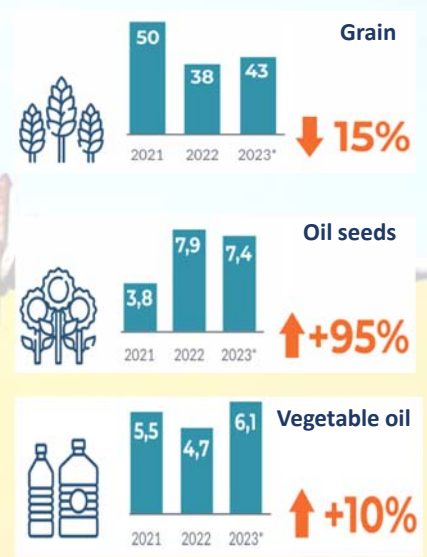
Source: Elevatorist

CHANGES IN UKRAINIAN AGRICULTURE DURING THE WAR TIME (% , 2023 TO 2021)

PRODUCTION, million tonnes

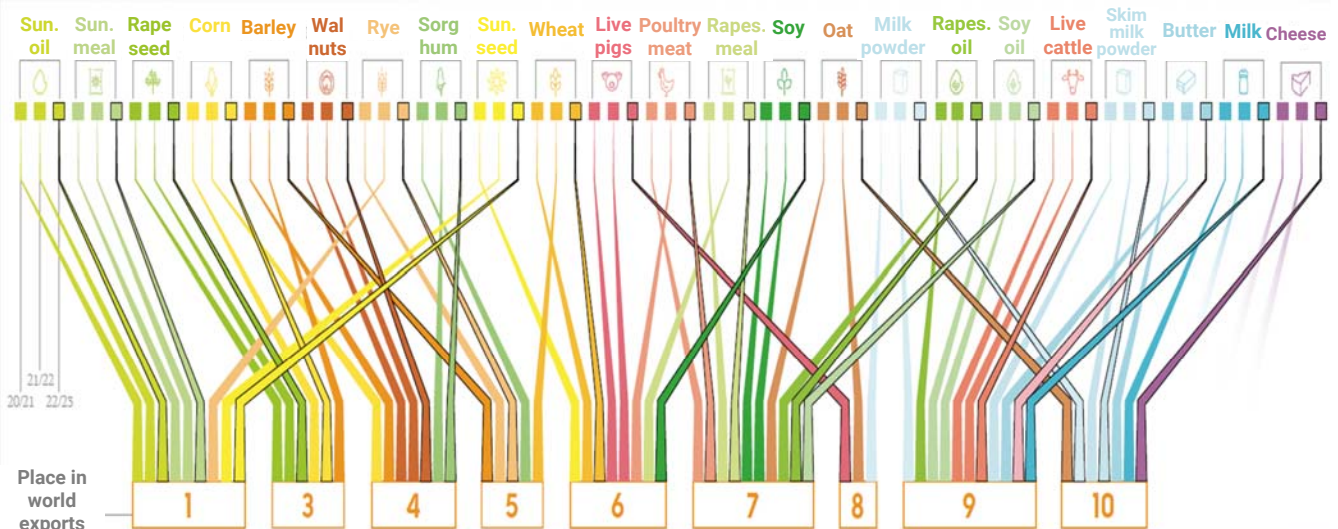


EXPORT, million tonnes



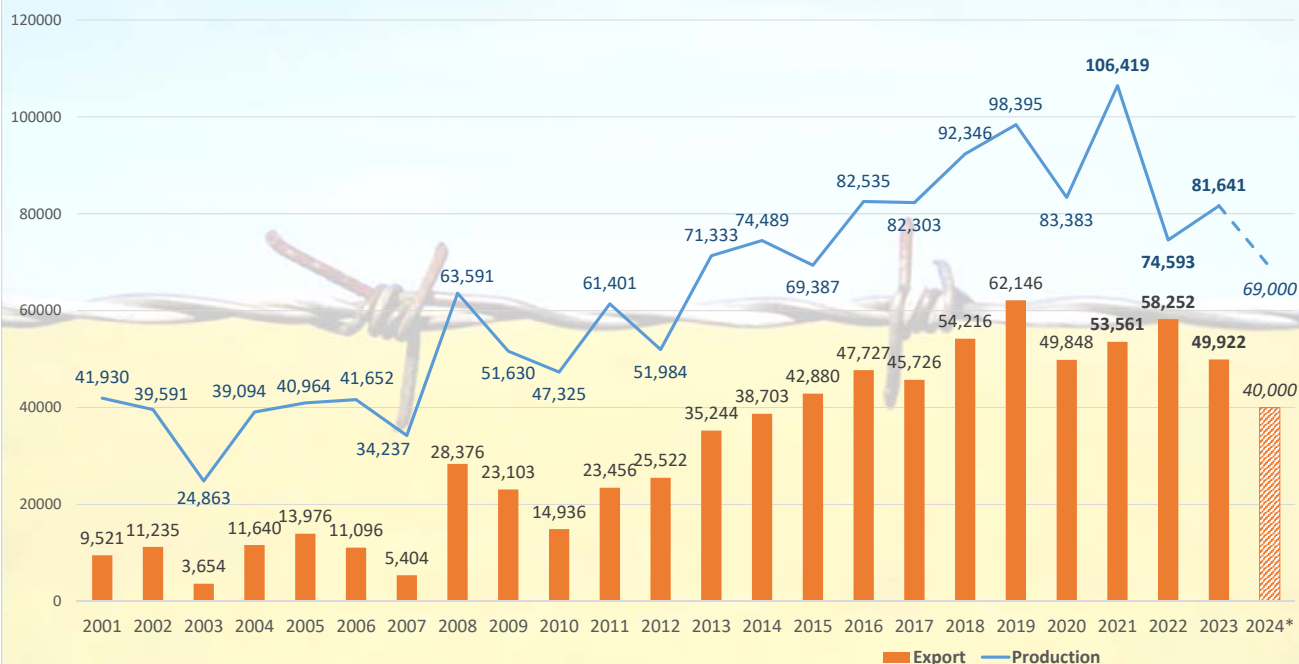
Source: based on data of Ministry of Agrarian Policy and Food of Ukraine, State Customs Service of Ukraine and UCAB

CHANGE IN UKRAINE'S PLACE IN WORLD EXPORTS



Source: Latifundist based on USDA, FAO

PRODUCTION AND EXPORT OF GRAIN, LEGUMES AND OILSEEDS IN UKRAINE, thousand metric tonnes



EXPORT OF GRAIN AND LEGUMES FROM UKRAINE with products of their processing (MY – Marketing year July-June),

