

AUSSEN WIRTSCHAFT BRANCHENREPORT UKRAINE

AGRICULTURE

INDUSTRY AND MARKET SITUATION
FOR GRAIN, VEGETABLE OIL, VEGETABLES, FRUITS, BERRIES
TRENDS AND EXPORT SCENARIOS

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ECONOMY

War Impact on Ukraine's Economic Performance in 2022

The first months of the war were extremely difficult for the Ukrainian economy. Many businesses stopped or significantly reduced production, and some were destroyed. The Black Sea blockade severely hampered exports of agricultural and metallurgical products. As a result, investments in the economy decreased, new projects were suspended.

Furthermore, the population has significantly reduced expenses due to multi-million migration. As a result, consumer demand for goods and services declined in general.

The government has taken a number of steps to support the economy. In particular, taxes have been reduced, and some bureaucratic barriers for business have been removed. The National Bank has fixed the hryvnia exchange rate to keep inflation under control and ensured the stable operation of banks and the non-cash payment system.

These measures and the constant support of international donors mitigated the negative impact of the war. The total international budgetary assistance to Ukraine in 2022 amounted to USD 27 B. with the main donor countries the USA, the EU, Germany, Canada, and the United Kingdom.

However, all these measures could not prevent the economy from a rapid decline, although some indicators were even better than expected according to previous forecasts (at the beginning of the war).

Ukraine Macroeconomic Indicators in 2022. Expectations and Reality

	Expectations World Bank (April 2022)	Reality (Preliminary results of 2022), NBU
Decrease in GDP	45 %	30,3 %
Slow economic recovery GDP will grow	in 2023 - by 2,1 % in 2024 - by 5,8 %	in 2023 - by 0,3 % in 2024 - by 4,1 %
Inflation	15 %	26,6 %
Decline in exports	8-9 %	35 % (The share of agricultural commodities in exports increased amid falling metal supplies)
Decline in imports	70 %	25 % imports are dominated by fuel, equipment and vehicles, in particular, for the needs of the defense complex

Key Macroeconomic Forecast, 2023-2025

The NBU Forecast, January 2023

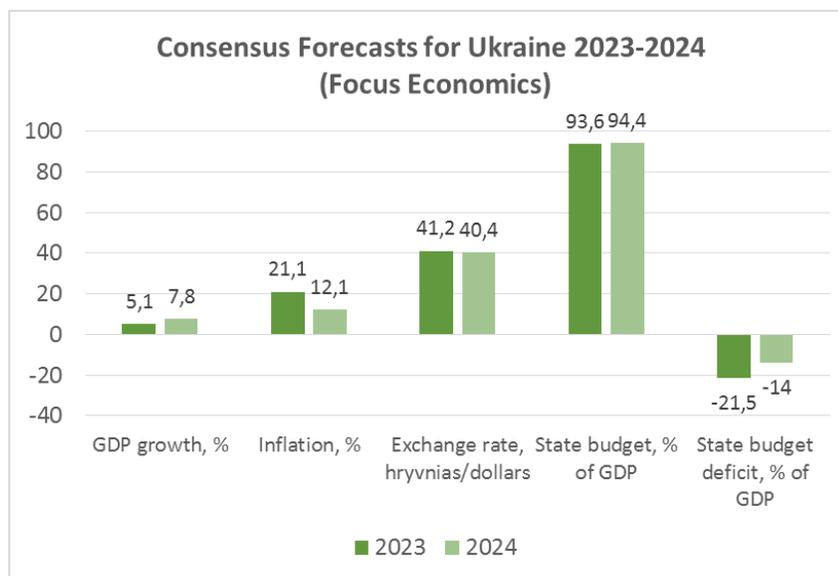
- Inflation - 18.7 % in 2023, 10.4 % in 2024 and up to 6.7 % in 2025. The NBU does not expect inflation to slow down rapidly in the wartime environment. The economy will continue to operate under conditions of limited logistics and electricity shortages for a long time.
- Interest rates - 25 % at least until the first quarter of 2024.
- Slight GDP growth by 0.3 % in 2023, with real GDP growth of 4.1 % in 2024, and economic growth accelerating to 6.4 % in 2025.

Macroeconomic Forecast of Main Indicators, the NBU, January 2023

	2022	2023	2024	2025
Real GDP, change, %	-30,3	0,3	4,1	6,4
Nominal GDP, UAH, B	4 825	5 985	7 085	8 175
Inflation, %	26,6	18,7	10,4	6,7
Current account balance, USD, B	8,6	-20,4	-8,4	-5,5
International reserves, USD, B	28,5	27	31	34,6

Forecast by Focus Economics (Goldman Sachs, JPMorgan, Moody's Analytics, Fitch Ratings, and others), November 2022

- Ukraine's GDP should return to growth in 2023. This is largely due to international financing, but risks remain;
- Due to the war, inflation in Ukraine will remain above the NBU 5 % target at least until 2027. The reasons are damage to infrastructure, falling supply and demand, and pressure on the national currency;
- The UAH exchange rate will remain stable due to large international reserves and growing foreign aid. As of early December, the NBU's reserves even exceeded the pre-war levels (almost \$28 B). The NBU will maintain a fixed UAH exchange rate for a certain period to ensure financial stability. The floating exchange rate is likely to be reintroduced as soon as economic conditions allow.



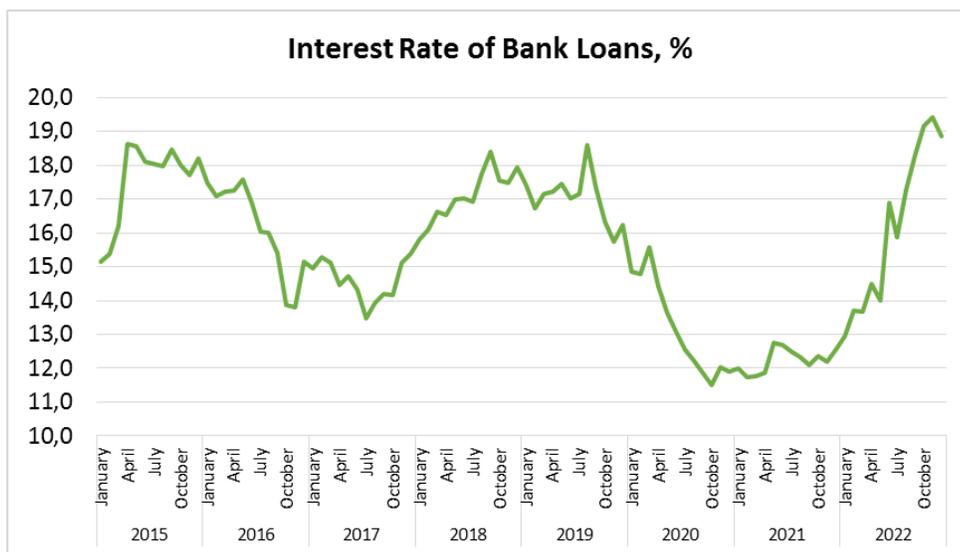
Source: Forbs Ukraine

Ukrainian Agriculture Key Challenges, 2022-2023

- War in Ukraine;
- Supply chains disruption and a sharp rise in logistics costs for grains and oilseeds exports due to the blockade of the Black Sea ports;
- An acute shortage of financial resources for the production cycle due to high risks of the banking sector. Growth in the National Bank of Ukraine's rate to 25 % that sharply reduces domestic investment and lending;
- A drop in farmers' incomes due to a sharp reduction in exports and a nearly halving the domestic grain and oil prices in March-May 2022;

- Growing prices for inputs supplies, contracts for their delivery are only signed on prepayment terms, no forward deals are made;
- Food price inflation amid falling household incomes. Low domestic consumption;
- Skilled labor deficit;
- Total losses to the economy, including future developments, might amount to more than \$1 trillion;
- Direct losses of the agricultural sector of Ukraine at the beginning of 2023 are estimated at about \$6.6 billion. Damages mainly include infrastructure facilities, grain marine export terminals, irrigation facilities, oil and fat industry enterprises, and other food producers;

For many years, farmers have been generating money for fieldwork mainly from their sales revenues. Bank loans contribution to working capital was considerably lower. Government has launched so-called “5-7-9” lending program for farmers. According to the Ag Ministry, in 2022 some UAH 95.5 B of loans at 5-7-9 % interest rates were granted to the agricultural sector (incl. animal husbandry, horticulture, etc.), though annual fieldwork costs are UAH 200-250 B on average. The interest rates on loans outside the 5-7-9 program are at two-digit highs.



Source: the NBU

Farmers' incomes in 2022 dropped sharply compared to the previous year. Large donor programs and other international support programs are important, but mostly, farmers can rely only on their commodity stocks and on revenues from their grains and oilseeds sales. According to UkrAgroConsult's calculations based on official exports statistics and own price monitoring (the AgriSupp database), exports revenues dropped in 2022 (see the tables below):

- down 49 % for early-season grains (wheat, barley, rapeseed etc.)

National Exports Revenues, July-December 2022 vs July-December 2021

US \$ M	+/-	%
Wheat	-2238.5	-56 %
Barley	-873.8	-74 %
Rapeseed	-206.5	-12 %
Rapeseed oil	-147.5	-68 %
Rapeseed meal	-36.5	-75 %
Total	-3502.8	-49 %

Source: UkrAgroConsult calculations

- down 7 % for late-season grains, oilseeds, vegetable oils and meals (corn, soybeans, sunflower seed, sunflower oil, and meal, etc.).

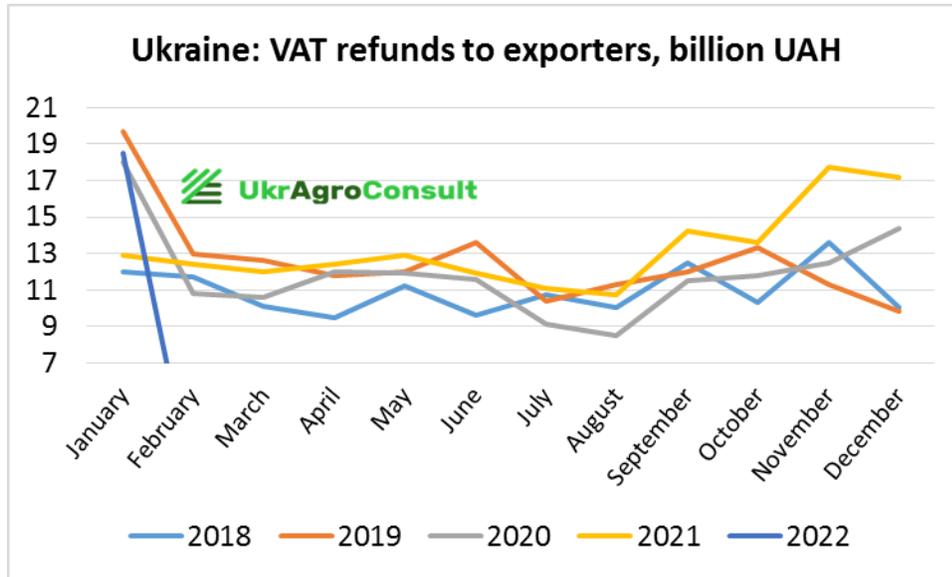
National Exports Revenues, Sept.-December 2022 vs Sept.-December 2021

US\$ M	+/-	%
Corn	-170.1	-7 %
Sunflower seed	247.2	132 %
Sunflower oil	-497.5	-19 %
Sunflower meal	-106.9	-27 %
Soybeans	116.1	36 %
Soybean oil	-8.6	-8 %
Soybean meal	-25.4	-26 %
Total	-445.2	-7 %

Source: UkrAgroConsult calculations

- Farmers' incomes suffered even more significantly. FOB Big Odesa prices in January 2023 are on average 10-15 % lower than in early 2022. However, domestic prices in US \$ are down 40 % y/y. Such a significant drop in the domestic prices stems from a sharp decrease in domestic demand and huge farmers' stocks due to increased logistics costs.
- Exporters' price behavior is usually influenced by export VAT tax refund. The law adopted on January 12, 2023, also regulates the VAT refund procedures. The market operators differ in their assessments of the consequences of the law. Under the law, Ukraine's government is entitled to introduce an export security regime during the martial law is in force. Some traders suppose, should this regime be introduced for their export deals, VAT refund will probably take still more time, especially for small companies.

The official VAT refund reports for 2022 are not disclosed, anyway it was rumored export VAT was refunded for January-August 2022.



Source: the NBU

Other Likely Consequences of the Law, Passed on January 12, 2023.

- Most likely, the law's primary purpose is dismantling shadow payment schemes for exported goods, as well as increasing fees paid to the state budget.
- The regulation under the Law increases the likelihood of freezing bigger financial liabilities of exporter for payment to the state budget.
- A surge in export volumes, especially after the harvest, compared to export in the pre-harvest months, will likely lead to higher payment liabilities of exporter to the state budget. These payments will be reimbursed, but considerably later in time and after receiving a positive tax audit report.
- If grains/oil crops are exported after money are paid to supplier in advance, the Law aftereffects will be considerably constrained compared to exports under other ways of payment.
- Forward contracts. In 2022, forward contracts as a tool for financing of field works and export related costs are mostly absent in the domestic market of Ukraine. Forward contracts were replaced by contracts providing advance delivery of grain in exchange for next sending to the grain supplier of seeds, fertilizers, plant protection etc. In such transactions, a farmer in fact plays unusual and new role of a creditor.

Summarizing, farmers' sources of working capital to finance fieldworks and pay for grain storage services have shrunk compared to 2021.

International Aid to Ukraine Economy in 2023

- At the end of 2022, the European Parliament and the EU Council approved the allocation of €18 B in macro-financial assistance to Ukraine in 2023. These loans will have a 10-year grace period. On January 17, the European Commission paid Ukraine the first tranche of €3 B. The EU will make subsequent payments of €1.5 B each month, starting in March.
- Further suspension of all customs duties and trade protection measures on Ukrainian imports to the EU and Great Britain.

- The European Bank for Reconstruction and Development (EBRD) invested €1.7 B in Ukraine in 2022 and intends to invest €3 B by the end of 2023;
- The International Monetary Fund is exploring a multi-year assistance package for Ukraine worth up to \$16 B to help cover the country's needs and serve as a catalyst for more international financing. If approved, the three- to four-year program, totaling \$14 B to \$16 B, would provide from \$5 B to \$7 B during the first year;
- An additional €400 M aid package for Ukraine is expected to be announced to support reforms;
- Ukraine's financial contributions to EU programs are expected to be suspended as long as the country has financial problems
- Financial resources will be allocated to attract \$1 B of private capital to support Ukraine's economy with the help of U.S. International Development Finance Corporation, DFC;
- Investment banks Goldman Sachs and BlackRock are ready to invest in the Ukraine's recovery;
- "Financial Rammstein". The EU, the G7 countries, the IMF and Ukrainian government set up donor coordination platform for Ukraine.

Farmers' Support by National and International Institutions

Ukrainian Government together with Ministry of Agrarian Policy and Food are doing their best to simplify the bank lending procedures with intention to facilitate farmers activity.

The government will continue simplified lending under the 5-7-9 program. The program of non-refundable grants for the creation of gardens and greenhouses will also be continued.

Cooperation with international organizations such as USAID and FAO, which implement support programs for farmers will be encouraged.

The government has decided to provide financial support to micro, small and medium-sized businesses to restore production facilities partially or completely destroyed by the hostilities. Agricultural enterprises can also count on such support.

Banks opened credit lines to businesses for energy supply: the purchase and installation of equipment that ensures smooth operation of the business's energy system. Lending for such investments is carried out at an interest rate of 0 % per annum.

International organizations (World Bank, EBRD) intend to provide more than \$5 B for the Ukrainian agriculture recovery.

Increasing the inputs supply and agrarian technologies (seeds, fuel, PPP, fertilizers, etc.).

More simple regulation and expansion of Ukrainian agriproducts to foreign markets.

Bank Loans to Farmers

In 2010-2021, medium-sized and small farmers in Ukraine showed no interest in bank loans, and many deliberately avoided taking loans. Fieldwork was financed mostly from farmers' own profits. Rising sun seed, rapeseed and corn prices significantly increased revenues and profits of agricultural producers.

As a rule, loans were taken by large agricultural holdings, which needed a lot of working capital. These holdings had a good credit history and good collateral.

The blockade of the Black Sea ports led to a drop in both domestic demand and prices. Farmers cannot sell grains and oilseeds, the usual scheme of financing input purchases through selling their stocks is gone. The fall in sales sharply strengthened farmers' demand for bank lending.

To support farmers and get the 2022 planting carried out successfully, the Government of Ukraine has provided an opportunity of receiving soft loans at zero annual interest with a government guarantee of 80 %. To obtain

such a loan, the farmer must provide collateral just for 20 % of the loan amount, with the remaining 80 % to be guaranteed by the state.

In 2022, farmers received UAH 95.5 B in loans and UAH 24.7 B (80 %) under the state guarantees program.

As of May 25, agricultural producers had raised worth of loans, including 80 % - about UAH 20 billion 297 million under the portfolio guarantee program. The loans were received by 13 016 of the producers.

The top regions financed by banks are as follows:

- Kirovohrad region (UAH 4 billion 81 million);
- Kyiv (UAH 3 billion 370 million);
- Vinnytsia (UAH 2 billion 916 million);
- Dnipropetrovsk (UAH 2 billion 522 million);
- Odesa (UAH 2 billion 480 million).

The beneficial loan program was in force until May 31, 2022, but later it was extended as the hostilities continued.

The top regions with beneficial loan program:

- Kyiv Region (UAH 15.5 B);
- Vinnytsia Region (UAH 10.2 B);
- Kirovohrad Region (UAH 8.6 B);
- Dnipropetrovsk Region (UAH 6.8 B);
- Odesa Region (UAH 6 B).

PrivatBank, Raiffeisen Bank, Ukrgasbank, Oschadbank, Ukreximbank, Kredi Agricol Bank, and PUMB issued the most loans to farmers.

LAND MARKET

After a shock pause with the outbreak of a full-scale war, the land market has begun to recover slowly.

Moreover, despite the war, the value of land in Ukraine is growing rapidly. As of January 1, 2023, the average price of 1 ha of land in Ukraine is UAH 52,462. This is 38 % more than in November 2022 and 47 % more than in the same period of 2021.

The figure was obtained based on 117,586 land sales transactions covering an area of 268.3 Th ha, according to Ukrainian Ministry of Agrarian Policy and Food.

Top regions in terms of land value per ha, as for December 2022:

- Ivano-Frankivsk Region – UAH 292,742,
- Donetsk Region – UAH 244,681,
- Kyiv Region – UAH 212,723,
- Lviv Region – UAH 107,749,
- Zhytomyr Region – UAH 88,786.

The cheapest land is in the Sumy region - UAH 10,534 per ha (excluding the Kherson and Luhansk regions, with no sales transactions).

Even though the Ukrainian land has been the most expensive since the land market launch in July 2021, it is considered the cheapest in Europe, which means great potential for land value growth. According to UkrAgroConsult estimates, the land market will strongly contribute to Ukraine after war economic recovery.