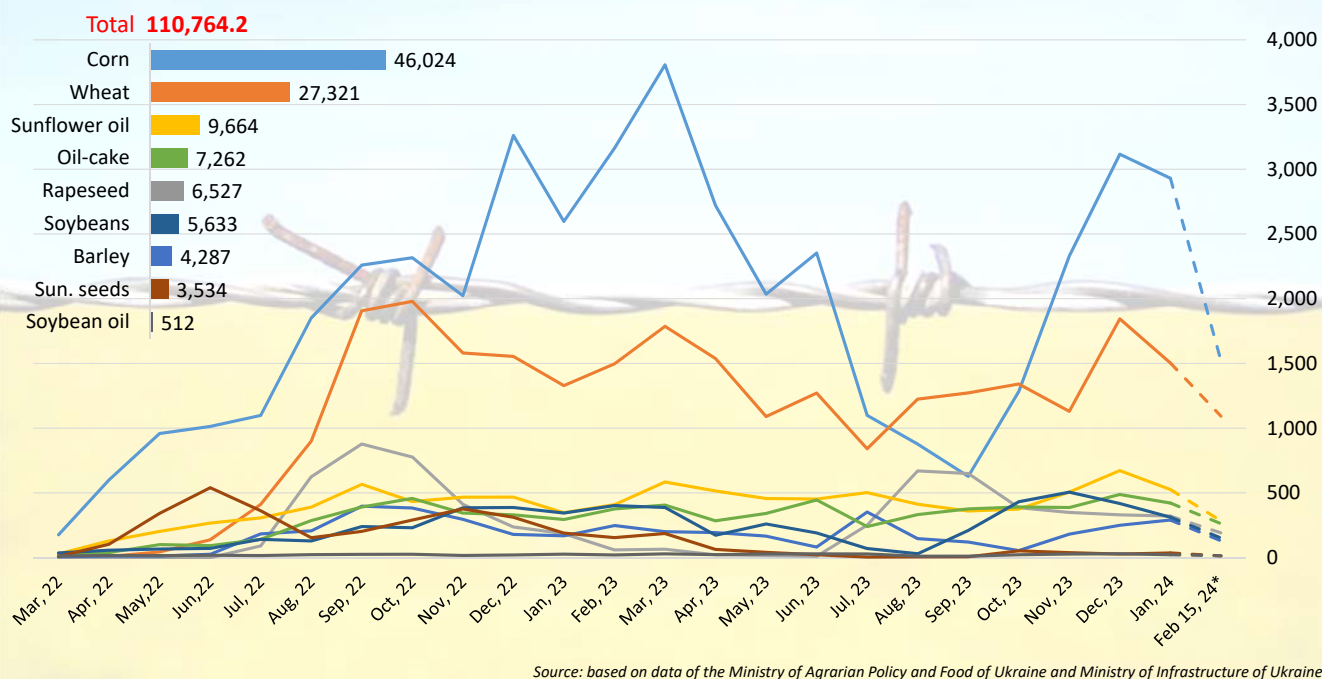
| | 2020/21 MY Total | 2021/22 MY Total | 2022/23 MY Total | 2022/23 MY Total as of Feb. 20, 2023 | 2022/23 MY incl. Feb. 20, 2023 | 2023/24 MY Total as of Feb. 20, 2024 | 2023/24 MY incl. Feb. 20, 2024 |
|-----------------------------------|---------------------|---------------------|---------------------|---|-----------------------------------|---|-----------------------------------|
| Grain and legumes, total | 43,939 | 48,508 | 49,079 | 30,318 | 3,347 | 27,059 | 3,183 |
| • wheat | 16,413 | 18,741 | 16,900 | 10,808 | 1,073 | 10,521 | 1,304 |
| • barley | 4,210 | 5,752 | 2,713 | 1,981 | 164 | 1,547 | 132 |
| • rye | 15.8 | 161.9 | 18.0 | 15.3 | 3.0 | 1.0 | 0.0 |
| • corn | 22,596 | 23,535 | 29,299 | 17,415 | 2,100 | 14,725 | 1,741 |
| Wheat flour | 123.7 | 69.4 | 148.1 | 88.7 | 10.0 | 68.0 | 4.7 |
| Other flour | 1.1 | 1.5 | 6.2 | 3.8 | 0.1 | 3.7 | 0.3 |
| Total flour | 124.8 | 70.9 | 154.3 | 92.5 | 10.1 | 71.7 | 5.0 |
| Total export (grain+flour) | 44,105 | 48,579 | 49,233 | 30,411 | 3,357 | 27,131 | 3,188 |

Source: based on data of State Customs Service of Ukraine

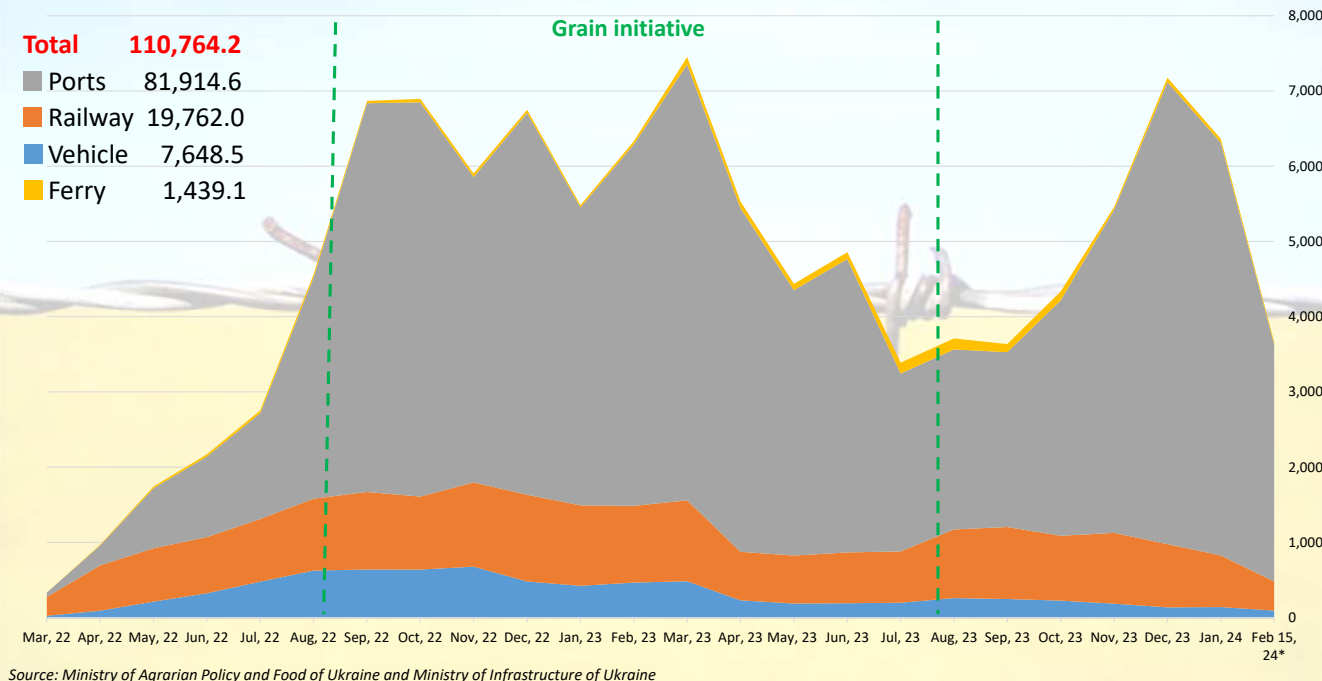
Dynamics of grain export from Ukraine, thousand tonnes



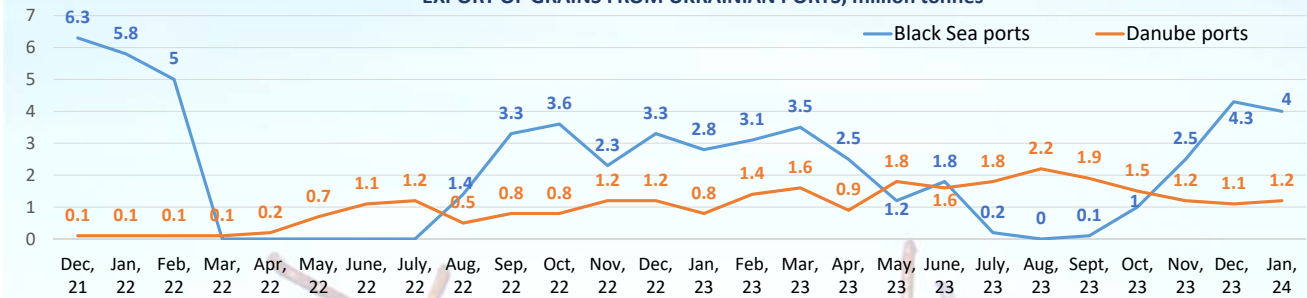
EXPORT SHIPMENTS FROM UKRAINE DURING THE WAR TIME BY TYPES OF AGRICULTURAL COMMODITIES, March 1, 2022 – February 15, 2024, thousand metric tonnes



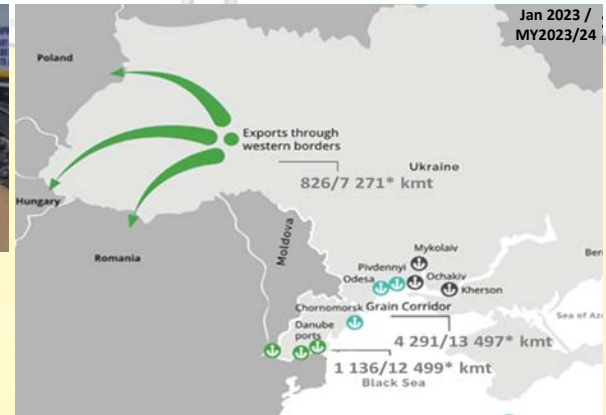
AGRICULTURAL COMMODITY EXPORT SHIPMENTS FROM UKRAINE IN TRANSPORTATION BREAKDOWN, March 1, 2022 – February 15, 2024, thousand metric tonnes



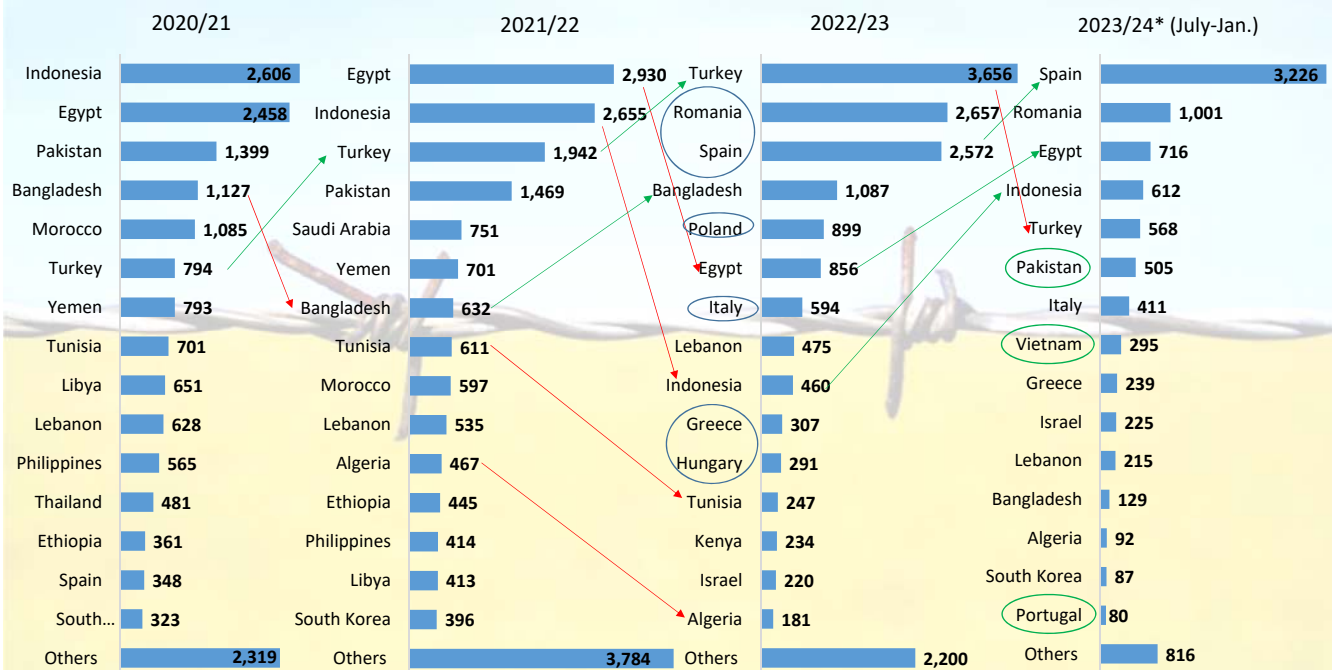
EXPORT OF GRAINS FROM UKRAINIAN PORTS, million tonnes



Source: based on data of the Ministry of Agrarian Policy and Food of Ukraine, Ministry of Infrastructure of Ukraine, Center for Economic Strategy, Ukrainian Grain Association

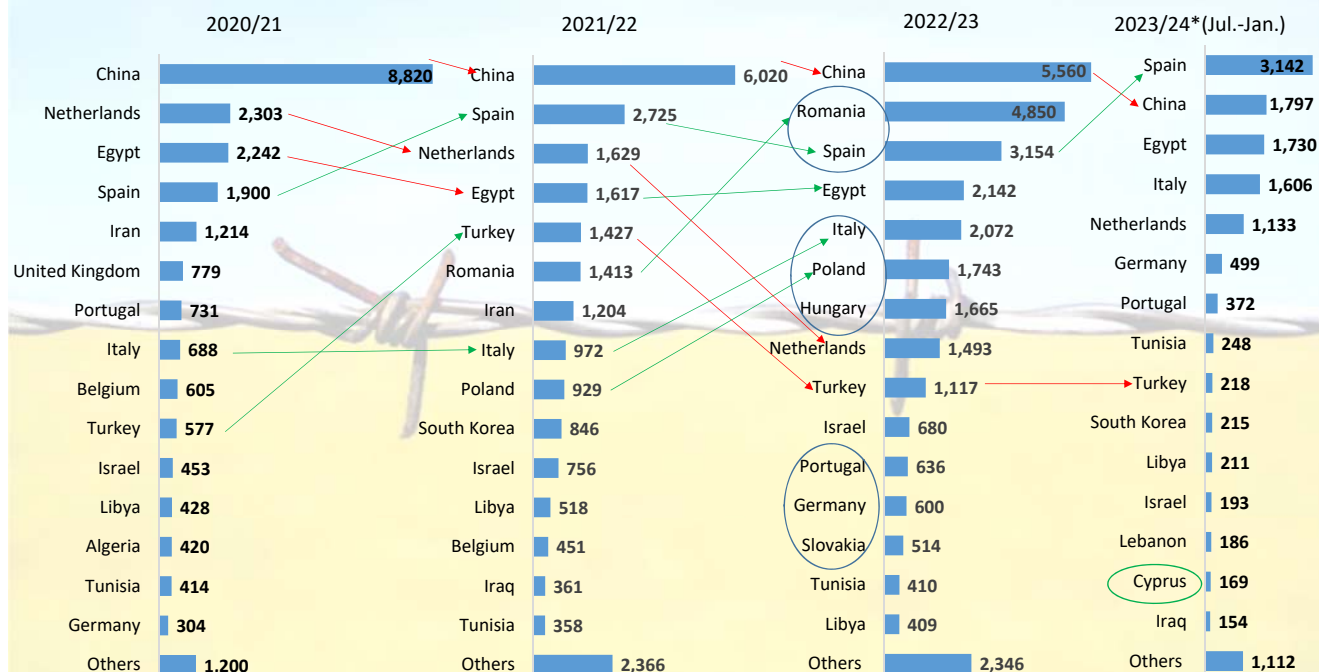


GEOGRAPHY OF WHEAT EXPORT FROM UKRAINE (July 1 – June 31), thousand metric tonnes



Source: based on data of State Customs Service of Ukraine

GEOGRAPHY OF CORN EXPORT FROM UKRAINE (July 1 - June 31), thousand tonnes



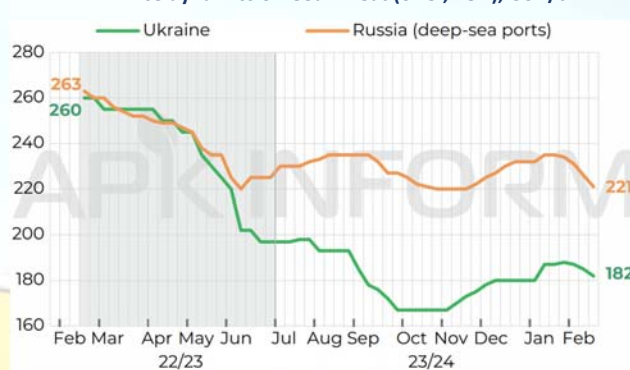
Source: based on data of State Customs Service of Ukraine