However, it is estimated that more than 200 Th ha of land are contaminated by mines, shells, and ammunition fragments. There is an opinion that it takes one day to clear 1 ha of land. Thus, demining and cleaning process is going to be time- and resource-consuming operation.

AGRICULTURAL PRODUCTION SECTOR

The Main Pre-war Trends in Grain and Oil Crops Production before 2021/22 MY

Crop areas continuous growth

In 2015-2021, the total arable land area in Ukraine was 27-28 M ha, with some 85 % of it accounted for six major crops (wheat, corn, barley, sunflower, soybeans, rapeseed). Since 2015, this area had gradually been expanding with its maximum of 28.4 M ha reached in 2021.

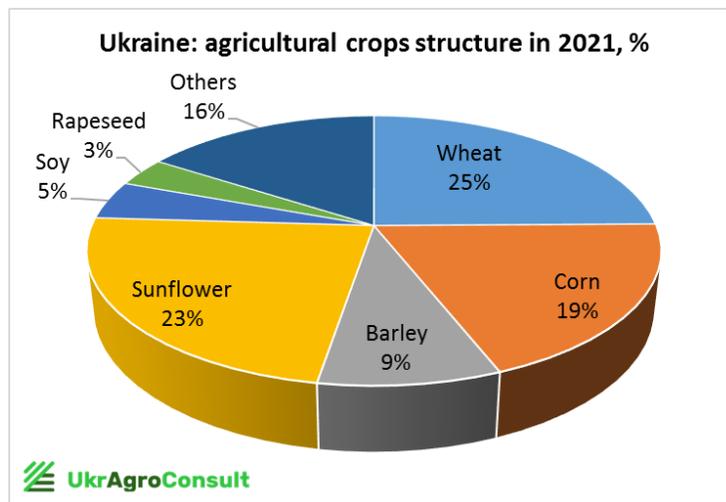
Total Cultivated Area, M ha

2015	2017	2018	2019	2020	2021
26.902	27.585	27.699	28.001	28.147	28.388

Source: Ukrainian Committee of Statistic (Derzhcomstat)

Wheat and sunflower are the leaders in the crop structure

Wheat and sunflower are prevalent crops; as a rule, they account for about half of the total planted area. Corn accounts for about 20 % of all crops.



Concentration of production within large holdings

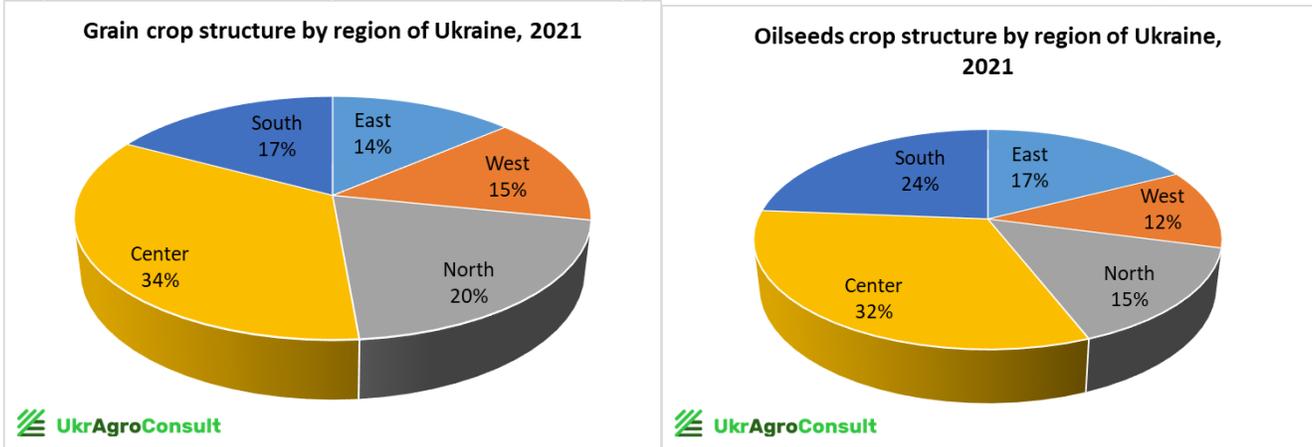
In 2022, the 20 largest vertically integrated holdings farm more than 3.4 M ha, with 13 companies farming at least 100 Th ha each. Large companies (i.e. those farming more than 1 Th ha) account for over 65 % of the grain crop and over 45 % of sunflower seed production. There is a direct relationship between the size of cultivated land and yield.

Advantages of large companies:

- access to finance;
- better use of technology;
- use of high-quality seeds, fertilizers and plant protection products;
- high qualification of employees.

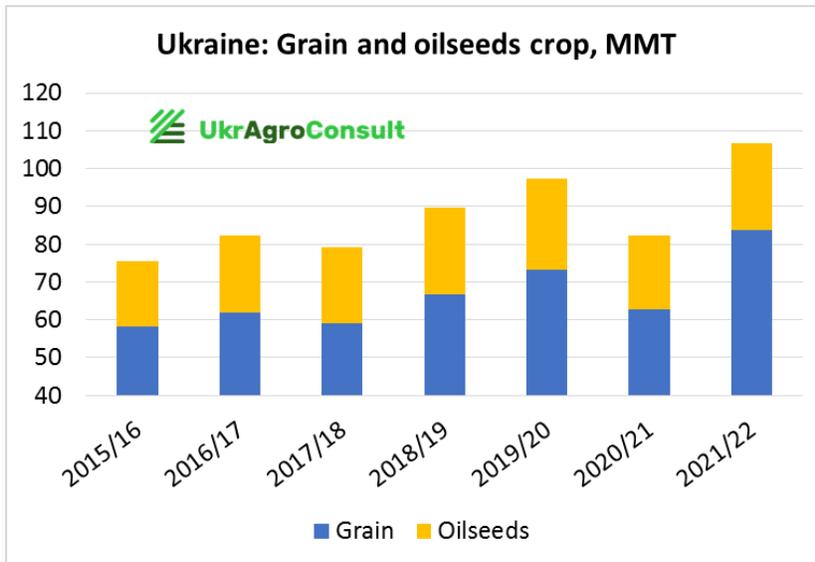
The main crops cultivated in the south and east are wheat and sunflower, in the center - soybeans and corn, and in the north - corn.

It's important to realize that under the influence of the global climate warming, along with traditional regions, crops such as sunflower, soy, and corn are also being planted in the northern and even western regions.



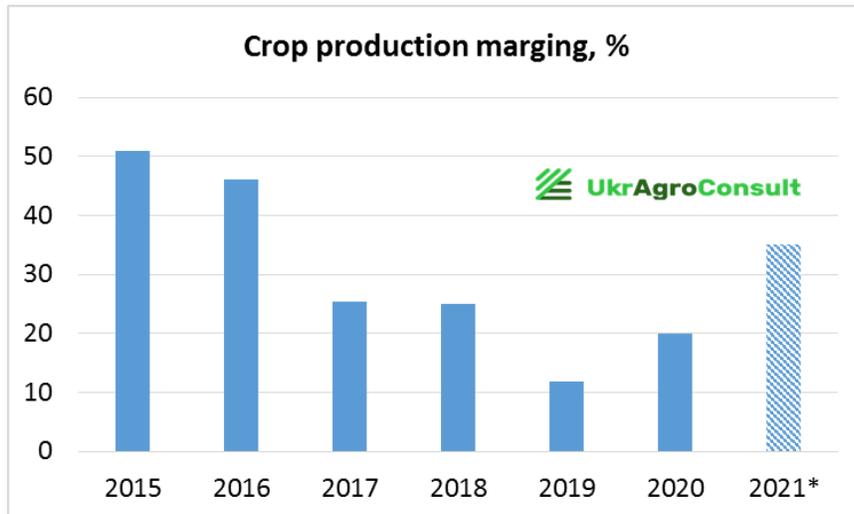
Gradual increase in grains and oilseeds production

In recent years, the dynamics of grain and oilseed production has been showing a positive trend. Moreover, in 2021, Ukraine harvested a record high 107 M mt (grains - 84 M mt, oilseeds - 23 M mt).



Stable margins in grain and oil crops production

High margins and profitability allow to finance production processes at someone's own expense, while improving technologies and constantly increasing yields. Sunflower and rapeseed are among the most profitable crops.



Main pre-war trends in the fruit and vegetable production

Vegetables

Fluctuations in sown areas

In Ukraine, there has been a decline in the area under potatoes and an increase in the area under other open ground vegetables. The main reasons for the trend are a decrease in consumer demand for potatoes and an increasing demand for other vegetables from the processing sector.

Ukraine. Vegetable areas, M ha

	2015	2017	2018	2019	2020	2021
Total	1823	1844	1825	1828	1854	1807
Potatoes	1291	1323	1319	1309	1325	1283
Open ground vegetables	440	439	433	446	457	454

Source: Ukraine State Statistics Committee

Majority of production is from households.

Growth in the share of agricultural enterprises production

In recent years, there has been a trend of growing share of agricultural enterprises production. Growth factors include the use of modern cultivation technologies, high-yielding planting material, and growing demand for vegetables from processing companies and for vegetables and vegetable products from retail chains.

Ukraine. Share of vegetable production by agricultural enterprises, %.

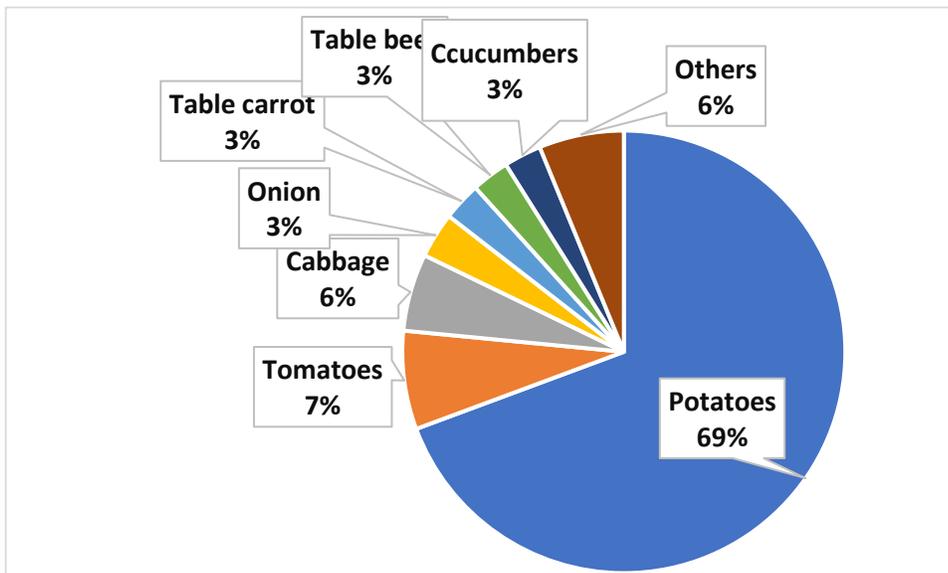
	2015	2017	2018	2019	2020	2021
Potatoes	2,2	1,9	1,9	1,8	1,9	2,3
Open ground vegetables	13,9	14,5	14,4	14,7	15,4	14,1

Source: Ukraine State Statistics Committee

Potatoes rate first in the vegetable production structure

Potatoes are the major vegetable crop in Ukraine, accounting for about 69 % of the total vegetable production. Other top vegetables grown in open ground include tomatoes and cabbage.

Ukraine. Vegetable Production by Crop, %, 2021



Ukraine. Vegetable Production, K mt

	2015	2017	2018	2019	2020	2021
Vegetable crops, total	29462,8	30931,8	31388,5	29459,4	29965,2	30801,5
Potatoes	20839,3	22208,2	22504,0	20269,2	20838,0	21356,3
Cabbage	1677,3	1718,1	1655,0	1739,4	1754,0	1740,5
Cucumbers and gherkins	675,7	626,3	714,6	779,9	754,9	843,8
Tomatoes	2013,1	2002,4	2068,0	2008,9	2020,9	2216,9
Table beetroot	834,6	836,2	818,1	856,5	818,4	847,4
Table carrots	822,9	839,0	841,8	869,5	861,9	863,3
Onions	956,5	976,7	883,9	998,1	1033,7	1024,3
Garlic	176,5	185,8	187,0	215,1	211,7	215,1
Table pumpkins	565,1	621,3	692,6	713,0	649,6	675,2
Table zucchini	496,5	543,1	645,4	633,0	618,4	639,4
Sweet and bitter capsicum	167,2	168,2	176,1	172,8	181,3	173,6
Food melons	578,1	434,2	499,6	556,0	494,8	503,2
Watermelons	460,7	351,1	396,9	441,7	400,1	400,1
Melons	117,4	83,1	102,7	114,3	94,7	103,1

Source: Ukraine State Statistics Committee

Vegetable crop distribution by region

Vegetables are grown in all regions of Ukraine. However, there are certain differences in production volumes due to soil structure and climatic conditions.

In terms of sown areas, potatoes occupied a significant share of the Western region, as well as Vinnytsia and Zhytomyr regions.

In the category of open ground vegetables, more than 40 % was produced in Lviv, Kherson, Dnipropetrovs'k, Kyiv and Kharkiv regions.

Melons and gourds production is concentrated mainly in Kherson region.

Ukraine. TOP Vegetable Production Regions

Vegetable crop	Regions
Potatoes	Zhytomyr, Lviv, Vinnytsia, Kyiv, Rivne, Volyn, Chernihiv, Khmelnytsky, Poltava, Ternopil
Cabbage	Lviv, Dnipropetrovs'k, Kharkiv, Kyiv, Kherson
Cucumbers and gherkins	Kherson, Dnipropetrovs'k, Lviv, Kharkiv, Kyiv, Poltava
Tomatoes	Kherson, Mykolaiv, Dnipro, Kharkiv, Poltava, Kyiv
Table beets	Lviv, Kyiv, Vinnytsia, Dnipropetrovs'k, Volyn, Zhytomyr, Poltava, Kharkiv, Chernivtsi
Table carrots	Lviv, Volyn, Kyiv, Kherson, Vinnytsia, Dnipropetrovs'k, Zhytomyr
Onions	Kyiv, Kherson, Vinnytsia, Dnipropetrovs'k, Kharkiv, Lviv, Odesa, Poltava
Garlic	Vinnytsia, Lviv, Kyiv, Zhytomyr, Rivne, Donetsk, Kirovograd, Poltava, Chernivtsi
Table pumpkins	Kyiv, Poltava, Dnipropetrovs'k, Kirovohrad, Zaporizhzhia, Donetsk, Kharkiv
Table zucchini	Ivano-Frankivsk, Rivne, Cherkasy, Luhansk, Odesa, Chernivtsi
Sweet and bitter capsicum	Kherson, Dnipro, Kyiv, Poltava, Kharkiv, Chernivtsi

Source: UkrAgroConsult

Gradual increase in the niche vegetable crops cultivation

The growing trend of healthy food preference in the domestic market and access to new foreign markets encourage niche vegetable crops cultivation. It also provides an opportunity to diversify agribusiness. In recent years, the production of asparagus, arugula, chard, sweet potato, okra, daikon radish, fennel, spikelet mullein, double monarda and many others that are just entering the consumption pattern, has grown significantly in percentage terms, although crop areas are still small.

Crop area dependence on price trends

There are still signs of spontaneity in the market. If vegetable prices are good in the current season, producers usually increase the area under crops in the next season, and vice versa, if prices are low, the area under crops is reduced in the next season. Such practice leads to either overproduction or to vegetable shortages in the next season.

Shortage of modern vegetable storage facilities

If you produce more than 30 M mt of vegetables and potatoes, you need to have high-quality storage facilities for 2 M mt, while in Ukraine storage capacity totaled 1.5 M mt. Only about 30 % of all storage facilities meet modern requirements.

Low state support

State financial support for vegetable industry in Ukraine is currently insignificant and started only in 2020 with the adoption of the Concept of the State Program for Vegetable Industry Development until 2025.

Fruit and berry crops

Steady decline in fruit areas

In Ukraine, there is a steady decline in pome and stone fruit crops area. Old unproductive orchards are being uprooted. At the same time, the berry crops area has remained fairly constant.

Ukraine. Fruit and Berry Areas, M ha

	2015	2017	2018	2019	2020	2021
Total	206,0	198,5	200,0	195,5	191,0	190,5
Fruit areas	173,6	165,7	166,2	161,3	158,0	157,2
Berry areas	19,8	19,9	20,2	19,8	19,9	19,9

Source: Ukraine State Statistics Committee

Majority of production is from households.

Growth in the share of agricultural enterprises production

In recent years, there has been a trend of growing share of agricultural enterprises production. Growth factors include the planting of new fruit and nut orchards and berry plantations using modern technologies with high-yielding planting material, and growing demand for fruit and berries from processing companies, retailers, and exporters.

Ukraine. Share of Fruit and Berry Production by Agricultural Enterprises, %.

2015	2017	2018	2019	2020	2021
19,1	16,3	21,6	16,6	16,8	20,8

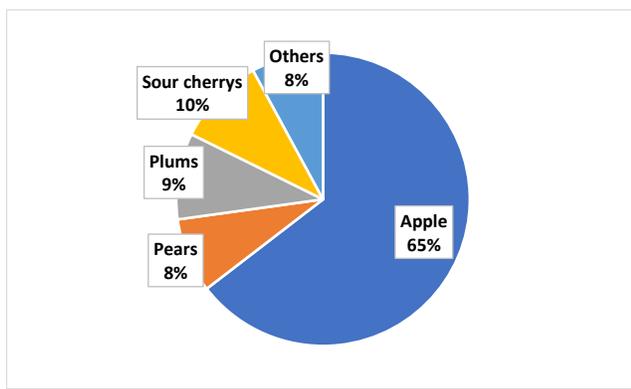
Source: Ukraine State Statistics Committee

Apples rate first in the fruit production structure

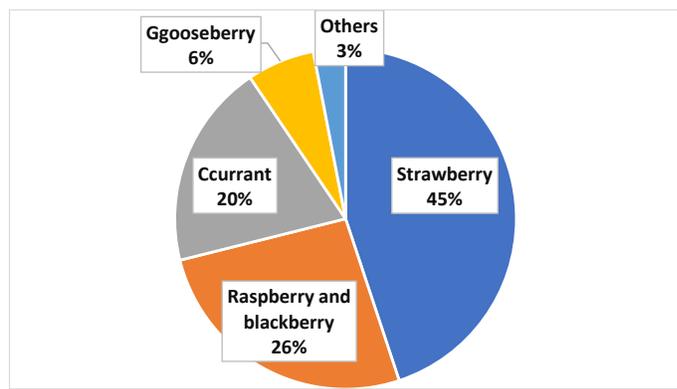
Apples make up the bulk of fruit production in Ukraine. In recent years, their share has amounted to around 55-57 %.

Among berry crops, strawberries are at the top position.

Ukraine. Fruit crop structure, %.



Ukraine. Berry crop structure, %.