IMPACT OF THE WAR ON GRAIN PRICES

Dynamics of milling wheat prices, USD/t



Price dynamics of feed wheat (offer, FOB), USD/t

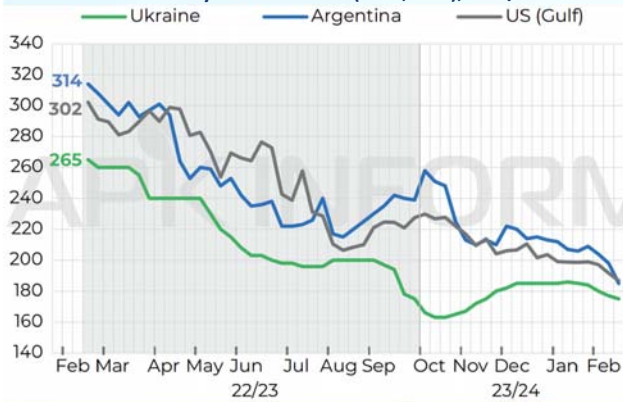


| | Stock / month | Country of origin | Terms of delivery | Feb 16 | Feb 9 | Feb 2 | Jan 26 | Jan 19 | Last weekly change | |
|--------------------|-----------------|-------------------|-------------------|--------|-------|-------|--------|--------|--------------------|---------|
| | | | | | | | | | USD/t | % |
| The futures market | | | | | | | | | | |
| Wheat | CBOT, March | USA | EXW | 205.9 | 219.2 | 220.3 | 220.5 | 218.0 | - 13.3 | - 6.1 % |
| Milling wheat | Euronext, March | France | CPT Rouen | 218.5 | 225.7 | 230.9 | 233.4 | 237.2 | - 7.2 | - 3.2 % |
| Wheat | LIFFE, May | EU | EXW | 205.1 | 214.2 | 214.4 | 219.8 | 222.0 | - 9.1 | - 4.2 % |
| Wheat | BCA, March | Argentina | EXW | 212.0 | 222.5 | 226.0 | 226.5 | 225.0 | -10.5 | - 4.7 % |
| Cash market | | | | | | | | | | |
| Wheat SRW | Feb. | USA | CPT Gulf of Mex. | 239.0 | 252.3 | 251.6 | 248.1 | 245.5 | - 13.3 | - 5.3 % |
| Wheat hard | Feb. | Argentina | FOB | 234.0 | 238.0 | 244.0 | 244.0 | 246.0 | - 4.0 | - 1.7 % |
| Wheat FCW1 | Feb. | France | FOB | 224.0 | 231.0 | 236.0 | 238.0 | 240.0 | - 7.0 | - 3.0 % |

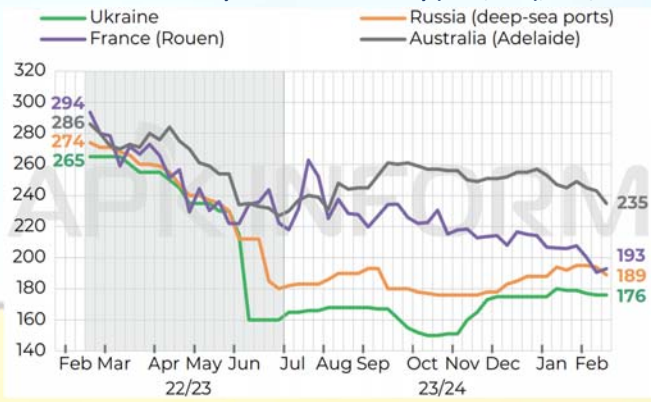
Source: APK-inform

IMPACT OF THE WAR ON GRAIN PRICES

Price dynamics of corn (offer, FOB), USD/t



Price dynamics of feed barley (offer, FOB), USD/t

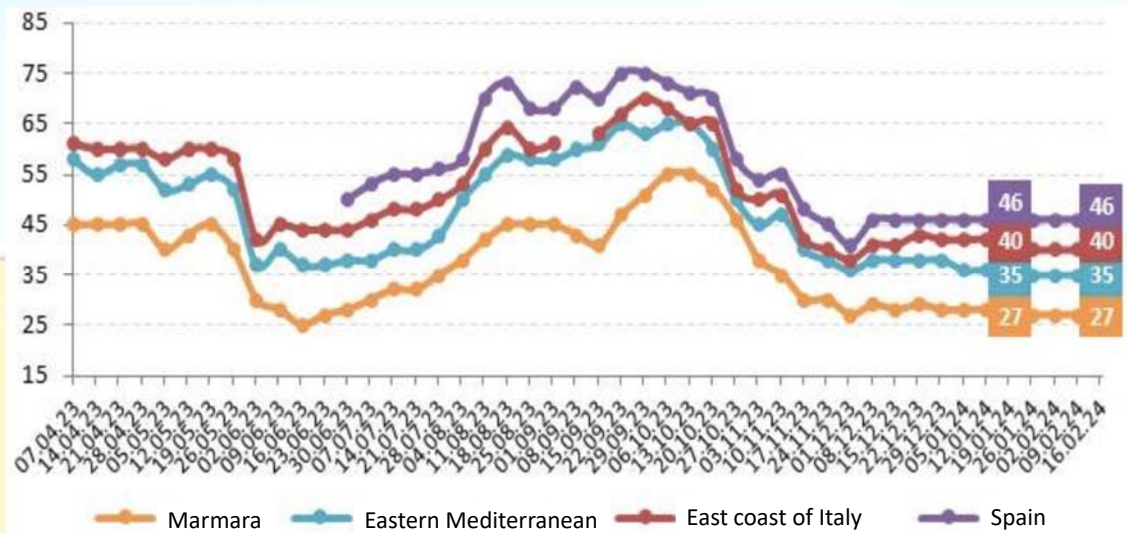


| | Stock / month | Country of origin | Terms of delivery | Feb 16 | Feb 9 | Feb 2 | Jan 26 | Jan 19 | Last weekly change | |
|--------------------|-----------------|-------------------|-------------------|--------|-------|-------|--------|--------|--------------------|---------|
| The futures market | | | | | | | | | | |
| Corn yellow | CBOT, March | United States | EXW | 163.9 | 168.9 | 174.3 | 175.7 | 175.4 | - 5.0 | - 2.9 % |
| Corn | Euronext, March | France | FOB | 185.7 | 192.6 | 196.5 | 203.0 | 203.5 | - 6.9 | - 3.6 % |
| Corn hard | BCA, April | Argentina | EXW | 169.0 | 175.5 | 173.3 | 173.6 | 171.0 | - 6.5 | - 3.7 % |
| Cash market | | | | | | | | | | |
| Corn yellow | Feb. | USA | CPT Gulf of Mex. | 186.8 | 191.7 | 197.1 | 198.9 | 198.6 | - 4.9 | - 2.6 % |
| Corn | Feb. | France | FOB | 198.4 | 195.6 | 205.9 | 109.8 | 211.4 | + 2.8 | + 1.4 % |
| Corn | Feb. | Argentina | FOB | 185.0 | 194.0 | 204.0 | 209.0 | 206.0 | - 9.0 | - 4.6 % |
| Fodder barley | Feb. | France | FOB | 193.0 | 190.7 | 200.3 | 207.6 | 205.9 | + 2.3 | + 1.2 % |