Fruit and Berry Production, K mt

	2015	2017	2018	2019	2020	2021
Fruits and berries:	2152,8	2048,0	2571,3	2118,9	2023,9	2235,1
apples	1179,6	1076,2	1462,4	1154,0	1114,6	1278,9
pear	170,6	165,4	183,2	155,3	152,3	163,3
plum	184,0	200,5	198,1	181,1	173,2	188,3
cherry	192,9	172,3	218,7	167,5	174,6	193,7
cherry	76,6	70,9	84,6	68,6	63,6	61,9
apricot	64,9	86,7	111,7	83,7	69,5	56,8
peach	15,6	19,9	26,4	24,2	17,1	17,7
nuts	115,1	108,7	127,2	125,9	113,4	115,5
strawberries	64,0	55,0	62,3	62,6	55,2	62,3
raspberries and blackberries	30,4	34,2	35,2	35,5	35,3	36,3
currant	25,5	27,1	29,6	26,6	25,8	27,0
gooseberries	6,6	7,8	8,2	8,1	8,1	8,9
Grapes	386,3	409,6	467,6	366,3	281,0	264,1

Source: Ukraine State Statistics Committee

Fruit and Berry Crops Distribution by Region

Fruits and berries are grown in all regions of Ukraine. However, there are certain differences in production volumes due to soil content and climatic conditions.

Ukraine. Key Regions for Fruit and Berry Crops Cultivation

Crops	Regions
Apples	Vinnitsia, Chernivtsi, Khmelnytsky, Zakarpattia, Lviv, Ternopil, Dnipropetrovs'k
Pear	Chernivtsi, Dnipropetrovs'k, Poltava, Lviv, Donetsk, Khmelnytsky, Rivne
Plum	Khmelnytsky, Odesa, Chernivtsi, Rivne, Poltava, Donetsk, Dnipropetrovs'k, Lviv
Cherry	Poltava, Dnipropetrovs'k, Rivne, Luhansk, Chernivtsi, Odesa, Zaporizhzhia, Donetsk
Cherry	Dnipropetrovs'k, Zaporizhzhia, Donetsk, Odesa, Chernivtsi, Poltava
Apricot	Odesa, Poltava, Luhansk, Donetsk, Kherson, Zaporizhzhia, Rivne
Peach	Odesa, Kherson, Donetsk, Dnipropetrovs'k, Zaporizhzhia, Mykolaiv
Nuts	Odesa, Vinnitsia, Zakarpattia, Lviv, Cherkasy, Chernivtsi, Khmelnytskyi
Strawberries	Vinnitsia, Volyn, Kherson, Odesa, Lviv, Kyiv, Ternopil, Zhytomyr, Dnipropetrovs'k
Raspberries and blackberries	Kyiv, Vinnitsia, Dnipropetrovs'k, Kharkiv, Poltava, Rivne, Cherkasy
Currants	Volyn, Ternopil, Lviv, Khmelnytsky, Sumy, Dnipropetrovs'k, Vinnitsia
Grapes	Odesa, Zakarpattia, Mykolaiv, Kherson, Dnipropetrovs'k

Source: UkrAgroConsult

Gradual increase in the niche fruit and berry crops production

Blueberries: The most marginal, dynamic, and interesting crop for berry producer. The blueberry has been actively cultivated since 2012. The peak of making plantations was in 2016. Currently, the area under blueberries in Ukraine totaled 5.3 K ha. The active cultivation areas cover Zhytomyr, Kyiv, Ivano-Frankivsk, Vinnitsia, Cherkasy, and Lviv regions.

Dogwood: The largest dogwood garden in Europe, covering 14 ha, has been planted in Zaporizhzhia region. The berries are sold fresh and processed at the company's own facilities.

Sea buckthorn: One of the newest berries for industrial horticulture. Sea buckthorn cultivation has become a new trend in the fruit and berry market. There is a stable demand for sea buckthorn among exporters.

Honeysuckle: An interesting and promising crop that has been present in Ukraine not so long ago. Currently, it enjoys delayed market recognition and demand.

Shortage of modern fruit storage facilities

Ukraine gross fruit and berries production amounts to 2 M mt. At the same time, the fruit and berries storage capacity totaled about 300 K mt. Only 80 K mt of storage facilities are equipped with the technology of controlled gas environment. The rest are equipped with conventional refrigerators or do not have them either. This situation primarily affects the produce quality and shelf life.

Growing state support

The state provides a system of grants to compensate for gardens and berry fields planting in the amount of UAH 140 K - 400 K per ha. The garden area is required to be from 1 to 25 ha. The main condition for gaining a grant is the creation of new jobs.

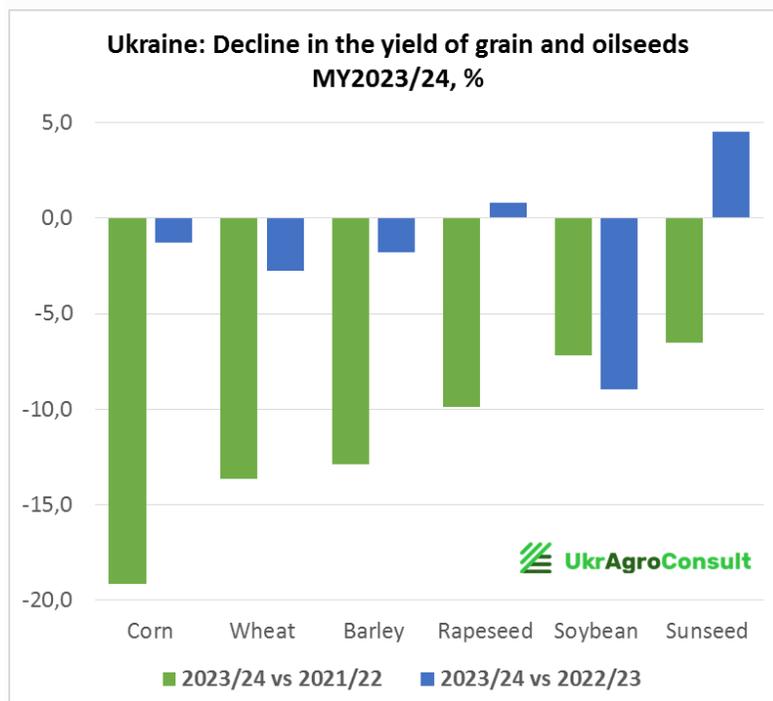
Recent Trends in Grain and Oil Crops Production in 2022-2023 MY

Crop Areas Reduction

About 20 % of all arable land is located in regions out of Ukraine control, where a significant part of wheat, barley and sunflower is grown.

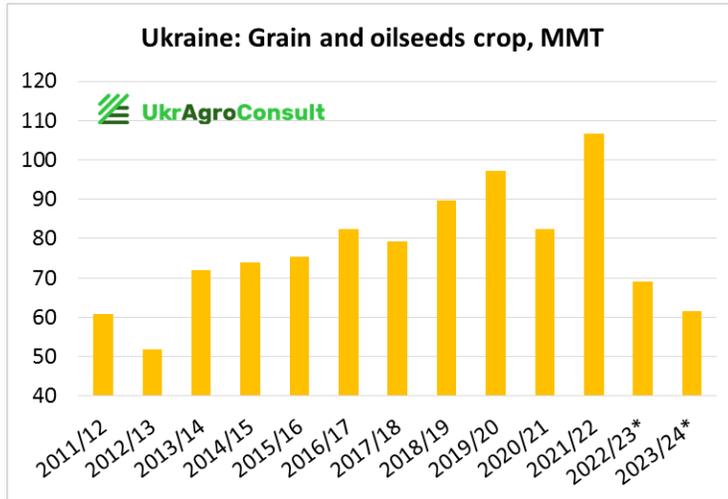
Lower yields

Due to reduced fertilizer and plant protection application, and other technology failures, yield decline is expected for almost all crops, in both 2022/23 and 2023/24 MY. The only exception may be sunflower, since this crop is in the highest demand in both domestic and foreign markets and shows the best margin among all crops. Therefore, farmers will allocate maximum funds to this crop.



Decrease in grain and oilseed production

Unfortunately, grain and oil crops production in 2022 decreased significantly, moreover, it is the worst result for the previous decade since 2013/14 MY. The harvest decline occurred before, mainly due to unfavorable weather, but it was not so significant – minus 37.7 M mt or minus 35 % compared to 2021/22 MY.



Change in regional crop structure

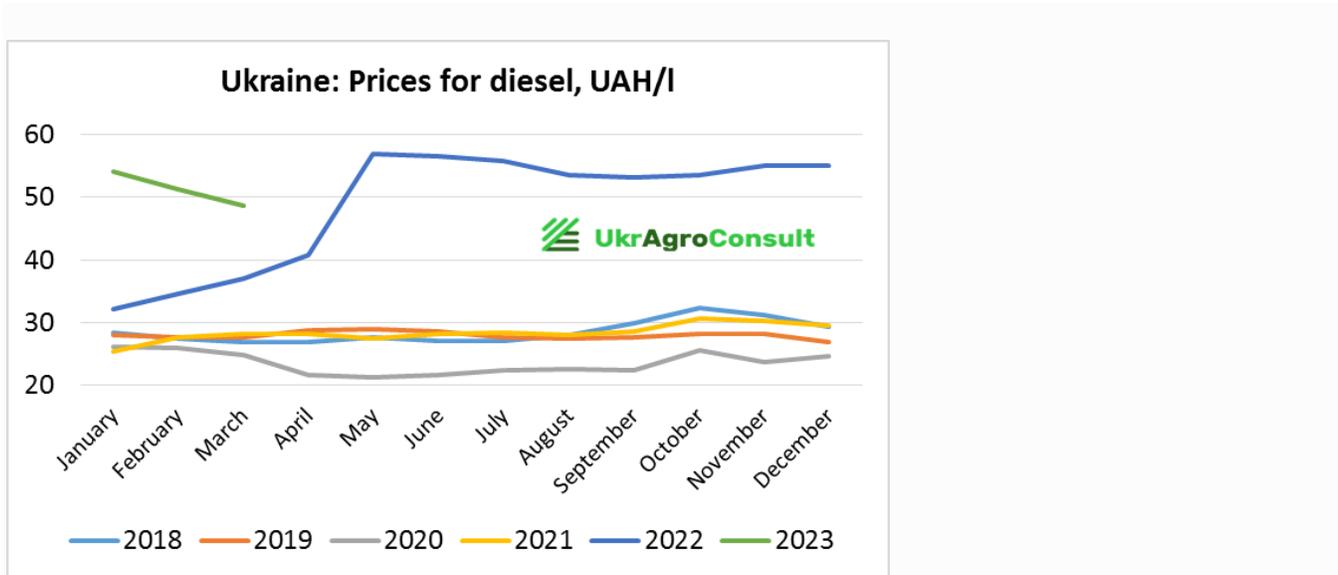
A significant portion of wheat, barley and sunflower crops is located in occupied, risky and adjacent territories. Some of these crops have shifted to relatively safer regions to the north and west, but not enough to compensate the losses in the south and east of the country.

Delayed corn harvesting

Lack of storage facilities, blackouts and power outages, the high fuel prices have resulted in an unusually slow corn harvesting. As of the early January 2023, 22 % of corn crops remained in the fields. Winter harvesting led to increased grain losses both in terms of quantity and quality. The situation was further aggravated by the high carryover stocks from 2021 harvest amid the restrained demand from exporters, which negatively affected corn prices. The gradual increase in prices in December-January encouraged continued winter harvesting, and as of mid-February, about 7 % of the corn area remained unharvested.

Sharp increase in production costs

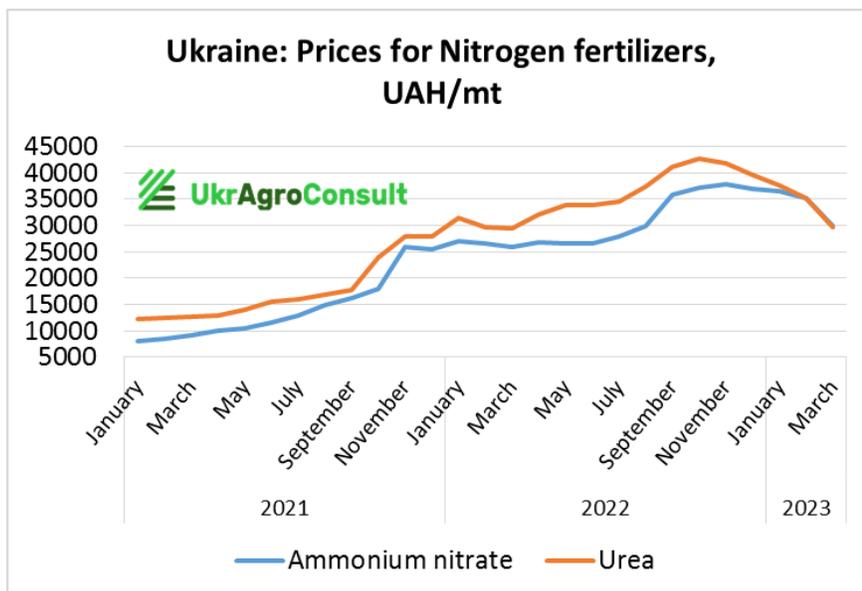
Prices for fuel, fertilizers, and plant protection products have almost doubled in UAH equivalent y/y. However, price growth was mainly driven by the hryvnia devaluation, while the inputs prices changed little if converted into foreign currency.



Source: *minfin.com.ua* according to the A-95 Consulting Group

According to UkrAgroConsult estimates, in 2022, the fertilizer market faced several serious challenges, which resulted in a 40-45 % decline in the market volume. The plant protection products market also shrank significantly.

Overall, the downward trend of the inputs market is expected to continue in 2023. Farmers will use the least resource-intensive technologies and rely on unpretentious and less costly crops. Farmers deliberately follow costs saving strategy through lowering expected yields of major crops to simplify technologies and reduce costs.



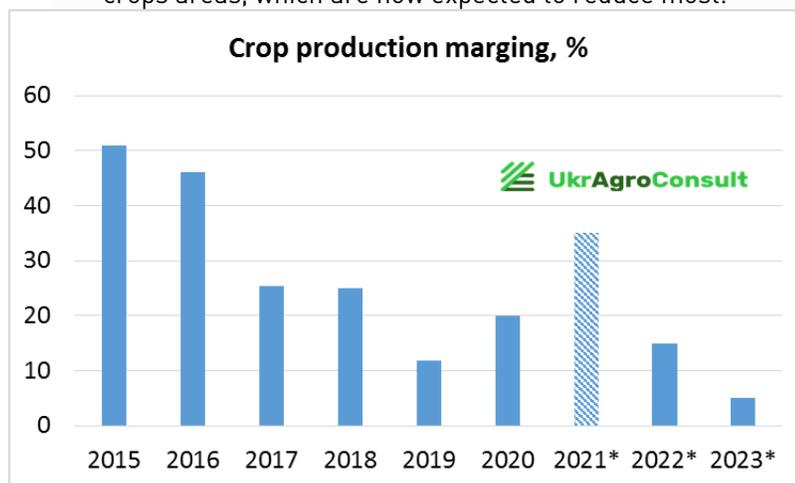
Grain storage and transportation costs also increased. Rising gas prices and unstable electricity supply have led to higher prices and problems with grain handling. Moreover, this year the autumn was wet in the center and north of the country, where the major corn areas are located, that is, the corn drying costs increased also due to weather-related reasons.

Sharp decline in profitability and farming margins

The significant domestic prices dropped while inputs prices were relatively stable or growing, leads to a decrease in margins and a fall in farmers' assets.

The key consequences of the financial weakening:

- reduction of the cultivated area. According to UkrAgroConsult's calculations, 2023 grain and oilseed areas may shrink by 3-4 M ha. Largely, the reduction will be in the occupied and near front-line territories, but partially due to land left under fallow.
- a crop rotation change. It implies a switch to less costly crops. We expect the share of oilseeds in the cropping pattern to expand to 31 % (23 % in 2022).
- farmers may prefer low yield crops due to the lack of silos and high cost of post-harvest grain handling. This trend is especially popular with small farmers having no on farm silos. The planted spring barley and niche crops areas in spring 2023 could still surprise and exceed expectations.
- delayed decision-making. Farmers going to sow at minimal costs with inputs available right now (leftover seed, sales of grain stocks, application of leftover fertilizers and PPP or the most affordable generics, etc.). This provides farmers with a certain amount of time to decide on the cropping pattern. Price changes/expected price growth in the coming February-April may give chance to stabilize corn and other crops areas, which are now expected to reduce most.



Key factors affecting the cropping pattern for grains and oilseeds in 2023/24 season

In 2022/23, the fall in farming margins pushes Ukrainian farmers to implement a strategy of reducing production costs and expanding the area of the most profitable crops for the 2023 harvest.

Key factors affecting the cropping pattern in 2023:

- Ukrainian farmers will be under full-scale pressure of the war-related risks in the 2023 plantings;
- working capital deficit and a decline in farming margins;
- uncertainties of the availability and possible upward movement of prices of seeds and fertilizers;
- forced changes of crop rotation, needs to use land at maximum, this rules out the possibility of leaving land under fallow;
- high logistics costs.

Currently, the impact of each of these factors encourages significant savings in production costs.

Winter Crops Areas for 2023/24 MY

A record small area was planted with winter crops in the fall of 2022, down 37 % from the pre-war level. The largest decline happened in the east and south of Ukraine, because of the hostilities. In the northern regions winter crop plantings also shrank by 16 % y/y.

Winter Crops Areas (2023 Harvest), Th ha

Crop, Th ha	2022*	2023**		2023 on 2022
		Estimate	Actual 28/11	
Winter wheat	5074,39	3989,40	3758,8	74 %
Winter rye	102,82	85,6	79,2	77 %
Winter barley	796,41	675,70	612,5	77 %
Winter rapeseed	1193,74	963,92	998,9	84 %
Total winter crops	5973,62	4752,60	4451,1	75 %

Source: MinAgro

Usually, the final data of the State Statistics Committee exceeds the operational information of the Ministry of Agriculture, so UkrAgroConsult estimate of the planted areas is slightly higher than the operational data. We will be able to adjust the forecast after the State Statistics Committee releases its data, but in any case, the winter crop will be at least 25 % lower than last year.

Most regions reduced winter crops areas. The largest reduction is noted in the north-eastern regions (Sumy, Kharkiv, Chernihiv) and Mykolaiv region. The increase in winter areas in the west of the country, in the Volyn, Zhytomyr, Zakarpattia and Khmelnytsky regions cannot compensate for this decrease.

Please note, the winter crops area decline compared to 2021 might be overvalued. The area numbers might be corrected after sown areas in the 4 most risky regions of Donetsk, Luhansk, Zaporizhzhya and Kherson is reported. Currently, the sown areas reports are missing in those regions. Despite military risks, certain areas were still sown there.

Grain and Oilseeds Harvest Forecast for the New 2023/24 Season

Wheat

Winter wheat area decreased greatly down to 3.76 M ha, as of the late November 2022, with more than 40 % drop from previous year.

The most significant decline is expected in Kharkiv region, which was liberated shortly before the start of planting season. Kyiv, Chernihiv, and Sumy regions, where many fields were damaged by the war, will see a decline in crops to a lesser extent. Not all territories have been cleared of mines and some fields will not be cultivated for certain time.

The rise in domestic wheat prices happened too late to encourage farmers in the western and central regions to expand wheat areas and thereby offset declines in other growing regions. Of course, these areas will be enough to satisfy domestic demand and even produce surplus for export. However, Ukraine's role in the world wheat market will become far less in the next 2023/24 season.

In case the increased demand for wheat from exporters is matched by corresponding price growth, spring wheat areas are likely to be expanded. Spring wheat areas are usually small and amount to 170-200 Th ha. This year, under friendly prices and weather conditions, spring wheat is likely to cover up to 300 Th ha. With overall reduction of crop areas, spring wheat share in the crop structure is very likely to be unusually high.

UkrAgroConsult expects the wheat harvest under the baseline scenario to reach 15.8 M mt, depending on weather conditions in winter and spring.

Barley

Winter barley areas shrank by 35 %. The largest winter barley areas are located in Odesa region thanks to its proximity to the seaports. As a reminder, 60-70 % of Ukrainian barley is exported in the first 3-4 months of the season.

UkrAgroConsult expects that spring barley areas will be 20 % lower than in 2022. Reduction of barley areas will be registered in war-affected regions. UkrAgroConsult expects spring barley acreage to be 20 % lower than in 2022. Large-scale farms in the western regions might give preference to other crops with high export demand in the EU and can also reduce barley areas.

Spring barley is attractive thanks to its cheap production costs and a quick return on investment (4 months from sowing to harvesting / sale). However, sales may face a problem in 2023. Over the past few seasons, Ukraine focused its barley shipments on China, giving way to Russian barley in other markets, for example in Saudi Arabia. And regaining those markets will not be easy. Shipments to Southeast Asia, incl. China, are only possible by large ships currently idle in the Bosphorus lines, i.e., shipping by Panamax vessels is difficult, long, expensive, and risky.

The 2023 barley production is expected to amount to 4.2 M mt (-22 % of 2022) with the total winter and spring barley area about 1,275 Th ha.

Corn

Even though the corn cultivation areas are far from the main hostilities, the corn acreage is expected to decrease to 3.5 M ha because of purely economic factors.

Weak domestic corn prices have already caused farmers to leave part of corn in the fields for wintering. It means the areas will not be properly prepared for spring sowing, as farmers usually do.

High European demand for corn and availability of alternative export routes (by sea/by land) fuel in domestic prices rise. However, the prices may fall if the 2023 in Europe turns out to be less dry and more productive. Moreover, corn growing requires complex and expensive practices, availability of which in Ukraine is in great doubt this year. Also, low market corn prices may leave the farmer on the edge of ruin in 2023.

With an average yield of 6.2 t/ha, next year's corn production may amount to 21.4 M mt, which is almost 20 % less than in 2021/22 MY.

Rapeseed

Rape is the only winter crop for which the sowing plan was exceeded, which indicates farmers are increasingly encouraged to plant oilseeds for 2023. The winter rapeseed area for the 2023 harvest is down 29 % y/y after its expansion in 2021. Farmers sowed some 1 M ha. Ukragroconsult's forecasts are more optimistic than the official ones and amount to 1.2 M ha (1.4 M ha last year). The main area reduction occurred due to the occupied territories of Kherson and Zaporizhzhya regions. The fairly stable indicator of areas in the unoccupied territory of Ukraine is due to the high margin of rapeseed compared to other crops, as well as high demand from European countries.

Spring rapeseed areas will probably expand up to 50-100 Th ha compared to the usual 40-50 Th ha, provided the weather is favorable.

The total rapeseed production is expected to amount to 2.9 M mt (-11 %) due to a reduction in both areas and yields.

Sunflower seed

Sunflower seed (SFS) is one of the most profitable crops. Since 2018, its average area has been exceeding 6.5 M ha for all Ukraine. SFS area is expected to increase to 5.6 M ha in 2023 (+10 % of 2022). In addition, the sun seed area expansion is driven by continued operation of crushers in the central and even southern regions of Ukraine thanks to vegetable oil exports renewal through the grain corridor and export shipments are rather active.

If yields remain at the average level of the last 5 years, the SFS production will reach 12.8 M mt (+18 % by 2022).

Soybean

The western regions of Ukraine are usually the top soybean producers, and they are far from war-related risks. In 2022, farmers in the western regions expanded soybean areas by 10 %. This trend continues in 2023. Soybean crushing industry is located in this safer part of the country. UkrAgroConsult expects an increase in soybean crushing, this will back Ukrainian farmers' incomes. In addition, the soybean area expansion is promoted by high European demand for soybeans, oil, and meal.

The forecast for the soybean production looks more optimistic compared to last year's due to the increase in acreage and yields and is expected to reach 4.2 M mt (+10 % by 2022).

Forecast for the 2023 grain crop

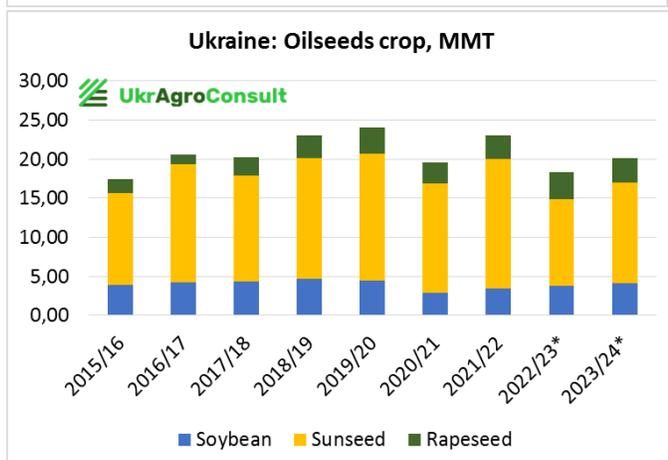
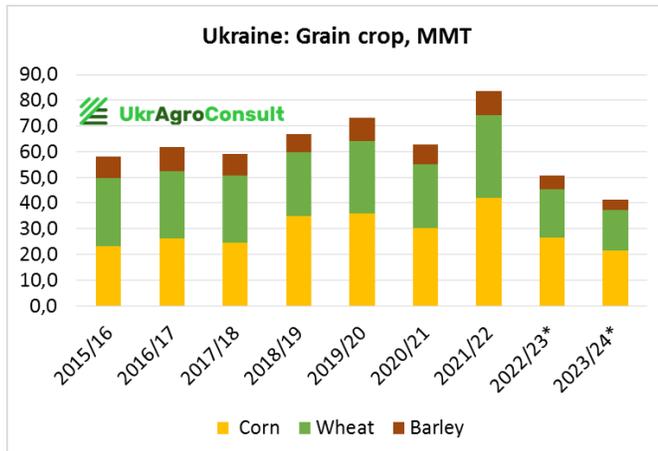
Crop	Sown area	Harvest area	Yield	Crop
Wheat	4050 🇺🇦	4041 🇺🇦	3.91 🇺🇦	15800 🇺🇦
Barley	1275 🇺🇦	1270 🇺🇦	3.31 🇺🇦	4200 🇺🇦
Corn	3500 🇺🇦	3452 🇺🇦	6.20 🇺🇦	21400 🇺🇦
Others	669 🇺🇦	656 🇺🇦	2.25 🇺🇦	1475 🇺🇦
Grains and pulses	9494	9419	4.55	42875

Forecast for the 2023 oilseed crop

Crop	Sown area	Harvest area	Yield	Crop
Sunflower	5600 🇺🇦	5550 🇺🇦	2,31 🇺🇦	12820 🇺🇦
Soybeans	1750 🇺🇦	1700 🇺🇦	2,45 🇺🇦	4165 🇺🇦
Rapeseed	1250 🇺🇦	1190 🇺🇦	2,64 🇺🇦	3142 🇺🇦
Oilseeds	8600	8440	2,38	20127

Summarizing the 2023 trends:

- A shift in planted areas to oilseeds;
- Farmers will prefer cutting their production costs at the expense of the proper application of agrarian technology;
- A decline in the weather factor role while crop margins becoming more important when choosing the crop to sow;
- A lack of long-term strategies as farmers make plans for the short-term only.



Recent Wartime Trends in Vegetable, Fruit and Berry Crops Production

The 2022/23 fruit and vegetable season in Ukraine will be the most difficult for the latest three decades since 1991.

Vegetables

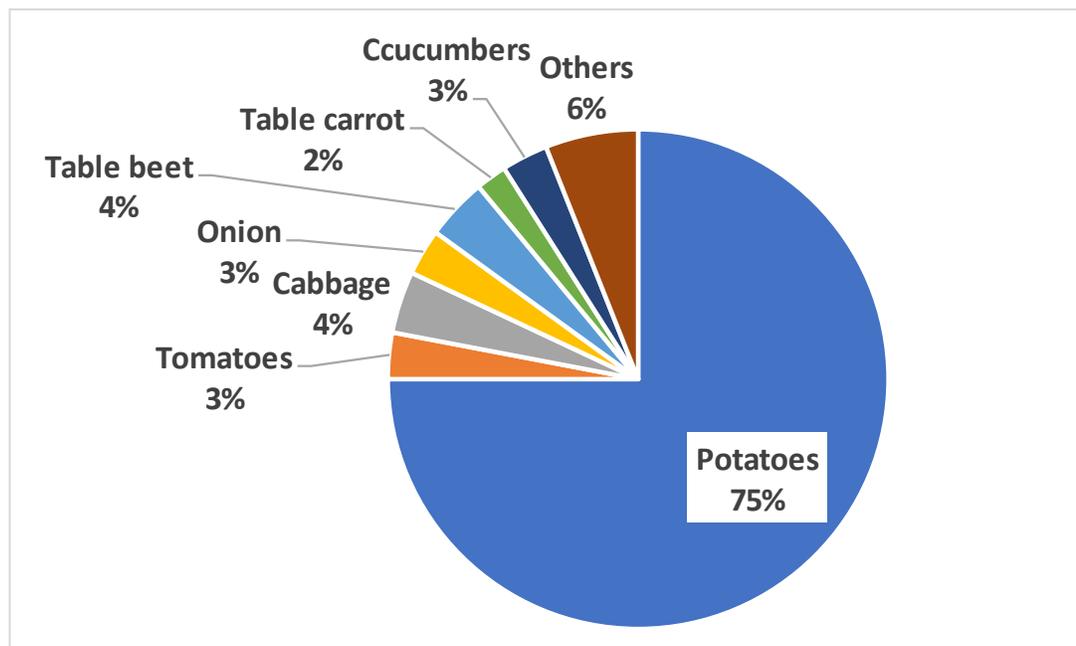
Reduction of cultivation area

The total vegetable cultivation area in 2022 is estimated at only 1.5 M ha, which is almost 20 % less than in 2021.

The territory of the large vegetable producers in Zaporizhzhia and Kherson regions, almost entirely Donetsk and Luhansk regions, a part of Kharkiv region are occupied. The territory of Crimea remains completely annexed. The military occupation of the southern and eastern regions deprived Ukraine of 40 % of the commercial production of onions and 30 % of carrots.

Supply chain disruptions from the regions with high military risks did not affect the total domestic vegetable supply. In addition, some regions in the center and in the west of Ukraine to offset the shortage of potatoes, beets, white cabbage increased the sown areas under "borscht set" vegetables.

The sown areas by vegetable crop in 2022, %

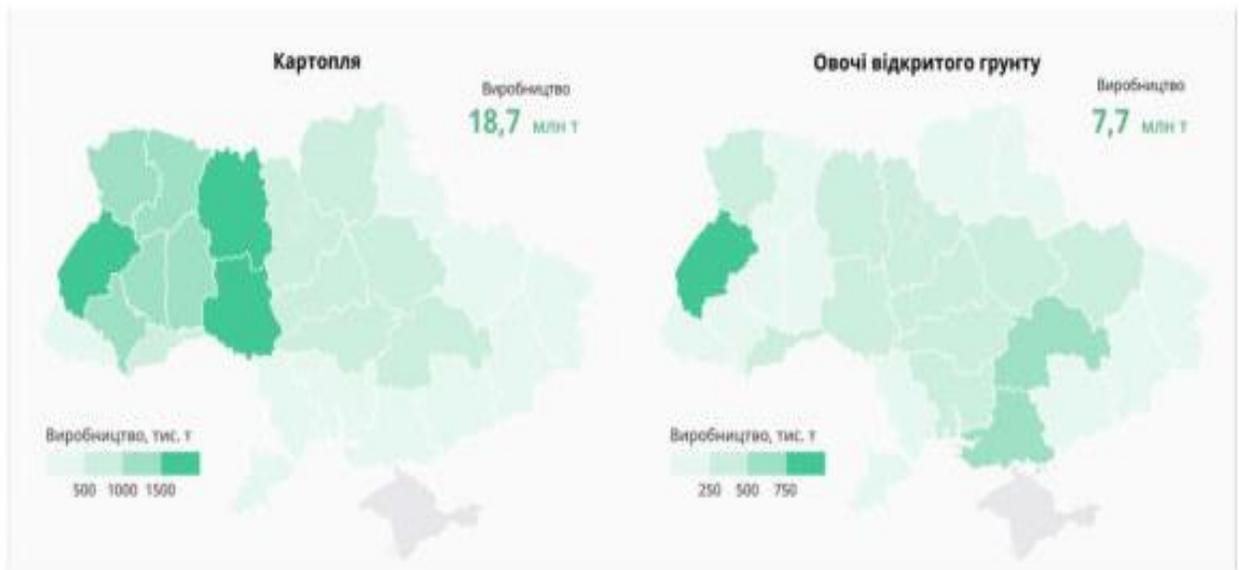


Source: UkrAgroConsult calculations

Declining production

Based on preliminary estimations, potato production is down by 12 % compared to previous years, and other open ground vegetables by 18 %. The five regions of Central Ukraine, which are the largest vegetable producers, harvested about 34 % of the 2022 total vegetable production.

Vegetable Production in Ukraine in 2022, M mt (preliminary estimates)



Source: NAASU

Vegetable price records

Wholesale prices at the beginning of the season in Ukraine for most items of the borscht set significantly exceeded the previous year's figures.

Potatoes are the least problematic crop of the borscht set in Ukraine in the 2022/23 MY, with the lowest wholesale prices throughout the current season.

The increase in beet areas by farmers in the regions free of hostilities led to a growth in the gross production and helped to keep prices moderate throughout the season.

The shortfall in carrot production in Kherson region was very difficult to fully compensate. As of early April 2023, carrot prices are on average 3 times higher than y/y and amount to UAH 28-36 /kg, depending on the quality. The price growth was promoted by a sharp increase in demand for carrots. At the same time, carrot stocks in Ukrainian farms are currently sufficiently depleted, which also supports prices.

The cabbage sector is also problematic. The gross cabbage production decreased, and the share of low-quality products increased due to frost and rainy weather in September. At the beginning of the season, wholesale prices were around UAH 10 /kg, and by early April 2023, they had risen to UAH 20-25/kg.

Onion production will remain the most vulnerable. Kherson region is traditionally the main player in the onion market in Ukraine. Few commercial producers from other regions have switched to this crop. In addition,

unfavorable weather has led to a rapid quality deterioration of 2022/2023 MY onion crop in almost all regions of Ukraine. At the beginning of the season, the onion price amounted to UAH 7 /kg, which is 2.3 times higher than last season's prices for the same period. As of early April 2023, the wholesale onion price rose to a record high and amounted to about UAH 45 /kg, which is 2.5 times higher than in 2021. The limit of onion price increase has not yet been reached, as the early onions harvest in Ukraine and Moldova (by mid-June) is still more than two months away.

Fruits and Berries

Overproduction of fruit and berry crops

Given the overproduction of fruit and berry crops, Vinnytsia, Chernivtsi, Khmelnytskyi, Dnipro, Lviv, and Poltava regions, which are the largest fruit and berries producers, are able to meet the domestic demand despite the war. However, the timing of deliveries is later than in the southern regions.

The major part of fruit and berry supply in Ukraine does not meet the importers' standards.

Additional problems with apple sales appeared after breaking supply chains. In recent prewar years, Ukraine has been quite successful in developing the Arab and Asian markets. These destinations during the war have become virtually inaccessible because of maritime logistics disruptions.

The market is oversaturated with blueberries. This has led to a decrease in the blueberry prices.

Reduced demand for fresh berries

The forced migration of a large number of Ukrainian population abroad and within Ukraine during the war significantly reduced the fresh berry consumption.

A bitter season of watermelons and cherries

Sweet cherry production is estimated as low. The main market player, Melitopol, was unable to sell its products in the domestic market due to the temporary occupation. Other regions, such as Vinnytsia and Chernivtsi, did not even set prices for cherry.

The situation with watermelons and melons is worse: no one can replace Kherson products. Shortage of these crops was only partially offset by the harvest from central and southern Ukraine.

Business re-profiling

Berry producers have partially switched from growing berries to vegetables, and therefore the berry production was significantly reduced.

Berry areas expansion despite the war

The dynamics of the area expansion is 4-5 times less than in the prewar period of 2018-2021.

The high price of raspberry for freezing encouraged the establishment of new raspberry plantations.

The new plantation creation in 2022 was planned and prepared the year before, so new garden blueberry plots were planted in the 2022/23 season in the spring and summer, despite the war.

For garden strawberries, there was a significant reduction in the new planted areas.

Vegetable and Berry Production Forecast for the New 2023/2024 MY

Vegetable crops

In 2023, it is expected

- reduction in potatoes areas and production by 3-5 %;
- increase in carrot and onion areas by 10-15 %;
- beet and cucumber area will remain at last year's level;
- increase in tomatoes areas by 5-7 %.
- Key factors impacting the vegetable crops area and structure:
- price trends in the vegetable market;
- domestic demand;
- access to vegetable crops cultivation areas in the liberated territories.

Seed distribution projects by charitable foundations will continue to support households in growing vegetables.

Fruit and berry crops

In 2023, fruit and berry crops production is expected to decline by 10 % and grapes by 11 %.

Garden strawberry production and consumption dropped impressively during the war. As a result, in one-two years after the war is over, Ukraine might experience strawberry shortage, which in turn should promote an upward price behavior.

The garden strawberry area expansion in the central, western, and northern regions of Ukraine in 2023 is unlikely to fully compensate for the deficit of berries from the South of Ukraine.

Favorable price trends and high demand for raspberry will stimulate the new plantations establishment and increase in raspberry supply.

The apple harvest is expected to be at the level of previous years. This will require solving problems with sales and processing to support producers.

The planting of new orchards and berry gardens is expected to increase due to the extension of the grant program of the Ministry of Agrarian Policy in 2023.