Source: APK-inform

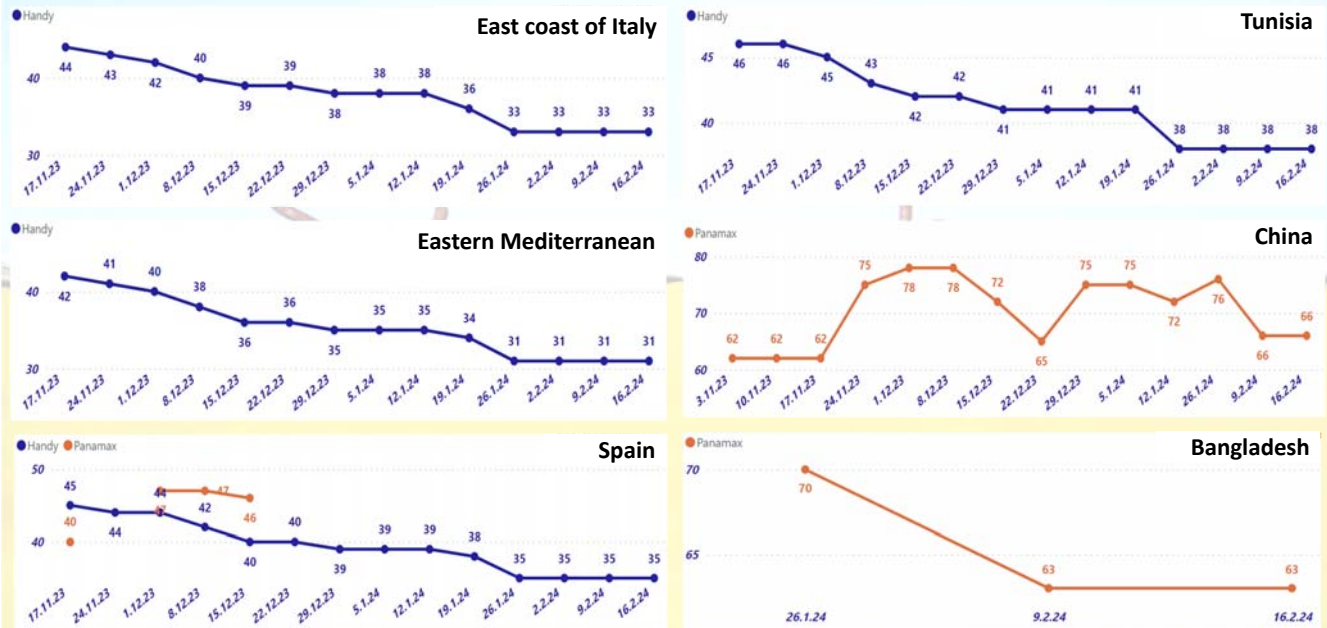
FREIGHT RATES FOR GRAIN TRANSPORTATION BY BULK CARRIERS FROM UKRAINIAN PORTS TO MAIN DESTINATIONS

From Danube ports of Reni and Izmail, Coasters (6,000 MT), USD/t



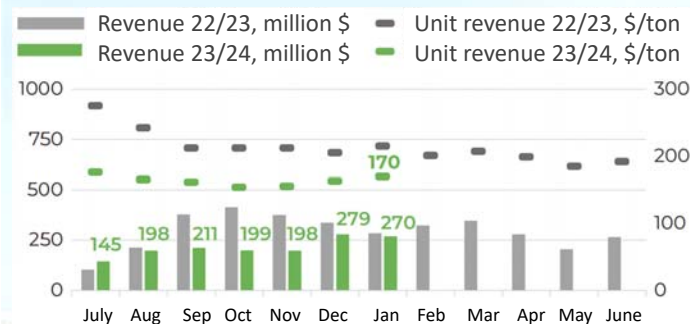
Source: Atria Brokers

FREIGHT RATES FOR GRAIN TRANSPORTATION BY BULK CARRIERS FROM UKRAINIAN PORTS TO MAIN DESTINATIONS From the "Great Odesa" ports (Odesa, Chornomorsk, Pivdenny), Handymax (40,000MT), Panamax (50,000MT) USD/t

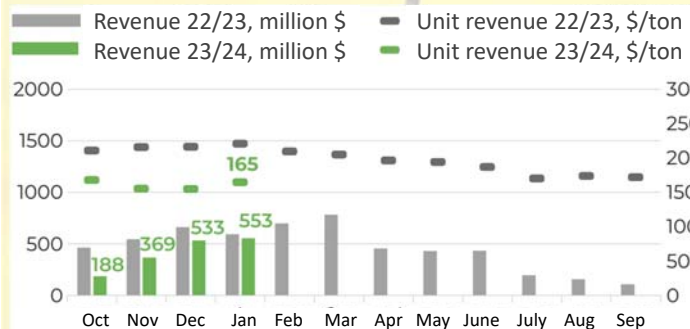


Source: Atria Brokers

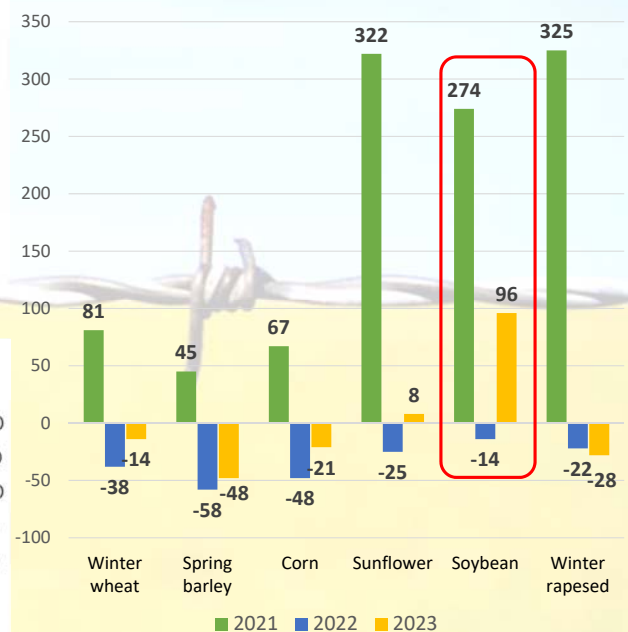
DYNAMICS OF REVENUE FROM WHEAT EXPORT



DYNAMICS OF REVENUE FROM CORN EXPORT



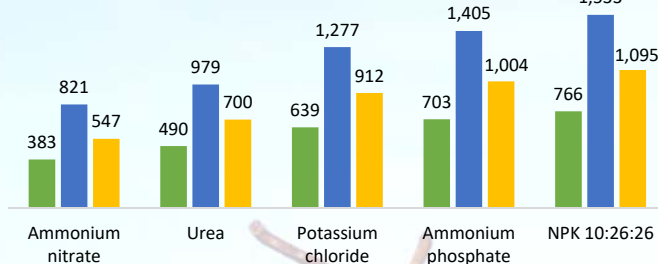
AVERAGE PROFITABILITY OF GRAIN AND OILSEED PRODUCTION IN UKRAINE, US\$ per metric ton



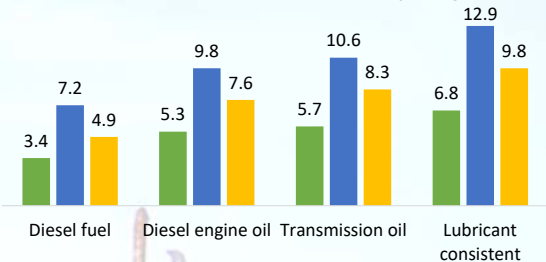
Source: Estimate based on UCAB data for central regions of Ukraine