PROCESSING SECTOR

Main Trends in Grain and Oilseed Processing before 2021/22 MY

Grain industry

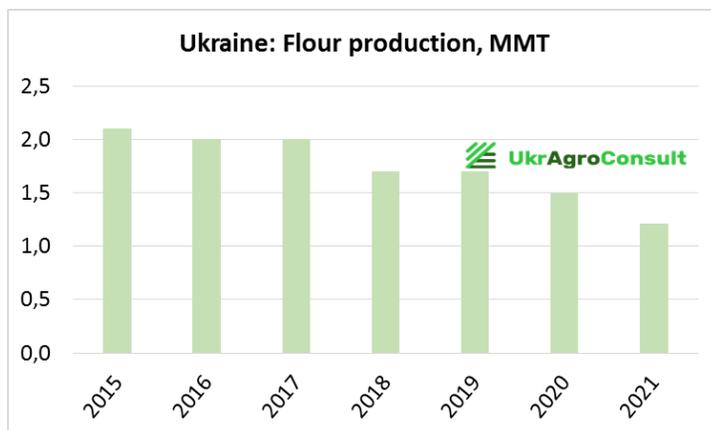
Traditionally, in Ukraine, the lion's share of the gross grain harvest was exported, while the share of the harvest required for domestic needs did not exceed 36 % over the past 5 seasons, incl. on average 6-8 % for food consumption and 15-18 % for feed. It should be noted that not all this grain was used for processing - a significant share of feed grain is used in livestock production, especially in the private sector, without any processing.

A significant excess of export potential over domestic processing is typical for major grain crops. According to UkrAgroConsult, in the last pre-war 2020/21 season, Ukraine processed about 5.4 M mt of grain for food purposes, incl. about 3.9 M mt of wheat. This is the lowest processing rate in the last 5 years.

In the grain processing industry, the following main trends were observed in the last pre-war seasons:

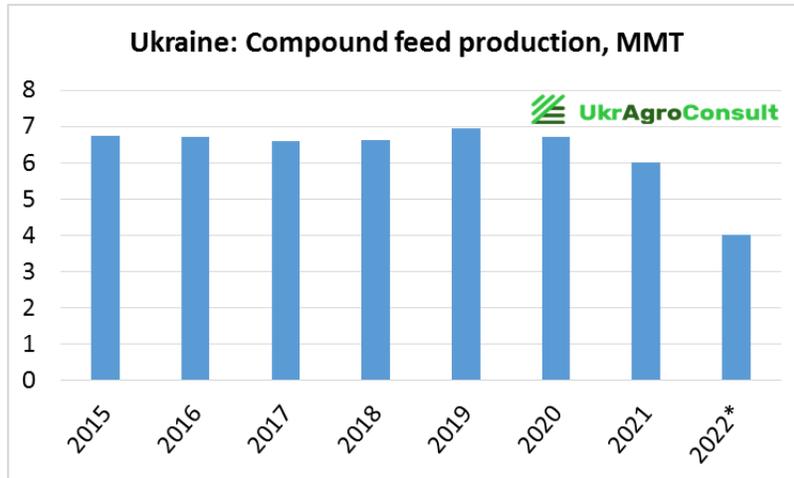
Grain processing into flour and cereals has been mostly declining

The dynamics of flour production in Ukraine has been on a downward trend in recent years, due to declining exports, low production profitability, changing gastronomic preferences of Ukrainians, and a declining population. Over the past 5 years, wheat and wheat-rye flour production has decreased by 37 %, while exports have fallen by 76 %.



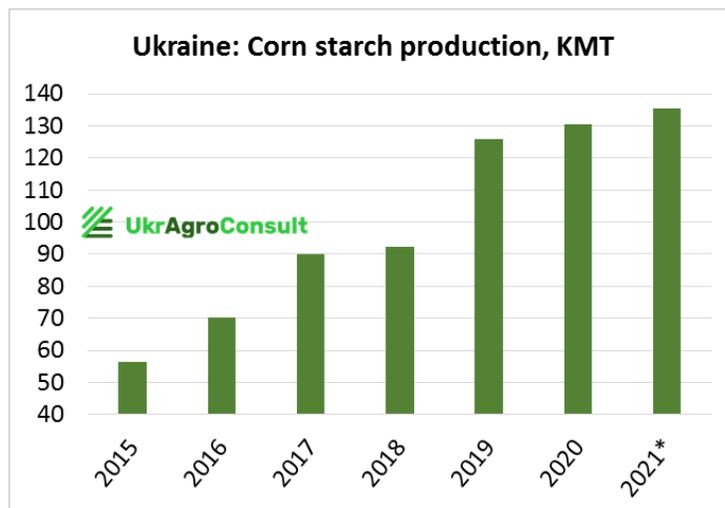
Feed production and overall feed consumption remained relatively stable

at around 6 M mt and 11.5 M mt per year, respectively.



Grain processing had been gradually increasing due to the production and exports of starch and glucose-fructose syrups.

Mostly corn is processed for industrial purposes. Between 2015 and 2021, starch production grew rapidly at an average annual rate of about 23 %. In addition, the glucose-fructose syrups production grew steadily but very slowly, at about 2 % per year. The main driver of these changes was demand from Asia and Africa. In the long run, the grain processing sector looks promising, but it requires rather large investments and does not promise a quick return on investment.



Currently, the grain processing industry in Ukraine is in a very start. The Ukrainian business began to show some interest in the processing industry before the war. New milling facilities with modern high-tech equipment began to appear, new projects for deep processing of grains, primarily corn, were launched. At the end of 2023, the first large UkrStarch plant for L-lysine production owned by Eridon company is expected to start operating and will make Ukraine fully self-sufficient in L-lysine amino acid.

According to UkrAgroConsult forecast, the trend of modernization of existing and construction of new processing plants will continue in the post-war period, as the production of value-added products looks quite promising:

- the country has a wide and diverse grain and oilseeds supply for the production of high value-added products;
- there are serious logistical constraints on grain exports;

- Ukraine does not have a number of important food ingredients that are currently imported but can be produced domestically by processing own raw materials;
- there is unmet demand from importers, including European ones.

Oilseed Processing

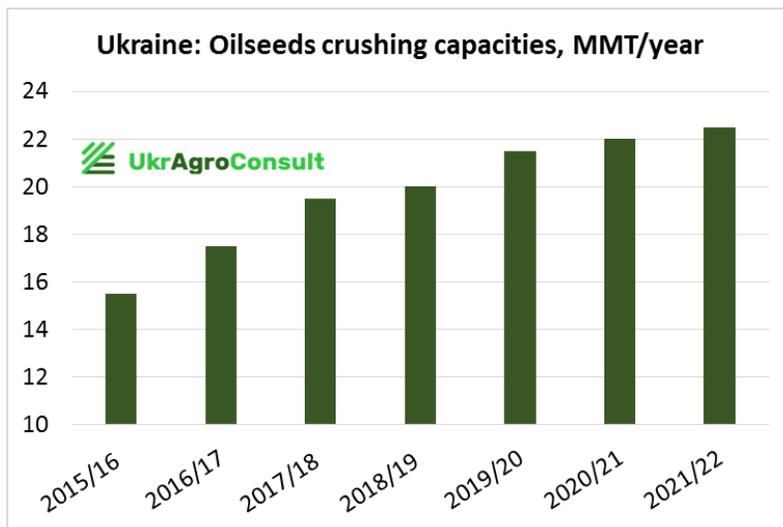
Continuous growth of crushing capacities

The fat-and-oil sector is the most efficient and powerful in Ukraine's food industry. Both large international and Ukrainian companies have invested in it.

The active development of the industry did not stop for a moment, with new crushing factories opening every year and old ones being modernized. Annual capacity growth reached 1 M mt per year.

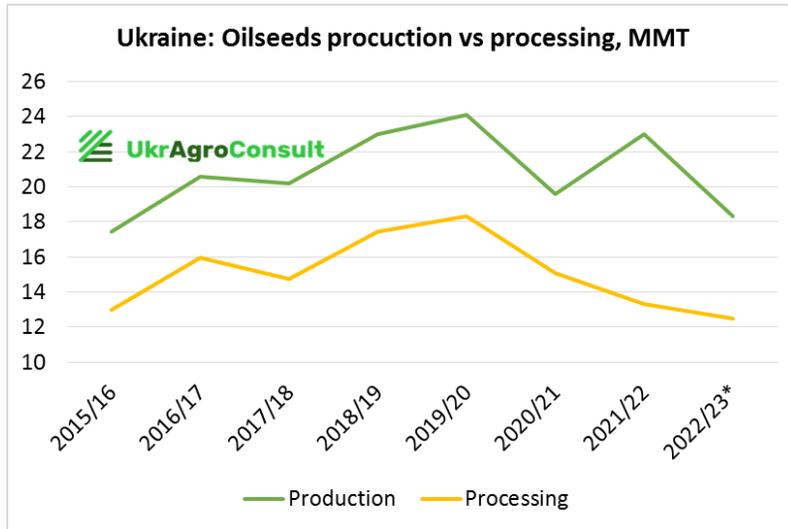
As of January 1, 2022, UkrAgroConsult estimated the crushing capacity at 22.5 M mt per year. Before February 2022, more than 200 market operators were engaged in the industry.

Crushing factories were built in almost every region of Ukraine. However, the main crushers were concentrated in the south and center, where they could operate efficiently, provided with an easy access to oil crops and ports (exports).



After the peak in 2019/20 MY, domestic oilseeds crushing and production of oil and meal had a negative trend

The downward trend in crushing started after the record-breaking 2019/20 MY, mainly due to the gradual decline in oil crops production. Oilseeds crushing and oil production directly depend on the harvest of oilseeds.



Since the beginning of the war, Ukraine's processing industry has faced new challenges and a number of factors that will impact this business in future.

Trends in the Domestic Grain and Oilseed Processing Industry, Generated by War

Loss of grain and oilseeds processing capacities in the occupied territories

About 28 % of flour production and about 10 % of compound feed production are concentrated in the occupied regions or close to hostilities.

More than 5 M mt of the capacities, or 22-25 % of Ukraine's total, are stopped by active hostilities according to UkrAgroConsult estimate.

As of May 2022, the total capacity of the factories left in the occupied territory totals 1.5 M mt per year.

Damage to property and equipment of food producers

Since the beginning of the war, several large agricultural and food producing enterprises have been destroyed. The total direct damage to the assets of enterprises, including the food industry, is estimated at \$9.9 B. As of early September, the direct damage to Ukraine's land fund and agricultural sector amounted to \$6.9 B. In terms of regions, Donetsk region suffered the most, with significant losses in Kharkiv, Luhansk and Kyiv regions.

Loss of grain and oilseeds in damaged or occupied warehouses

Thanks to a record harvest, as of February 1, 2023, Ukraine still had significant grain and oilseeds stocks. Some of them were stored in the regions occupied later or suffered significant losses because of hostilities.

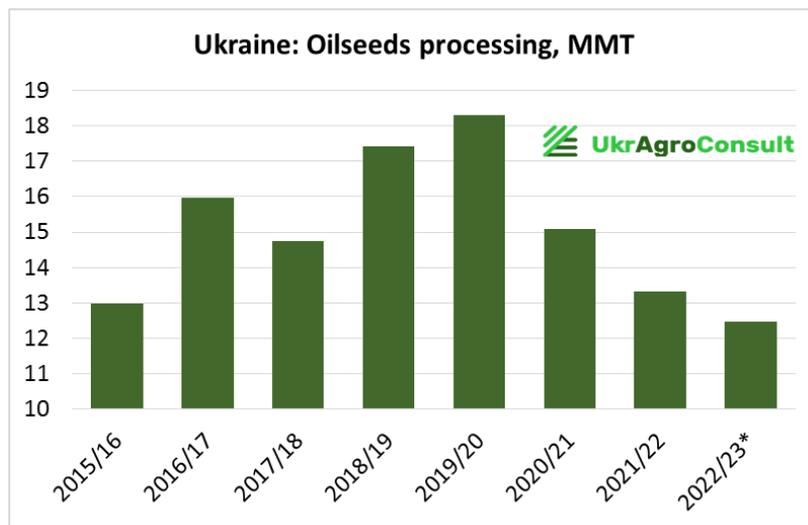
Commodity, K mt	Total as of 1/02/2022	Including the high-risk areas of Donetsk, Luhansk, Kherson, Zaporizhzhia, and Kharkiv regions
Wheat	8 200	2 699
Barley	1 260	314
Corn	16 488	874
Sun Seed	6 147	1 706
Soybean	1 432	161
Rapeseed	91	16

Not all this grain was lost, some owners managed to move it to a safer area. According to UkrAgroConsult estimates, the grain losses amounted to about 2 M mt and SFS losses - about 0.5 M mt.

Reduction in domestic grain and oil crops processing

At the beginning of the war, many companies reduced grain and oil crops processing, but in the second half of 2022, a recovery trend was already observed. Enterprises in the Ukraine-controlled areas worked at maximum capacity, meeting not only current needs but also creating strategic stocks.

However, the numerous problems caused by the war could not but affect the total domestic grain and oil crop processing. According to UkrAgroConsult's balance sheets, the total grain and oil crop processing in 2022/23 MY may be reduced to the lowest rate in recent seasons.



UkrAgroConsult does not expect a significant increase in processing by the end of 2022/23 MY, as Ukraine confronts serious problems in energy system, especially in Odesa region. Unpredictably slow pace of vessels inspection in Bosphorus does not give cause for optimism. In addition, the grain deal prolongation for 60 days instead of 120 after March 19 could again create some uncertainties with exports from Ukraine.

Reduced loading of large factories compared to the pre-war period

As a rule, large enterprises formed grain and oilseeds stocks for at least 1.5-3 months of guaranteed work. This strategy ensured high loading of the enterprise. Unfortunately, many processing enterprises have reduced their stocks. Large stocks require large financial resources and are also a high risk.

The growing role of small local flour and oil producers

The role of small local mills and oil crushers is growing, as a result of broken logistics chains. The grain and oilseeds supply in the regions is still sufficient, despite the export demand recovery. Also, small businesses are more flexible compared to large enterprises. They do not require multimillion-dollar working capital, they are free from the need to make large stocks and a narrower product coverage area makes them less dependent on established logistics routes than large enterprises.

Fragmentation of the previously single agricultural market

Factories located in the west and north, and to a lesser extent in the center of Ukraine, are producing the biggest share of total grain and sun seed processing products due to the growth in food consumption and demand after large population migration from the eastern and central regions. Some large enterprises in both the center and south have not yet resumed operation due to slow grain exports through the Black Sea ports.

Increased oilseeds processing on tolling basis and higher cost of services

Oilseeds processing on tolling basis was quite unpopular before the war. As a rule, only small businesses that had problems with the purchase of raw materials used it.

Now there is a great demand for tolling, and we expect the loading of these plants to increase significantly compared to the pre-war period. Already, the cost of services has risen to \$ 100 per ton compared to \$ 40-45 per ton in the past. At the beginning of the war, with a small number of plants operating, the cost of processing amounted to \$145 per ton.

Increased logistics costs due to broken supply chains

During the peak period of the 2022/23 season, domestic transportation costs almost doubled and, in some cases, amounted to 80-90 euros per ton. At the same time, the cost of grain at elevators decreased and amounted to 150-160 euros per ton for corn, for example. This means that the share of logistics in the cost of grain sold has increased significantly. Thus, the margin on grain sales shifted from the production sector to the logistics sector.

Increase in production costs due to severe energy restrictions caused by damaged energy facilities

Currently, the main problem that grain and oilseed processors deal with is power outages. Due to blackouts and power outages, Ukrainian businesses have to quickly purchase generators, change their work schedules, and reconfigure production.

Large-scale production facilities require powerful generators, but they cannot provide electricity for the entire production cycle. Generators are mainly used for emergency shutdowns to unload processing equipment. In addition, the transition to generators and the forced reduction in processing capacity significantly increase production costs.

Permanent shutdowns of enterprises with a continuous production cycle are dangerous and can lead to unpredictable consequences. This is especially true for the oil industry, given that crushing plants are classified as explosive.

A significant reduction in electricity consumption will inevitably lead to a decrease in the production of final products, an increase in production costs and a possible shortage of Ukrainian products in retail trade and, as a result, an increase in imports.

Reducing domestic consumption of processed grain and oilseeds for food purposes

Traditionally, the production of flour, vegetable oil and cake in Ukraine is much higher than required for domestic consumption. Reducing food consumption has been a trend in recent years. And due to the war, it is expected to further decline to the lowest level for many years.

The main reasons:

- migration of more than 6 million people abroad;
- reduced production of food products (confectionery, chips, mayonnaise);
- decrease in the range of products and price growth;
- change in the diet of the remaining population;

Demand from the population is supported by a reduced consumption of more expensive products in favor of cheaper ones. The share of bakery, pasta and cereals in the Ukrainian diet is growing.

Consumption recovery to the pre-war level can take at least 4-5 years in case of the fast end of war and 5 years in case of long confrontation.

Decline in domestic consumption of feed grains and meals by the livestock sector

The main consumer of feed grains and meals in Ukraine is the livestock sector, including the poultry segment.

The annual feed grain consumption is 10-12 M mt, while the meals consumption varies, but does not exceed 1.5-1.7 M mt. This is due to price and quantity dependencies of meal and feed grain market.

Most feed is produced for the poultry industry. In Ukraine, compound feed enterprises are, as a rule, built at large poultry or livestock complexes. When such a complex closes, the feed production is also closed. This is the reason for the decline in feed production in the previous two seasons.

In 2022, the livestock and feed companies' performance was determined by the following factors, which will continue to be pressing in 2023:

- excessive supply and cheap grain will positively affect the margins of the feed industry. However, rising energy costs will significantly slow down margin growth;
- we expect the reduced oilcake share in the compound feed production at the expense of grain crops, which stocks are much higher than last year, and prices are much more affordable than oilcake prices;
- declining solvency and population numbers provoke a decline in demand for meat;
- duty-free exports of Ukrainian livestock/poultry to the EU amid lower feed costs could become a powerful driver for the development of livestock and poultry farming. Poultry farming is the most attractive due to its short return on investment. Swine breeding requires a longer payback period but remains attractive to investors. Increased risks will hinder investment in the dairy industry.

In the pre-war period, investment projects with a payback period of less than 3 years were usually financed. In a time of war, even such short-term investments are seen as risky.

Forecast:

In 2023, the domestic grain and oilseed processing and processed products consumption are expected to grow under the following conditions:

- all occupied territories will be liberated, enterprises in the southern and eastern regions of Ukraine will resume their operations;
- reopening of all ports;
- demand recovery after the Ukrainian refugees coming back home from abroad;
- food and feed industry recovery;
- improving population welfare and solvency;
- speedy livestock recovery.

Main trends in development of vegetable and fruit processing for MY 2021/22

More than 230 producers of fruit and vegetable products are operating in Ukraine. Specialization is characteristic of the enterprises of the industry. In total, about 20 types of products obtained during the processing of vegetables, fruits and berries are presented on the market.

The main areas of fruit and vegetable processing are:

- juice production,
- canned vegetables and fruits,
- tomato paste,
- jams, confiture, etc.
- fruit fillers, purees, etc.,
- snack production,
- freezing and drying.