AVERAGE INPUT PRICES IN UKRAINE

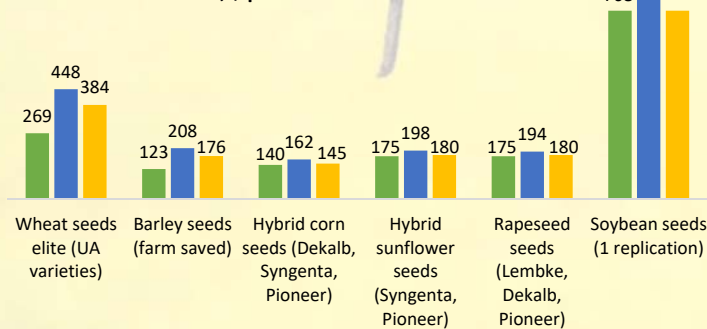
Fertilizers, \$ per 1 ton



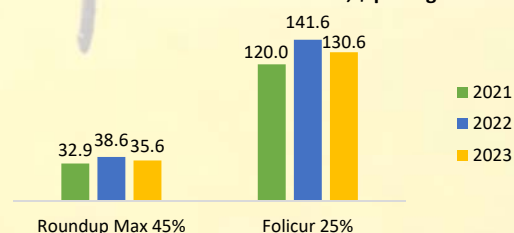
Fuels and lubricants, \$ per 1 gallon



Seeds, \$ per 1 ton

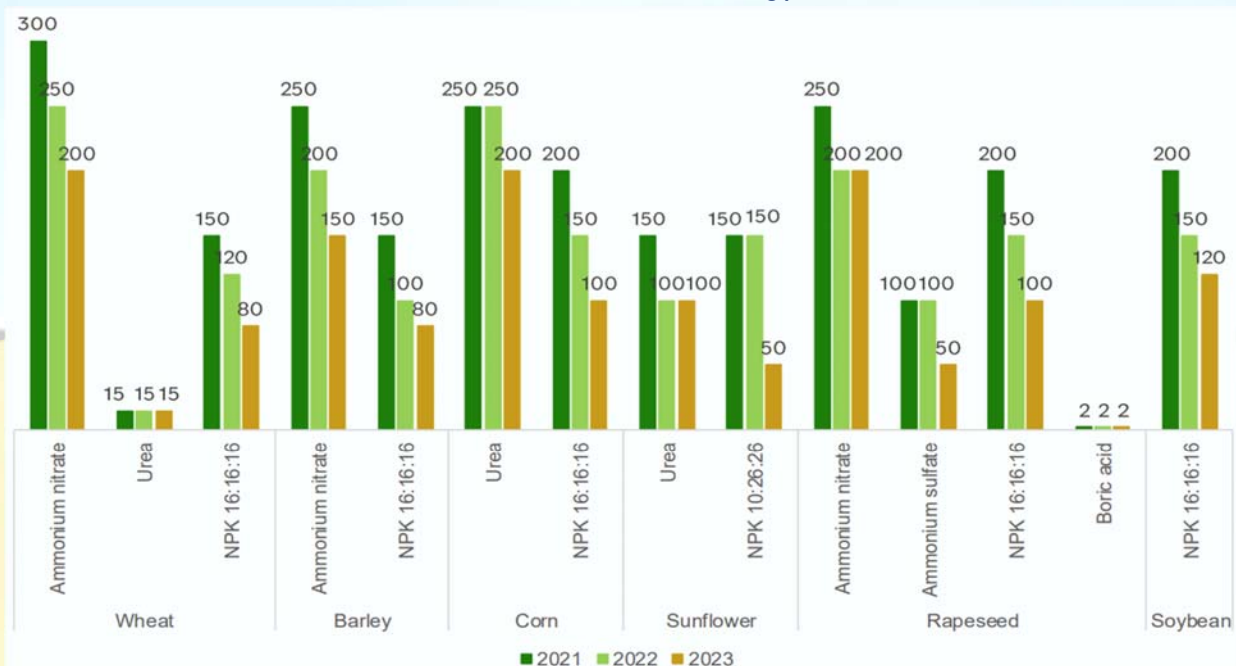


Plant Protection Products, \$ per 1 gallon



Source: Estimate based on UCAB data for central regions of Ukraine

FERTILIZER APPLICATION IN UKRAINE, kg per hectare



Source: Ministry of Agrarian Policy and Food of Ukraine, UCAB

WINTER WHEAT

- ✓ Wheat remains unprofitable for the second year in a row.
- ✓ Farmers mainly use saved seeds. In 2022, they bought about 10% of new varieties from originators. In 2023, the purchased new seeds decreased to 5% of total seed use.
- ✓ Most of the fertilizer applications 2022 WW season were done before the end of February 2022 with high rates of application. In 2023, fertilizer application rate declined by at least 20%. Fertilizer prices remain higher than in 2021 due to the costly import logistics and the lower domestic production of fertilizers.
- ✓ The cost of logistics skyrocketed in 2022 and declined in 2023 due to the lower diesel price and lower volumes for export, but after the BSGI suspension, it started to grow again.
- ✓ The high cost of export logistics after the BSGI suspension has prevented an increase in farm profitability. Losses are made from sales on both local and export markets.

Source: Estimate based on UCAB data for central regions of Ukraine

| | 2021 | 2022 | 2023 |
|--|------------|------------|------------|
| Costs, \$/hectare | | | |
| Seed | 37 | 46 | 37 |
| Fertilizers | 218 | 269 | 145 |
| PPP | 66 | 78 | 62 |
| Fuel and lubricants | 43 | 73 | 50 |
| Wages (production staff) | 24 | 20 | 23 |
| Taxes on wages | 13 | 10 | 12 |
| Repair of fixed assets | 47 | 55 | 50 |
| Depreciation of fixed assets | 72 | 72 | 72 |
| Administrative expenses | 72 | 65 | 68 |
| Land rent | 148 | 111 | 119 |
| Unified tax of group 4 (agriculture) | 10 | 6 | 6 |
| Contractor services | 28 | 34 | 29 |
| Total costs, \$/hectare | 777 | 839 | 672 |
| Yield (gross), ton/hectare | 5.4 | 5.3 | 5.2 |
| Elevator services, \$/metric ton | 10 | 10 | 9 |
| Yield (net), t/hectare | 5.2 | 5.1 | 5.0 |
| Total costs, \$/metric ton | 159 | 175 | 144 |
| Price at an elevator (center of Ukraine), \$/metric ton without VAT | 240 | 137 | 130 |
| Profit/loss, \$/t | 81 | -38 | -14 |
| Option 1. To the ports of Odessa | | | |
| Logistics to the port, \$/metric ton | 26 | 48 | 21 |
| Price at the port (CPT), \$/metric ton | 270 | 197 | 166 |
| Profit/loss, \$/metric ton | 85 | -26 | 1 |
| Option 2. To the port of Constanta (Romania) | | | |
| Logistics to the port, \$/metric ton | | 141 | 78 |
| Price at the port (CPT), \$/metric ton | | 289 | 216 |
| Profit/loss, \$/metric ton | | -27 | -5 |
| Option 3. To the ports of Gdansk/Gdynia (Poland) | | | |
| Logistics to the port, \$/metric ton | | 140 | 74 |
| Price at the port (CPT), \$/metric ton | | 287 | 213 |
| Profit/loss, \$/metric ton | | -28 | -5 |

CORN

- ✓ Many farms contracted corn seeds for 2022 season in advance (mainly hybrid seeds) at higher prices. A decrease in corn area for season 2023 affected seeds prices, some farmers switched to lower-quality seeds.
- ✓ Fertilizer application declined in 2023 compare to 2022 and 2021, especially phosphorus and potassium components
- ✓ Drying services at elevators for corn were very expensive in 2022 because of the high price of natural gas and problems with electricity supply in October 2022 – March 2023. In 2023 season, the price of natural gas is lower and many contracted volumes in advance.
- ✓ Corn is foreseen to stay unprofitable in the 2023/24 season