Ukraine. Production of certain types of fruit and vegetable products, KMT

Products	2015	2017	2018	2019	2020	2021
Canned vegetables	55,2	55,3	58,2	58,3	55,3	59,6
Jam, preserves, etc.	46,1	44,4	63,2	57,1	51,9	56,3
Juices	601,1	389,3	429,3	421,4	352,8	415,6
Tomato paste	94,2	112,5	112,4	108,0	128,1	129,5
Potato chips	11,4	17,2	20,5	16,1	20,7	24,5
Potato starch	5,6	5,2	6,7	5,6	7,6	9,1
Frozen vegetables	21,4	12,0	8,9	12,5	12,2	12,0
Frozen fruit*	48,0	56,0	61,0	65,0	65,0	68,0

Source.: Ukraine State Statistics Committee * UkrAgroConsult calculations

The majority of enterprises are concentrated in western and central regions of Ukraine, including companies specialized in freezing of fruit and berry products (raspberries, blueberries, etc.). To a large extent, this is due to the proximity of the sales markets of the EU countries.

At the same time, in the northern part of Ukraine with a high potential for the production of fruit, berry and vegetable products, there are almost no companies that do the freezing.

Main factors affecting the level of fruits and berries processing:

- Quality and quantity of raw materials;
- The volume of demand for processed products in domestic market and for export;
- The volume of demand for fresh products of corresponding categories;
- Trend for a healthy lifestyle;
- Development of the fast-food market.

Frozen products

Demand for frozen fruit and vegetable mixes in Ukraine is growing daily. Market of this type of product started forming after active expansion of Hortex and Hortino.

National producers noted that frozen products are in high demand and decided to bring their own frozen products to the market, which are of the same quality as imported products and are more attractive in terms of pricing.

At the moment, market is saturated by approximately 70-75 % or less. Frozen fruits and vegetables market is characterized by wide assortment, represented by both: fruits and vegetables as well as wild berries and mushrooms.

Ukrainian market of frozen goods is young, in process of formation and is unsaturated on one hand and quite narrow and specific on the other.

Structure of national market of frozen goods is composed of mixes (53 %).

New wartime trends in the sector of domestic processing of vegetables and fruits:

- The relative stability of the work of frozen products enterprises. The main berry processing and freezing companies are located in the west and center of Ukraine, where the situation is not as difficult as in the eastern or southern regions.
- Reduction of juice production by the largest producers, whose facilities are located in the south.
- The largest producer of tomato paste in Ukraine has stopped production. A shortage of this product appeared.
- Some brands have transferred their production to the facilities of competitors.

- Shortage of packing materials for children's juices. Most package for baby food was made in Sumy. This company has stopped working.
- Sales problems. Impossibility of delivery to certain regions of the country and complicated export logistics.
- Growing demand for high quality sorting equipment. Modern manufacturers are convinced that it is much easier to sell carefully sorted quality products.
- The margin of frozen products business has significantly decreased. The main reasons are a drop in prices on the main sales market - EU, an increase in energy consumption and logistics costs.

Forecast:

In 2023, growth in domestic production and consumption of vegetable, fruit and berry processing products is expected under the following conditions:

- Gradual restoration of production capacities in the liberated territories,
- Increase in domestic consumption due to the improvement of the welfare and solvency of the population and the return of refugees from abroad,
- Adjustment of production towards products that will remain competitive,
- Increase of organic food production with a focus on export.
- Expansion of sales markets.

TRADE SECTOR

Main Trends in Exports of Grain and Oilseed Crops and Products of Processing in 2021/22 MY

Ukraine plays a significant role in the world trade

Ukraine plays a significant role in world trade and is a strong player in world markets. Ukraine is a major supplier of wheat, corn, barley, oilseeds and oil, meal to the EU, China, Asia, and Africa. Some countries depend on the supply of Ukrainian products. The hostilities broke the stable supply of agricultural commodities and created a large deficit, which is not easy to compensate.

Ukraine's rate in world trade

Wheat	#5
Corn	#4
Barley	#3
Sunflower	#7
Rapeseed	#3
Soy	#7
Sunflower oil	#1
Sunflower meal	#1

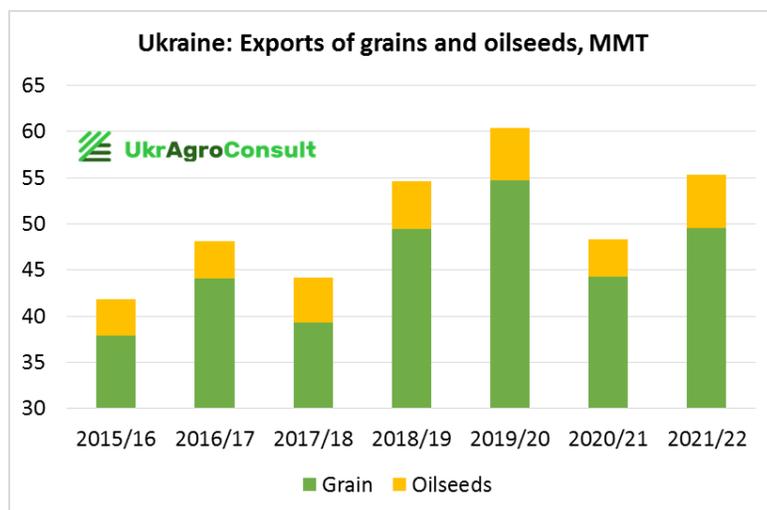
As Ukraine's export share remains stable even amid rapid growth in global grain production and, correspondingly, exports, this indicates the country's growing importance on the world market.

Before the war, Ukraine accounts for 8-10 % of global wheat exports, 12-15 % of corn exports and about 15 % of barley exports. As for sunflower oil and cake, Ukraine's share in world trade is 47-50 % depending on the season.

A positive trend in grain and oilseeds exports

Grain and oilseed exports have grown steadily with slight fluctuations. In 2019/20 MY, grain exports for the first time reached 55 M mt and vegetable oil exports exceeded 7 M mt.

A bumper grain and oilseeds crop in 2021 suggested that exports would certainly be record-high as well. However, due to the key export hubs blockade, the multimillion-dollar export potential remained in the country in the form of carry-over stocks.



Wide exports destinations

Before the war, the grain exports destinations covered more than 100 countries. The main export destinations of Ukrainian wheat were North Africa and Southeast Asia, corn - China and the EU.

TOP importers of agricultural commodities from Ukraine

Wheat	Barley	Corn	Rapeseed	Soy	Sunflower oil
Indonesia	China	China	German	Turkey	India
Egypt	S. Arabia	Netherlands	Belgium	Belarus	China
Pakistan	Libya	Egypt	Netherlands	Netherlands	Netherlands
Bangladesh	Tunisia	Spain	United Kingdom	Egypt	Spain
Morocco	Israel	Iran	France	Italy	Iraq

Correlations of Ukrainian and global prices

Since the biggest share of grains and vegetable oils have always been exported, the trends in domestic prices have largely coincided with global price behavior.

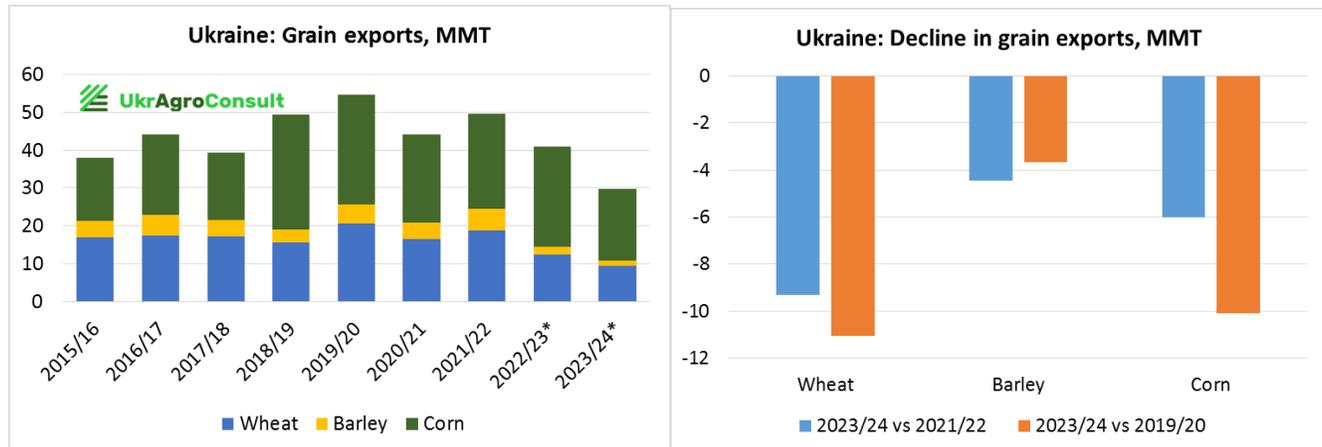
This made it possible to predict the price trend and expand the forward contracts making.

Latest Trends in Trade, Generated by War Risks

A sharp drop in grain exports

With the outbreak of a full-scale war and the Black Sea ports blockade, Ukrainian grain exports have plummeted. The main export route before launching the grain corridor was by rail and road (for more details, see the Logistics Sector section). But land transportation was not able to offset the grain volumes that were usually exported through seaports.

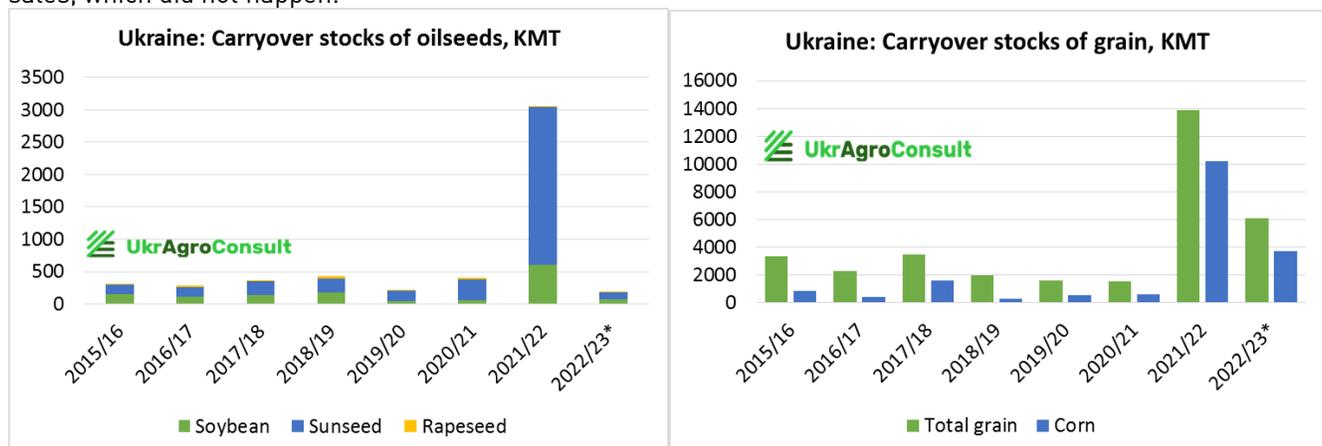
The downward trend in grain exports will be observed until the end of 2022/23 MY and will continue in the 2023/24 MY due to a sharp decline in production.



Unusually long exports of carryover stocks

Given the high grain harvest in 2021 and the almost impossible grain export deliveries caused by war risks in the end of 2021/22 MY, Ukraine faced a new problem - unprecedentedly high carryover stocks. These carry-over stocks compensated for the reduced 2022 harvest and added to the potential exports in 2022/23 MY.

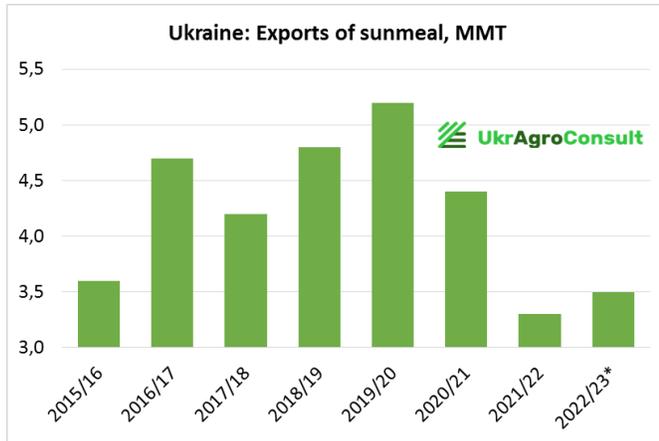
Losses also increased, as some grain was stored in warehouses and big bags in anticipation of early spring sales, which did not happen.



Source: State Statistics Committee

Reduction of meal exports

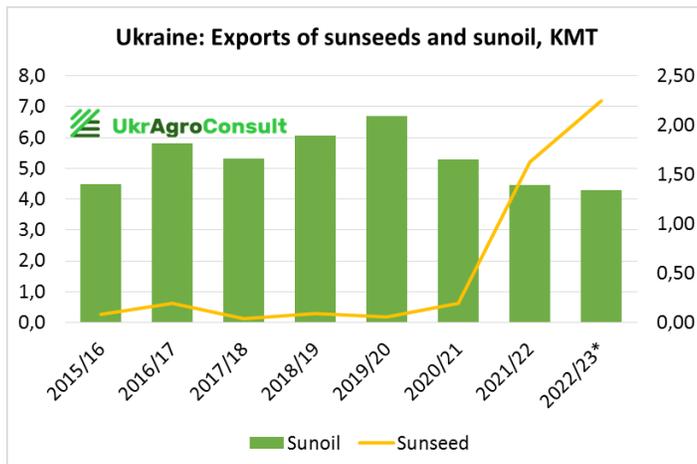
Given that the lion's share of oil and meal goes through ports to India and China, the Black Sea ports slow operation is the main reason for the reduction in grain exports to these markets and the global market in general.



Reduction of oil exports and growth of sun seed exports

Traditionally, Ukraine specializes in the export of sunflower oil, as it has large crushing capacities, sufficient harvests, a high portion of the crop processed (98-99 %) amid a customs duty imposed on sunflower exports (10 %).

However, logistical difficulties with sunflower oil exports will lead to an increase in sunflower seed exports to Bulgaria, Romania, and Moldova via the port of Reni for further re-exports to Turkey and the EU and even China, which previously imported sunflower oil.



Now, even despite the export duty, sunflower seed exports exceed the most optimistic forecasts.

According to the results of the 2022/23 MY, sun seed exports may significantly exceed the record of the last 2021/22 MY- 1.6 M mt and amount to 2.25-2.5 M mt. In the worst case, exports may grow to 3 M mt.

Sun seed stocks may run out by May-June 2023. If so, the following scenarios are possible:

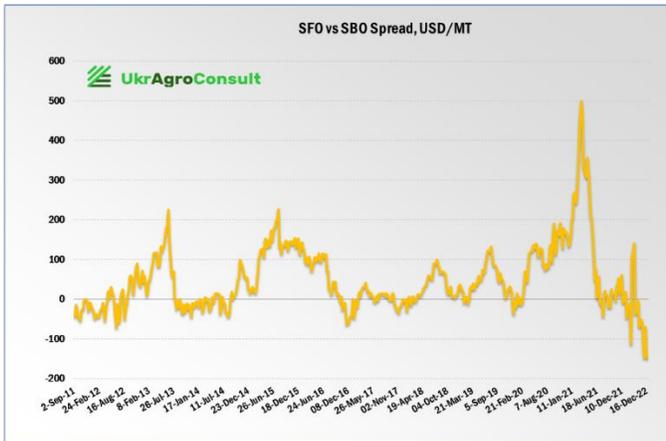
- 1 – shutdown of crushing plants in Ukraine;
- 2 – sunflower imports from Bulgaria, but sunflower will be much more expensive to compare with sun seed Ukraine exported to Bulgaria at the beginning of 2022/23 MY;
- 3 – unusual increase in rapeseed processing after harvesting.

But in our opinion, the extremely high rate of sun seed shipments from Ukraine will continue until the sunflower oil and meal export through the Black Sea ports is established. In any case, this trend is short-term.

Significant reduction in the spread for sunflower oil

Due to high military risks, sunflower oil from Ukraine is sold at a significant discount.

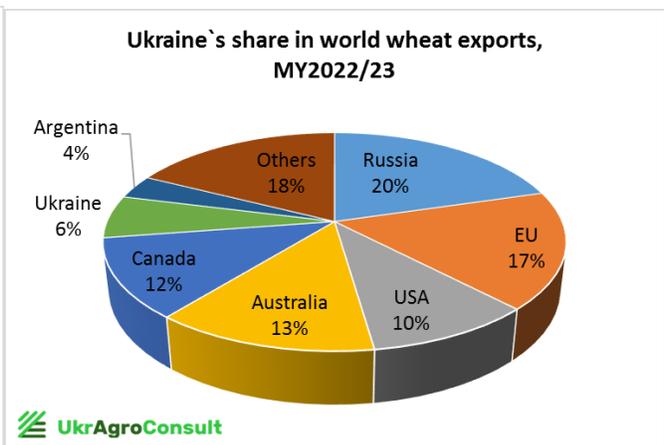
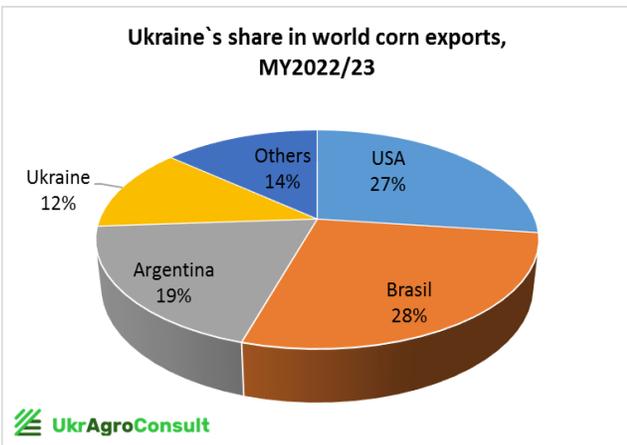
In January, the spread between sunflower oil and soybean oil prices equals USD 150/mt, which has not been the case for at least 10 years. Yes, sunflower oil happens to be much cheaper than soybean oil, but the largest discount in the past decade was USD 72 /mt in MY 2011/12.



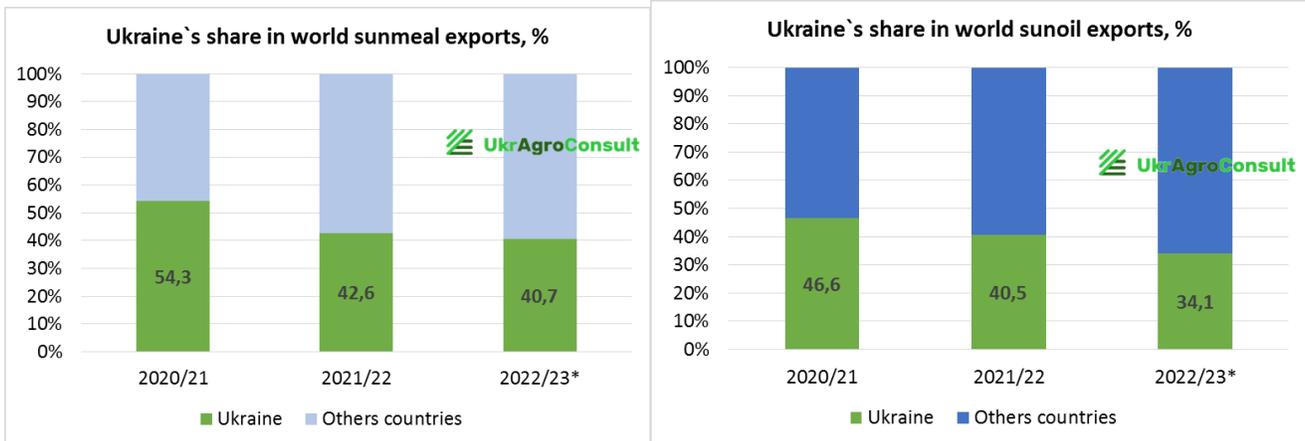
In our view, the discount on sunflower oil will gradually decrease as prices rise due to the depletion of both sunflower and sunflower oil stocks.