Source: Estimate based on UCAB data for central regions of Ukraine

| | 2021 | 2022 | 2023 |
|--|------------|--------------|------------|
| Costs, \$/hectare | | | |
| Seed | 123 | 143 | 124 |
| Fertilizers | 250 | 327 | 173 |
| PPP | 84 | 98 | 81 |
| Fuel and lubricants | 60 | 102 | 70 |
| Wages (production staff) | 22 | 18 | 21 |
| Taxes on wages | 11 | 9 | 11 |
| Repair of fixed assets | 47 | 55 | 50 |
| Depreciation of fixed assets | 72 | 72 | 72 |
| Administrative expenses | 72 | 65 | 68 |
| Land rent | 148 | 111 | 119 |
| Unified tax of group 4 (agriculture) | 10 | 6 | 6 |
| Contractor services | 75 | 87 | 76 |
| Total costs, \$/hectare | 972 | 1,094 | 870 |
| Yield (gross), ton/hectare | 9.8 | 9.7 | 9.5 |
| Elevator services, \$/metric ton | 43 | 51 | 41 |
| Yield (net), t/hectare | 8.6 | 8.5 | 8.3 |
| Total costs, \$/metric ton | 157 | 180 | 146 |
| Price at an elevator (center of Ukraine), \$/metric ton without VAT | 224 | 132 | 125 |
| Profit/loss, \$/t | 67 | -48 | -21 |
| Option 1. To the ports of Odessa | | | |
| Logistics to the port, \$/metric ton | 26 | 48 | 21 |
| Price at the port (CPT), \$/metric ton | 256 | 187 | 161 |
| Profit/loss, \$/metric ton | 73 | -41 | -6 |
| Option 2. To the port of Constanta (Romania) | | | |
| Logistics to the port, \$/metric ton | | 141 | 78 |
| Price at the port (CPT), \$/metric ton | | 278 | 213 |
| Profit/loss, \$/metric ton | | -43 | -10 |
| Option 3. To the ports of Gdansk/Gdynia (Poland) | | | |
| Logistics to the port, \$/metric ton | | 140 | 74 |
| Price at the port (CPT), \$/metric ton | | 276 | 207 |
| Profit/loss, \$/metric ton | | -44 | -13 |

HARVESTING OF GRAIN, LEGUMES AND OIL CROPS IN UKRAINE,
as of February 16, 2024

| Crops | Harvested, thousand hectares | | 2023* | | Harvested to forecast 2023*, % | Harvested 2023*, thousand metric tonnes | Average yields, metric tonnes per hectare | | | Change in yields per hectare, % | |
|--|------------------------------|-----------------|-----------------------------|------------------------------|--------------------------------|---|---|-------------|-------------|---------------------------------|----------------|
| | 2021 | 2022 | Forecast, thousand hectares | Harvested, thousand hectares | | | 2021 | 2022 | 2023* | 2023* to 2021 | 2023* to 2022 |
| Grain and legumes total, including: | 15,299.2 | 10,969.7 | 10,569.4 | 10,262.0 | 97.1 % | 57,921.9 | 5.50 | 4.88 | 5.64 | +2.5 % | +15.6 % |
| • wheat | 7,073.0 | 4,979.4 | 4,646.4 | 4,694.5 | 101.0 % | 22,477.6 | 4.64 | 4.05 | 4.79 | +3.2 % | +18.3 % |
| • barley | 2,467.7 | 1,666.5 | 1,492.9 | 1,504.5 | 100.8 % | 5,909.1 | 3.92 | 3.47 | 3.93 | +0.3 % | +13.3 % |
| • corn | 5,356.0 | 4,045.0 | 4,055.2 | 3,689.2 | 91.0 % | 28,748.1 | 8.01 | 6.68 | 7.79 | -2.7 % | +16.6 % |
| • peas | 240.4 | 118.1 | 150.0 | 154.4 | 102.9 % | 399.5 | 2.43 | 2.28 | 2.59 | +6.6 % | +13.6 % |
| • buckwheat | 84.2 | 115.9 | 141.5 | 140.0 | 98.9 % | 207.5 | 1.30 | 1.37 | 1.48 | +13.8 % | +8.0 % |
| • millet | 77.9 | 44.7 | 83.4 | 79.5 | 95.3 % | 180.2 | 2.52 | 2.28 | 2.27 | -9.9 % | -0.4 % |
| Soybeans | 1,279.5 | 1,537.0 | 1,811.0 | 1,805.6 | 99.7 % | 4,778.7 | 2.68 | 2.43 | 2.65 | -1.1 % | +9.1 % |
| Rapeseed | 1,013.9 | 1,134.8 | 1,425.6 | 1,396.0 | 97.9 % | 4,005.4 | 2.95 | 2.86 | 2.87 | -2.7 % | +0.3 % |
| Sunflower | 6,482.4 | 4,825.5 | 5,059.7 | 5,020.8 | 99.2 % | 11,979.7 | 2.52 | 2.18 | 2.39 | -5.2 % | +9.6 % |

Note: includes data from territories under Ukrainian control as of the reporting date

| Forecast of sowing area in 2024 | optimistic | pessimistic |
|---------------------------------|------------|-------------|
| Grain crops, million hectares | 10.2 ↓3% | 9.1 ↓17% |
| Oil crops, million hectares | 8.4 ↑1% | 6.9 ↓16% |

Source: based on data of the State Statistic Service of Ukraine



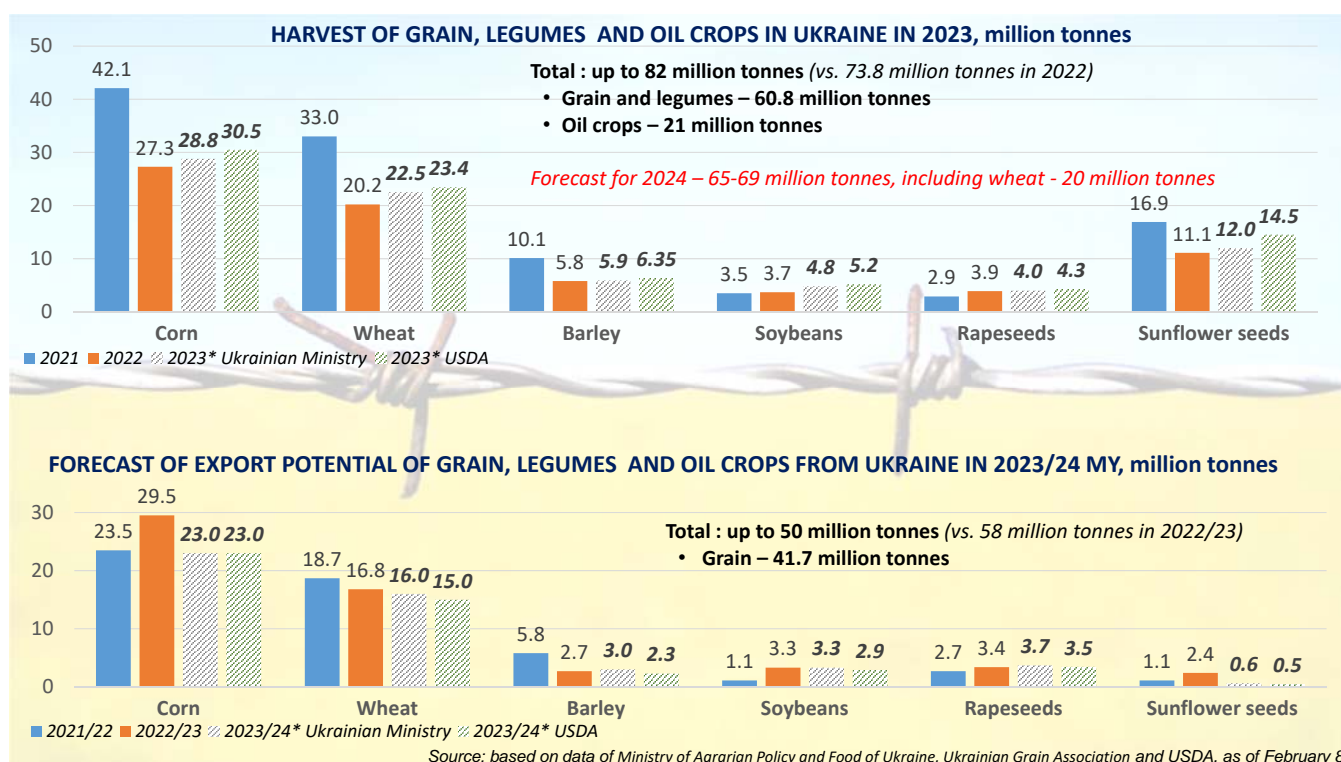
SOWN AREA OF WINTER CROPS IN UKRAINE, thousand hectares