Loss of Ukraine's share in global exports

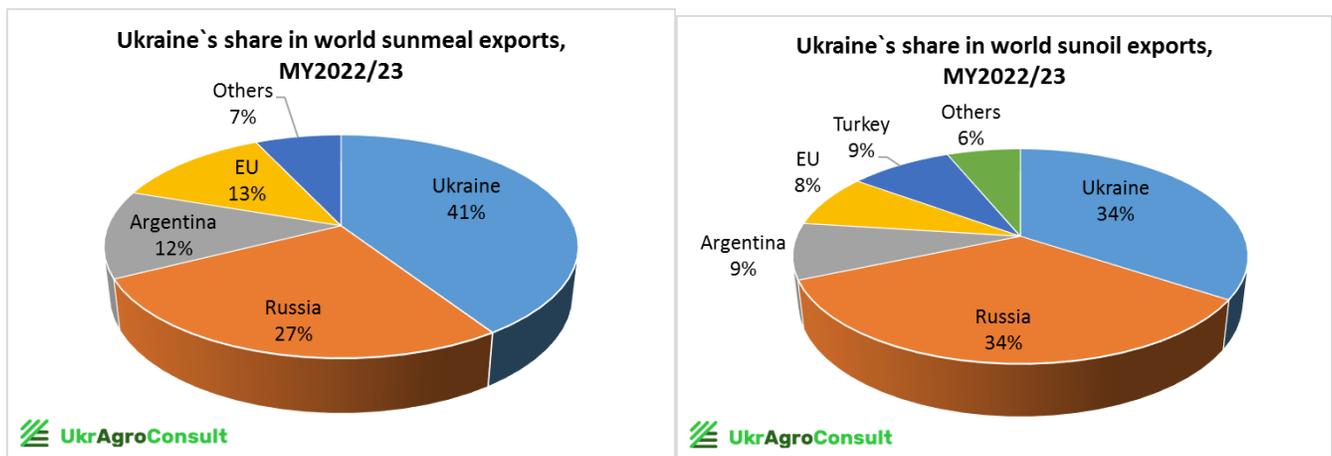
The decline in exports resulted in a loss of Ukraine's share in global exports of grain, oil, and meal. In 2022/23 MY, Ukraine will lose the smallest share of exports in corn and wheat - minus 1 % and 3 %, respectively, compared to the previous years. The most significant decline in grain exports is expected in the new MY 2023/24.



A more significant decline in Ukraine's share of global trade occurred in the sunflower oil and meal markets. In 2021/22 MY, Ukraine has already lost almost 12 % of the global meal market and 6 % of the oil market due to the hostilities and blocked ports. In 2022/23 MY, Ukraine's share is expected to further decline. At the same time, this will not change the country's leading position.



Given that Ukraine is a de facto monopolist on the global sunflower oil and meal market, accounting for half of the world's trade in these crops, it will be difficult to replace it in the short term. Therefore, despite a significant reduction in the export share, this will not change the country's leading position in global grain trade.



Significant narrowing of export destinations

Exports to North African and Middle East countries are possible by small vessels, incl. through the small ports of Ismail and Reni. Exports to Southeast Asia are only possible if the shipment is of the Panamax + size. The lack of access to deep-water ports narrows the range of export destinations down to neighboring countries. This has resulted in higher competition in these markets, which are traditional for Russia.

The seaports inaccessibility has made the EU an almost exclusive export destination. In the new reality, Ukraine can offer grain to Europe at much more attractive prices than those of competitors.

Decline in the export share of major traders

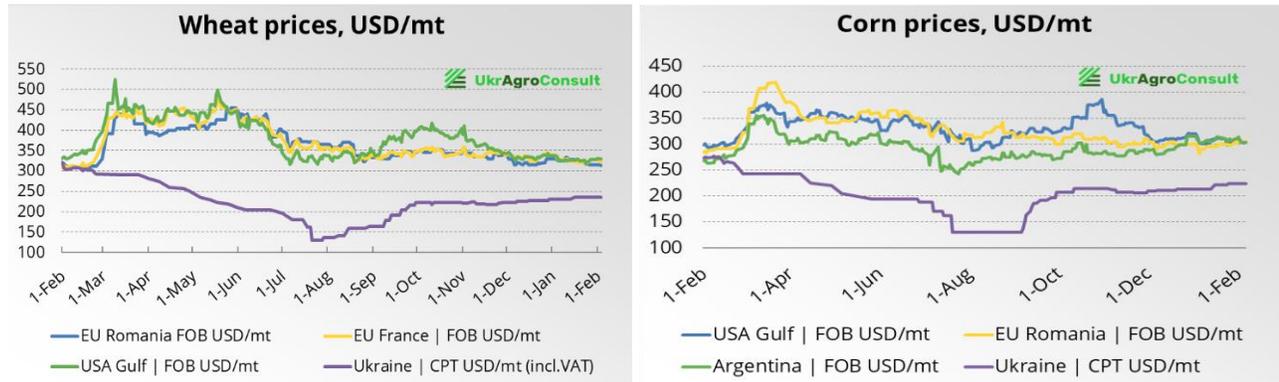
Before the war, large international companies owned about half of Ukraine's grain and oilseed exports. At the same time, the new realities show that manufacturing companies were forced to start exporting themselves, without using the intermediary services - large traders, as it used to be.

A large trader has turned from a buyer to a competitor in relation to a farmer. And we do not exclude that this forced move has given rise to a new trend, which is likely to become particularly evident in the future, when the gross harvest starts to recover and export volumes grow.

Destruction of the correlation between domestic and world prices

Since the beginning of the war, domestic prices have fallen sharply due to a drop in demand from both domestic industry and exporters, as seaports were blocked for a long time.

This drop in domestic prices is especially striking compared to world prices, which, on the contrary, began to rise due to the loss of such a strong supplier as Ukraine. After the "grain corridor" started operating in August, the upward trend in domestic prices began.



A few main pricing trends are worth noting under the latest conditions:

- no correlation between domestic and world prices. The occupation of the southern regions and the narrowing of export flows destroyed the mutual dependence of prices.
- new pricing factors:
 - production costs as a resistance level;
 - payment terms - significant discounts are possible when paid in cash;
 - logistics costs (point of delivery).
- Transition from a seller's market to a buyer's market. While previously it was the farmer who decided what and when to sell, now the farmer sells goods for which he finds a buyer.
- No price peak. As a rule, after the seasonal post-harvest slump, grain and oilseed prices were steadily rising until May-June, when the factor of the approaching new harvest began to take effect. This seasonality has now disappeared. For example, in 2020/21 season, the corn price increased up to 60 USD/t. In 2021/22 MY, there will be no traditional seasonal peak, but rather a price decline by 55 USD/t. This trend will continue until the multi-year average export rates are restored.

Correlation between domestic and world prices disappeared and domestic price behavior is determined by:

- the level of production costs, i.e., price behavior for inputs, fuels, energy resources, currency exchange rates, etc.;
- recovery of domestic demand, renewal of oilseed crushers and other processing plants operation;
- reopening of seaports that connect the domestic market to the global one;
- export demand for value-added products, i.e. oil, meat, milk, sugar, etc.
- fundamental factors such as prospects for 2022/2023 crop production.

The main trends in trading of vegetables, fruits, berries, and processed products for MR 2021/22

VEGETABLES MARKET

In general, large-scale vegetable business in Ukraine is its developing stage. Since demand for large-scale shipments of quality vegetable products from wholesale resellers (supermarket chains, exports) is increasing annually in Ukraine, there is high growth potential for the fruits and vegetables sector.

At the same time, along with high segment potential, development of supermarket chains under high consumer demand is attracting large new companies to the sector, which are investing significant amounts in its development.

However, recent years have shown that fruits and vegetable sector in Ukraine is characterized by significant over-production due to irrational use of farmland, seasonality factor, as well as lack of necessary amount of storage facilities, leading to existence of increase of external risk factors.

Although Ukraine is self-sufficient in vegetables, it is a net importer of vegetables because on any given year 10 % or more of vegetables produced are lost to waste. The most losses are post-harvest. The reason for large post-harvest losses is lack of adequate storage.

Following the cessation of vegetable shipments to Russia, Ukrainian vegetable exports have slumped in 2015. Ukraine's growers turned out to be unprepared to enter alternative markets. Exports gradually recovered in the following years thanks to new markets.

Ukraine: Vegetable Exports (Commodity code 07), USD Mln

2015	2017	2018	2019	2020	2021
97,2	235,4	235,7	184,5	168,1	196,6

Source.: Ukraine State Statistics Committee

The share of fresh vegetables in the structure of exports is about 15 %

Nearly 76 KMT of fresh vegetable were exported in 2021. Their export volume was represented by onion (27,9 %), potatoes (24,9 %), root vegetables (18,3 %) and other vegetables – Cabbage, tomatoes, cucumbers etc. (a combined 28,9 %).

FRUITS&BERRY MARKET

Owing to Ukraine's membership in the WTO and the International Plant Protection Convention, vegetable products can be exported without restriction, provided phytosanitary requirements of the importing country are met.

A few professional export-oriented players have emerged in the market over the last five years.

However, there are problems related to underdeveloped infrastructure and logistics, the absence of large wholesalers, high prices, non-conformity of cultivated varieties with the European standards, and the lack of experience.

Ukraine: Fruits Exports (Commodity code 08), USD Mln

2015	2017	2018	2019	2020	2021
154,1	195.3	228,6	260.1	238,4	368.2

Source: Ukraine State Statistics Committee

The share of fresh fruit and berries in the structure of exports is about 8 %.

<https://techhorticulture.com/2022-roku-zbilshyvysya-eksport-yabluk-i-grush-z-ukrayiny/>

Apples are the basis of export of fresh fruit.

In 2021, Ukrainian apples were exported to more than 70 countries of the world, but their biggest consumers were the following: Belarus (25.7 %), UAE (14,1 %), Austria (13.1 %), Saudi Arabia (8?5 %).

Ukraine. Apple exports, KMT

2015	2017	2018	2019	2020	2021
5,0	23.0	42.4	53,6	19,3	29,8

Source: State Statistics Service of Ukraine

The berry market in Ukraine is not fully fledged yet, but it in many respects reflects global trends. The lion's share of the crop is either consumed by households or sold by growers directly from the field or in food markets. The loss of the Russian market has forced Ukrainian exporters to switch to European consumers.

At the same time, there are factors restraining the development of our domestic market and, consequently, its export potential. Due to the lack of cooperation, many small producers are unable to offer required volumes of marketable products. In addition, there is a substantial shortage of facilities for berry processing (freezing) – their availability would enable growers to widen the commercial product range and thereby stay in the market for a longer period.

In Ukraine, the berry season (including wild berries) begins in May and ends in November.

Seasonality of ripening and harvesting of some berries

	May	June	July	August	September	October	November
Strawberry							
Raspberry/Blackberry							
Currant							
Blueberry/Bilberry							
Cranberry							
Lingonberry							

An upward trend is lately observed in berry exports. This increases market competition, especially with regard to quality products. The portion of fresh berries in the total fresh fruit export volume is roughly 40 %.

Nearly 4 KMT of fresh berries were exported in 2021. Their export volume was represented by bilberries (38,8 %), strawberries (9.8 %), raspberries and blackberries (a combined 14.6 %) and other berries – blueberries, lingonberries, cranberries etc. (a combined 36.9 %). Noteworthy is a rise in blueberry exports that results not only from a boom in its cultivation in Ukraine, but also from focused efforts for promoting this product on the European and other markets. Blueberry growers pass required certification, for instance Global Gap.

FROZEN PRODUCTS

Share of Ukrainian producers is growing annually and reached 63 % on frozen vegetable & fruits market in Ukraine. Imported products are represented by popular producers, such as: Bonduelle, Hortex, Globus, Hortino. Over 80 % of imported products are supplied from Poland and China. Producers from Hungary, Serbia, Egypt, and Belgium hold large shares of the market.

In the future market will be developing as the result of diversification of market participants and own distributing networks.

Market is vulnerable to seasonality factor. Demand is starting to grow in January-April. At the same time, frozen goods market requires long-term financial investments as raw materials must be purchased in summer, while the goods are sold towards the New Year.

Nearly 76 KMT of frozen berries were exported in 2021. Their export volume was represented by raspberries (43.7 %), strawberries (5.1 %) and other berries – bilberries, blueberries, lingonberries, cranberries etc. (a combined 51.2 %).

New wartime trends in sales sector

In 2022, Ukraine imported various types of vegetables worth 352.3 million U.S. dollars, which is 41 % more than in 2021. At the same time, the import of vegetables in natural terms decreased by 2 % - to 415.4 thousand tons. Such a significant increase in monetary terms compared to natural terms is due to both the change in the supply structure and the global increase in vegetable prices. The war led to significant change in the structure of import supplies. If in 2021 the basis of imports were potatoes (42 % of the total volume of import), tomatoes (24 %) and cucumbers (6 %), then in 2022 it was onions (25 %), tomatoes (24 %) and carrots (13 %). There was a significant increase of import supplies of carrots (by 10.7 times to 53.9 thousand tons), onions (by 4.6 times to 105.5 thousand tons), cabbage (by 2.7 times to 51.6 thousand tons). At the same time, the import of potatoes decreased by 92 % to 13.9 thousand tons.

Difficult logistics did not prevent Ukrainian producers from expanding the geography of frozen raspberry export. In 2022, frozen raspberries were supplied to 24 countries of the world. The export of frozen raspberries from Ukraine reached 40,000 tons, an increase of 20 % compared to the record set in 2021. Ukrainian producers exported frozen raspberries this year at the first opportunity to reduce storage risks.

The total export of fresh blueberries from Ukraine in 2022 exceeded 2.5 thousand tons, increasing one and a half times compared to 2021. Traditionally, Poland was the main market for blueberries from Ukraine. In 2022, this country imported 2.2 times more berries from Ukraine than in 2021. At the same time, Poland was only a transit point for blueberries from Ukraine to other EU countries.

The export of Ukrainian apples in the 2022/23 season as of the beginning of spring amounted to 24.8 thousand tons, which is about half as much as in the same period last season. The main restraining and market factors of this trend:

- lack of Belarus among supply markets - it was the largest export market for Ukrainian apples;
- logistic restrictions due to blocked Ukrainian ports – the high cost of logistics limited deliveries to Bangladesh and a number of exotic destinations;
- increasing costs for the entire supply chain – Ukraine today pays the most for logistics compared to other European apple-producing countries.

Another factor of export decrease was that the export of small-sizes apples was almost absent. Producers were afraid to store such apples and immediately sent them for processing. However, the demand for small apples this season was and remains quite high.

Forecast

Ukraine's vegetables overproduction crisis will likely force numerous weaker smaller producers out of business, and lead to greater specialization of agricultural enterprises on crops they are best prepared to produce. Another consequence of the crisis will likely be that investment in equipment and storage, and on high quality inputs and chemicals will likely fall.

We expect Ukrainian consumption of vegetables will increase by 5-10 % over the next five years. This increase will be mostly concentrated in urban areas, as rural areas remain mostly self-sufficient in supply of own vegetables than urban ones. The bulk of growth will be concentrated in the retail chain/outlet channel. According to evaluation of market participants, demand for frozen fruit and vegetable products will be growing. Raw material base, which is currently in development in Ukraine will be an important factor of future market growth. In general, average annual growth rate of Ukrainian market of fruits and vegetable goods is estimated at 6-8 % with simultaneous increase of national production share. Potential demand growth is forecasted not only by tendencies of end consumption, but also by general consumption trends, which indicate increase of vegetable mixes share in total consumption compared to traditional meals.

LOGISTICS SECTOR

Pre-War Trends

- For a long period before the war, the main challenges for domestic logistics were large harvests, insufficient number of grain cars, and rising diesel prices
- Domestic grain prices correlated with global trends. The market also depended on farmer behavior. Traders tried to enter forward contracts to guarantee the supply of grain to fulfill export contracts.
- Most exports were carried out through deep water ports. About a third of exports were carried out by ports in Mykolaiv region.
- In peacetime, the cost of transshipment for large companies was \$7-8 per ton, and for medium-sized companies - \$10-11 per ton.
- Within the country, grain was mainly transported by rail (approximately 60 %). The cost of railroad logistics from the central regions of Ukraine varied \$30-40/t.
- Before the war, there were 43 M mt of certified elevator capacities in Ukraine. Considering the capacities of farms, PE sleeves, and floor storage, Ukraine is capable for storing up to 57-60 M mt of agricultural products at a time.
- Ukraine has a quite large network of elevators, but the western part of the country has less storage capacities than the south and center. With the shift of sunflower and corn cultivation to the north and west, there has been a trend of building new modern elevators in these parts of the country.

Trends modification during the war, 2022/23 MY

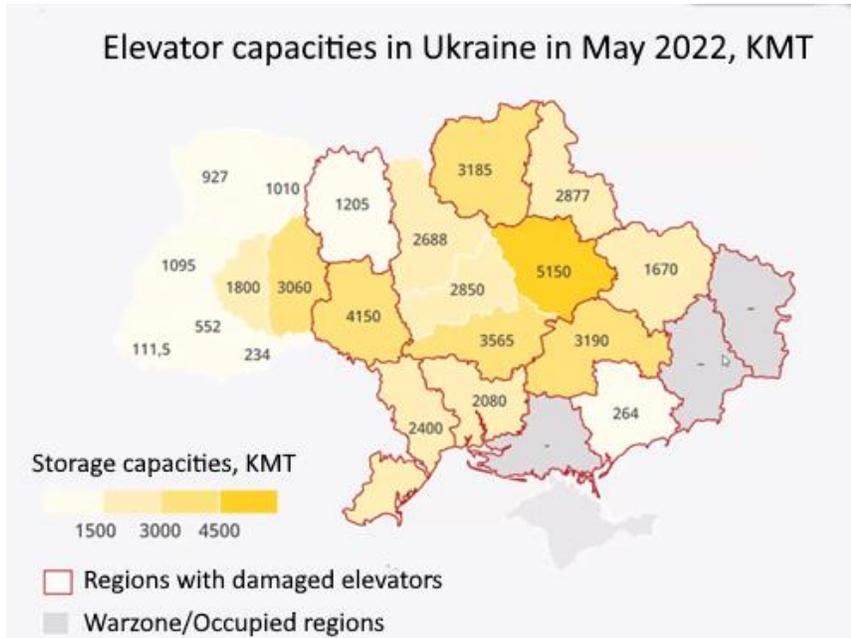
A sharp decline in grain and oilseed exports through ports and a switch to land transportation routes led to a distortion in the logistics system.