| Crops | 2021 | 2022 | 2022 to 2021, % | Forecast 2023 | Sown areas in 2023 for the 2024 harvest | | | |
|---------------------------------------|----------------|----------------|-----------------|----------------|---|---------------|-------------------------------|----------------|
| | | | | | Planted in 2023 | | Planted in 2023 to planted in | |
| | | | | | thousand hectares | % to forecast | 2022, % | 2021, % |
| Winter crops total, including: | 9,029.4 | 5,449.4 | -39.6 % | 6,339.9 | 5,962.1 | 94.0 % | + 9.4 % | -34.0 % |
| • winter wheat | 6,538.4 | 3,758.8 | -42.5 % | 4,355.3 | 4,161.9 | 95.6 % | + 10.7 % | -36.3 % |
| • winter barley | 969.0 | 612.5 | -36.8 % | 692.1 | 558.8 | 80.7 % | - 8.8 % | -42.3 % |
| • winter rye | 108.5 | 79.2 | -27.0 % | 80.9 | 77.2 | 95.4 % | - 2.5 % | -28.8 % |
| • winter rapeseeds | 1,413.5 | 998.9 | -29.3 % | 1,211.6 | 1,164.2 | 96.1 % | + 16.5 % | -17.6 % |

Note: includes data from territories under Ukrainian control as of the reporting date

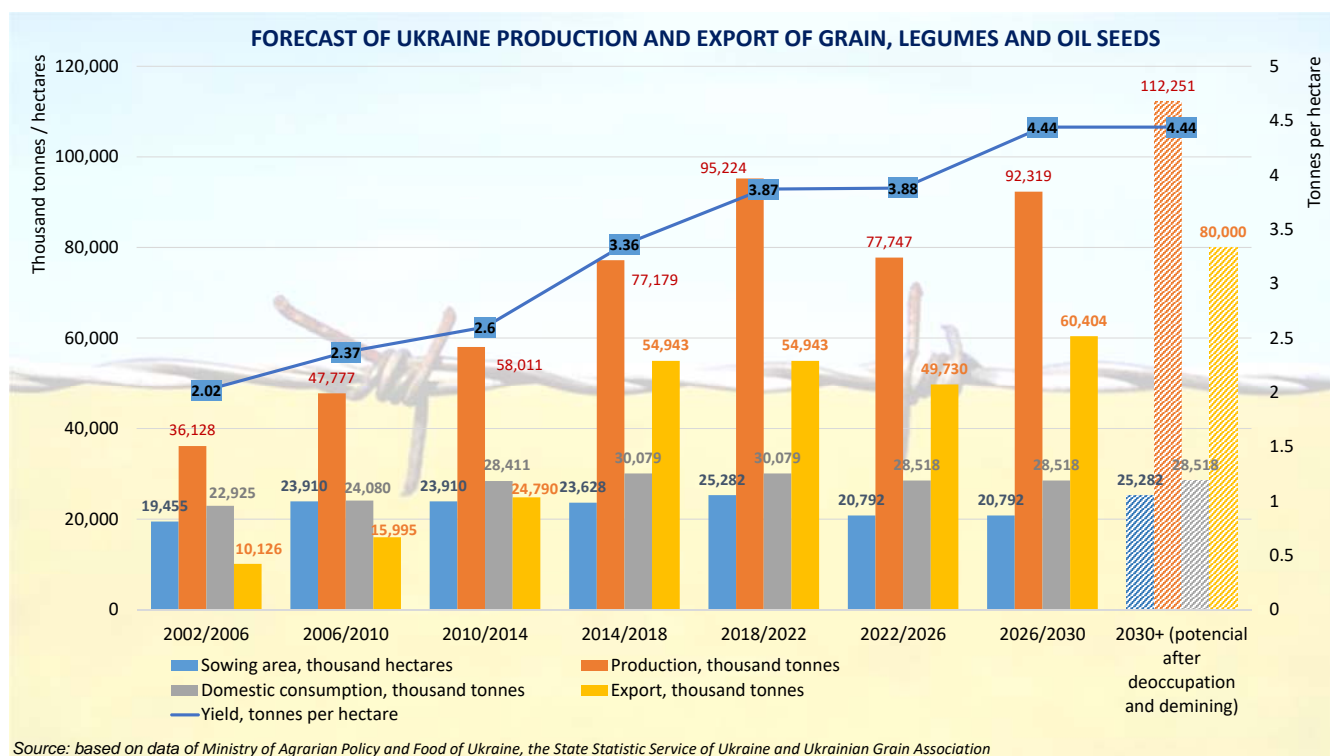


Source: based on data of the State Statistic Service of Ukraine and Ministry of Agrarian Policy and Food of Ukraine



| BALANCE OF SUPPLY AND DEMAND OF GRAIN AND LEGUMES IN UKRAINE (*forecast as of February 6, 2024) | | | | | |
|---|-----------------|-----------------|-----------------|--------------------|---------------------|
| | 2021/22 | 2022/23 | 2023/24* | Deviation , % | |
| | thousand tonnes | thousand tonnes | thousand tonnes | 2022/23 to 2021/22 | 2023/24* to 2022/23 |
| Initial stocks | 4,817 | 13,325 | 3,954 | in +2,8 times | -70.3 % |
| Sown area, thousand hectares | 15,995 | 12,171 | 11,058 | -23.9 % | -9.1 % |
| Harvested area, thousand hectares | 15,948 | 11,773 | 10,792 | -26.2 % | -8.3 % |
| Yield, tonnes / hectare | 5.39 | 4.58 | 5.35 | -15.0 % | +16.9 % |
| Gross harvest | 86,010 | 53,864 | 57,756 | -37.4 % | +7.2 % |
| Import | 125 | 152 | 126 | +22.4 % | -17.7 % |
| Total supply | 90,952 | 67,341 | 61,835 | -26.0 % | -8.2 % |
| Domestic consumption: | 25,396 | 16,147 | 17,231 | -36.4 % | +6.7 % |
| food | 4,611 | 4,230 | 4,150 | -8.3 % | -1.9 % |
| fodder | 13,325 | 7,935 | 9,125 | -40.5 % | +15.0 % |
| seeds | 1,666 | 1,470 | 1,579 | -11.8 % | +7.4 % |
| losses | 4,812 | 1,696 | 1,557 | -64.8 % | -8.2 % |
| other (alcohol, malt, starch, etc.) | 982 | 816 | 820 | -16.9 % | +0.5 % |
| Export | 52,231 | 47,240 | 39,902 | 9.6 % | -15.5 % |
| Total distribution (demand) | 77,627 | 65,387 | 57,133 | -18.3 % | -9.9 % |
| Ending stocks | 13,325 | 3,954 | 4,703 | -70.3 % | +18.9 % |
| Ratio of ending stocks to distribution | 17 % | 6 % | 8 % | | |

Source: based on "APK-Inform", the State Statistic Service of Ukraine and the State Customs Service of Ukraine



Thank you!

Questions?

Agricultural Economics