Increased time and transportation costs

- The ports of the Mykolaiv cluster have been virtually excluded from the export flow. Attacks destroyed infrastructure facilities in the ports of Mykolaiv and Olvia, which have port elevator capacity of 1.3 M mt. Some companies managed to move grain from port elevators to linear ones. Nibulon, COFCO, POSCO, and Bunge operate in these ports;
- The demand on elevator services in the western part of the country has increased sharply, and grain delivery costs has risen;
- According to market data, compared to the pre-war period, the cost of rail logistics from the central regions of Ukraine has more than doubled to \$80/t;
- Delivery time increased sharply. Previously, it took 25-30 days for cargo to get from the producer to the end consumer, but now this period has increased to 60 days;
- Transshipment costs have risen to \$17-20 per ton;
- Huge queues of vessels waiting for shipment with a corresponding increase in prices - in the low season, the price for cargo transportation was \$30-40/t, now the chartered vessel costs \$90-100/t.

Storage capacity deficit and rising storage costs

- It estimates that about 5 % of storage capacities may be damaged because of hostilities, but a more precise estimate is impossible due to the fact that many of them are located in the occupied area.



- The elevators that are currently blocked in the occupied territories pose the main problem. According to our estimates, about 6.8-7.0 M mt of elevator capacity remains blocked, or 12 % of Ukraine's total grain storage capacity.
- As export flows across the western border have increased, the tendency to build new modern elevators in this part of the country has intensified. The total storage capacity in the western regions is about 10M mt.
- According to UkrAgroConsult's calculations, excluding blocked elevator capacities located in the occupied territories, the total grain and oilseed storage capacity has decreased to 50 M mt.
- The share of alternative storage methods, such as polymer sleeves and modular granaries, has increased. In previous seasons, such granaries stored up to 4 M mt of grain. The cost of storage in liner bag can be 2-3 times lower than at an elevator and amounts to 3-5 euros per ton. In 2022, the price of 1 grain sleeve started from 400 euros. According to our estimates, in 2022/23 MY, the deficit of elevators reached about 15 M mt, partially covered by sleeves and modular granaries, partially offset by delayed corn harvest.

Rapid development of alternative export routes

- **Through the port of Constanta**

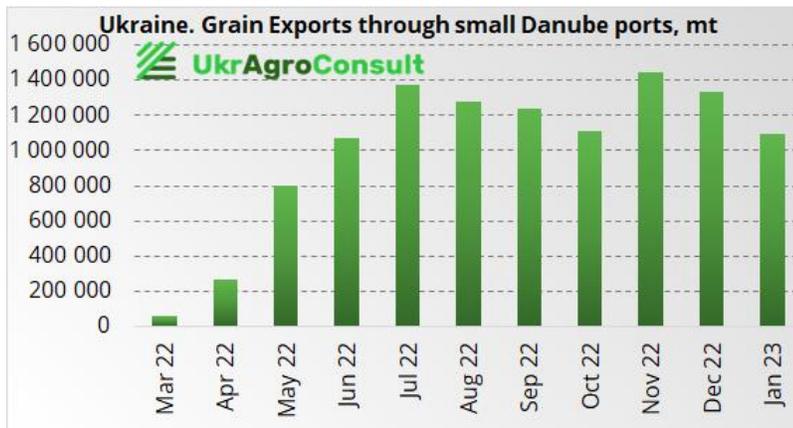
The port of Constanta differs from Ukrainian ports in the following ways:

- More than 10 operators deal with transshipping grain in the port;
- 5 grain terminals belong to large grain trading companies - Ameropa, Cargill, CHS and COFCO;
- Grain storage capacity in the port totals 2 M mt;
- All terminals are capable of transshipment from barge to ship using floating cranes;
- The port transships more than 25 M mt of grain per year (on average 2 M mt of grain per month).

About 2.9 M mt of grain of Ukrainian origin, mainly from the small ports of Reni and Izmail, transited the port of Constanta in the first half of 22/23 MY.

- **Small Danube Ports**

Until 2022, the ports of Ismail, Reni, and Ust-Dunaisk were not in demand and exported only symbolic volumes due to their shallow waters and long distances to the main grain production regions. Currently, many large companies operate through these ports. Monthly export volumes comprise 1.4 M mt.

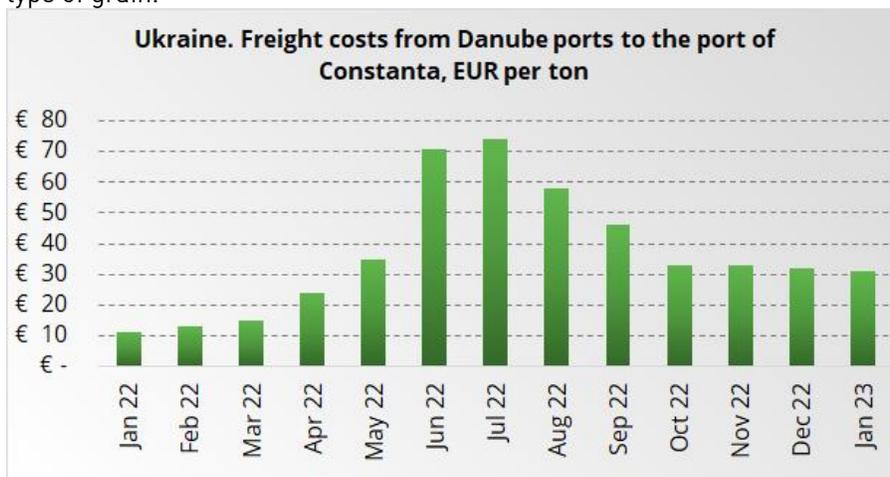


Source: UkrAgroConsult based on customs data

In these ports most stevedores use the direct transshipment option, and almost no new warehouses were built in 2022.

The exception was Nibulon, which invested in the port terminal construction in Ismail. The first stage of the terminal was launched in January, and once fully completed, the Ismail terminal will supply up to 300 K mt of grain per month to the European market.

Most of the cargo is shipped to the outer road of Constanta port, where it is transhipped to larger vessels for export to Southeastern countries. The freight cost per 1 ton of grain in the summer of 2022 reached EUR 71 per ton, but with the opening of the grain corridor, it gradually decreased and fixed at EUR 30-40, depending on the type of grain.



Source: UkrAgroConsult based on data from Ukrainian Danube Shipping Company

The complex services incl. loading in the port, delivery of grain to the outer road and transshipment to larger vessel will cost an exporter an average of 55-65 euros per ton. The cost of services depends on the method of transshipment (direct or warehouse) and the type of grain (light, heavy, processed).

Example of calculating the costs of logistics services per ton of light grain

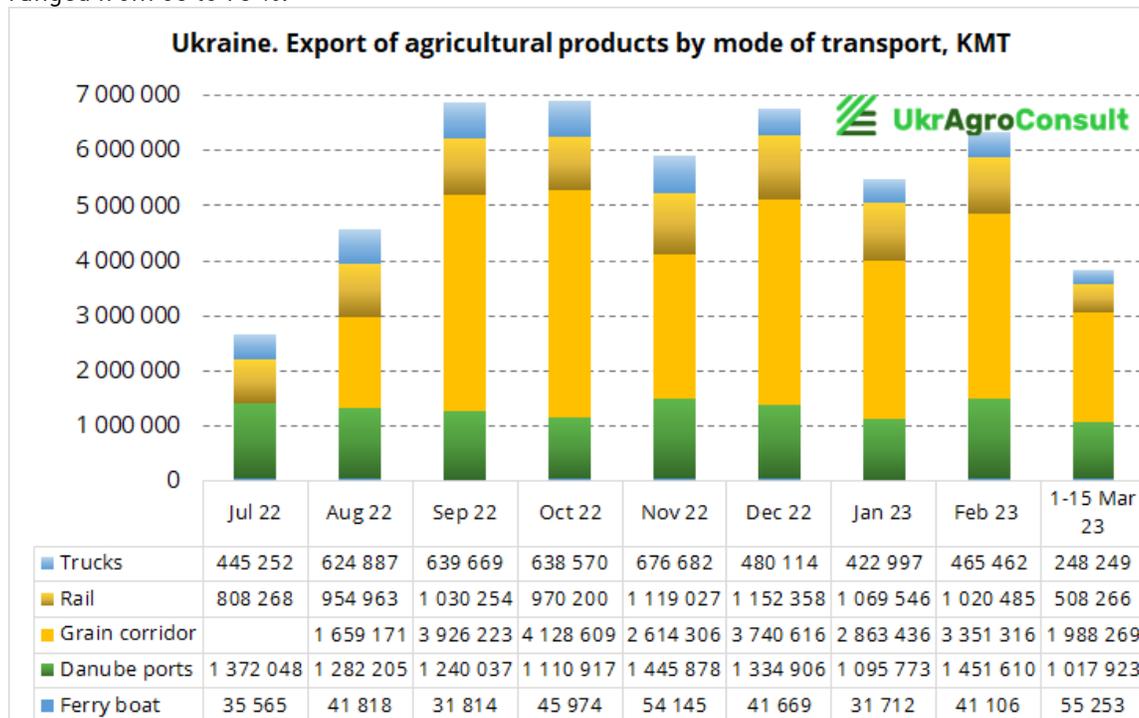
Loading in the port of Kilia directly to the barge	Transfer to the port of Constanta	Unloading on a road
15 EUR	42 EUR	7.75 EUR

Source: UkrAgroConsult based on data from Ukrainian Danube Shipping Company

The intensification of agrarian business in the small Danube ports has also initiated the infrastructure improvement. The ports of Ismail and Reni were dredged in the summer, and the dredging of the Bystre mouth is still ongoing. After the dredging, not only barges but also small vessels (coasters) will be able to navigate the estuary. The increased throughput may lead to further investments in grain transshipment capacities of the Danube ports. According to UkrAgroConsult, it will be difficult for the Danube ports to maintain large cargo flows after the end of the war, but the gradual restoration of the fleet and investments in infrastructure will allow them to attract sufficient volumes of agricultural products from the region.

- **Grain deal. Operation of the ports of "Greater Odesa"**

While in the first months after the full-scale invasion the railroad played a key role in the export of agricultural commodities, with the opening of the grain corridor, the share of exports by sea increased significantly and ranged from 65 to 75 %.



Source: UkrAgroConsult based on customs data

As part of the Grain Deal, grain shipping from the ports of Odesa, Chornomorsk, and Pivdennyi was approved. The number of inspection teams is limited by the Russian side, so only a few ships are inspected per day. To increase the cargo flow, the Ukrainian side prefers vessels with a capacity of more than 15 K mt.

Grain exports by vessel deadweight

Vessel type	Odesa		Chornomorsk		Pivdennyi	
	M mt	Share, %	M mt	Share, %	M mt	Share, %
Coaster (up to 15 K mt)	0.743	18,9 %	0.848	14,4 %	0.493	9,9 %
Handysize-Handymax (15-50K mt)	2.507	63,7 %	3.272	55,4 %	2.201	44,2 %
Supramax+ (50 K mt and more)	0.683	17,4 %	1.782	30,2 %	2.283	45,9 %

Source: UkrAgroConsult based on port data

The decline in grain production and exports expected in 23/24 MY may lead to increased competition between terminals that transship mostly export grain of market players rather than their own. This will be reflected in a decrease in transshipment costs, which have increased several times since the beginning of the war.

- **Baltic Sea Ports**

Until 2010-2011, the Baltic ports were actively used by Russia for the transshipment of grain cargoes, so they have infrastructure that can now be set up to handle Ukrainian grain export.

This project is complicated as previously grains were delivered to the Baltic ports via the Ukraine-Belarus-Lithuania transit route. Delivery through Poland necessitates to change the wheelsets at the Polish border and then once again at the exit to Lithuania. This complicates the grain export through the ports of Lithuania and Latvia.

Grain delivery is possible to almost all ports in Europe, but the most attractive from a logistical point of view are the ports of the Baltic States and Poland.

Baltic Sea Ports able for Ukraine export grain transshipment



Latvian and Lithuanian ports are able to handle Ukrainian grains, but logistical problems still need to be resolved. The main obstacle to the transportation of Ukrainian grain through Lithuania is the different width of the railway tracks - in Ukraine and Lithuania, the Russian track is still used, and in Poland - the European, so you must change the rolling stock while delivering grain from Ukraine to the ports.

The port of Klaipeda (Lithuania) is capable to handle with up to 8-9 M mt of Ukrainian agricultural commodities if railway logistics problems are fixed. Before the sanctions were imposed, the flow of goods from Russia (incl. agrarian goods) provided the largest share of the loading of transshipment capacities of the Baltic ports of Lithuania and Latvia. The grain will be transported from Ukraine thru Poland to the Sheshtokai railway station to be reloaded on Lithuania railway cars for delivery to Klaipeda port.

Summarizing the above, the total grain transshipment capacity at the five terminals is about 10-11 M mt of agricultural commodities per year. Sure, these terminals may be partially loaded with export of grain of the Baltic origin, but the total export capacity of the Baltic ports far exceeds the current port loading.

The port capacities of the Baltic States can be used only if the logistical problems in Ukraine and at the western railway border crossings are solved.

2023 Grain Export Logistics Challenges

Alternative routes

According to UkrAgroConsult, export volumes via alternative routes have reached their current maximum and have been fixed at the following monthly rates:

- Road transport - 0.6-0.7 M mt;
- Rail transport - 1.1-1.3 M mt;
- Small ports on the Danube 1.3-1.5 M mt.

Nevertheless, it is important to realize, that the ongoing construction of grain terminals in the ports of Ismail and Reni, simplification of export rules and procedures, introduction of electronic queues at the borders, and creation of dry ports in the western regions should increase Ukraine's grain exports in 2023.

The grain corridor functioning

The number and speed of ship inspection commissions in Istanbul raises many questions. At the end of 2022, we saw a long queue in the Bosphorus of more than 150 vessels waiting for more than 30 days. The newly created electronic queue has indeed made it possible to optimize and make transparent the planning of vessels' entry and exit to/from the ports of Big Odesa. But it has not solved the problem of ship inspection in the Bosphorus either. Another challenge will be the grain deal extension.

Insurance and vessel chartering

Starting from January 1, 2023, some insurance companies refused to cover war risks for ships heading to Ukraine and other countries in the Black Sea region. This complicates the work of both, charterers, and vessel owners. However, there have been no insured events on the grain corridor since August 2022, so it is possible for the vessel owners to enter the Black Sea without war-related risk insurance.

CONCLUSIONS AND SCENARIOS

Ukraine economy recovery forecast

Over the previous 15 years, major trends in the Ukrainian agriculture were encouraged by exports. The war and supply chains disruption broke well-established practices and dramatically changed the behavior of all industries, including agriculture. Devaluation, inflation, falling prices, and reduced profitability have become the new realities.

The most optimistic estimates and assumptions of post-war development say it will take at least 5 years to restore the economy to pre-war levels, provided that international financial support is active.

Ukraine is projected to be the fastest growing economy, currently undervalued, but with fantastic growth rates expected soon after war.

The storage and processing capacities have been significantly damaged, which will require sufficient investments to renew their effective functioning. The reconstruction and reopening of the capacities will focus on high technological efficiency, which will have a positive impact on the Ukrainian processing and storage industries. The EBRD, the IMF and other financial and investment institutions are involved in Ukraine's recovery support. Investors like Goldman Sachs and BlackRock have announced that they are also ready to invest in Ukraine's recovery.

JP Morgan intends to create a fund to rebuild Ukraine's infrastructure with potential of between \$20 and \$30 B of private investments. The fund will cover sectors of green energy, IT, and agricultural technologies.

The most important trend is long-running military actions since 2014 have delayed demand for investments. After the war is over, Ukraine will be an object of increased investment attractiveness, particularly in the agriculture.

Ukrainian agriculture short-term outlook

Agriculture is one of the most profitable industries in Ukraine, accounting for about 40 % of total foreign exchange earnings before the 2022. The recovery of Ukraine economy depends on the adaptation rates of the agricultural industry to the new realities.

Along with cybersecurity and energy, agriculture is among the top 3 priorities in Ukraine's post-war recovery.

The short-term intentions include:

- Investments in irrigation systems and related logistics;
- Building new logistics grain hubs to ensure expansion of Ukrainian products shipping to Asian countries, to the EU, African countries.

The main drivers of the agricultural industry development for 2023-25:

- Producers face the deficit of financing;
- Loss of arable land in the occupied territories and in the war zone;
- Rising input prices and not stable input supply chains will negatively impact on technology application. Limited access to fertilizers and fuel may lead to a decline in both, yields and quality;
- Companies will optimize areas, crop rotation, and give preference to the least technological (costs saving strategy) and most profitable crops;
- Growth of oilseeds areas. Given the good margins of oil crops cultivation compared to grains, the pre-war level of oilseeds areas is expected to be reached in 2024-25.

UkrAgroConsult expects the 2023 will be a year of great changes. Until 2022, mainly revenues from grain and oilseeds sales financed development of farming businesses and agricultural technology application. The drop in the domestic prices and disruption of correlation between the domestic and world prices make the access to the

financing increasingly difficult in the coming 2-4 years. Ukrainian market operators are currently looking for partners willing to take risks and invest in the underestimated assets right now.

Key resilience trends of Ukrainian business, 2022-2023

- Goods-producing value chains are becoming more regionally concentrated and covering contiguous markets and industries. Ukraine will face active market shares redistribution and large-scale mergers and acquisitions
 - KSG Agro is planning to enter the canned and stewed meat market.
 - A.G.R. Group is looking for opportunities to reduce its logistics leverage and facilitate exports of agricultural products to the EU. This means growing interest in buying grain storage facilities and agricultural enterprises in western Ukraine.
 - VITAGRO Company is engaged in the construction and putting into operation a new elevator complex with a 50 M mt storage capacity.
 - Kernel Agro Holding acquired the OilExport Terminal in Pivdennyi port (Black Sea, Big Odesa), which was previously owned by RISOIL Company. The new asset is strategically important for the company given not functioning oil transshipment at Mykolaiv terminals.
 - Volyn-Zerno-Product (brand "Vilia") acquired Bio-Lan company in Ternopil region, which belongs to NCH Capital (Agroprosperis Group).
 - Nestlé is investing \$42.8 M (CHF 40 M) to open a new food and culinary products (noodles) production facility in Volyn region.
- Joint ventures with foreign partners
 - MHP Agro Holding is planning to establish a joint venture with Desert Hills for Veterinary Services Company, a subsidiary of Tanmiah Food Company, the market leader in the Kingdom of Saudi Arabia (KSA) in the production of poultry and other meat products.
 - TAS Group has become a partner of Voestalpine, an international steel company, and OBB RailCargo Group, and has become a 40 % shareholder in TransAnt GmbH, a developer of new generation freight cars.
- Expansion of International Institutions' Loan Programs
 - The European Bank for Reconstruction and Development (EBRD) will provide a \$100 M loan to a subsidiary company of MHP agroholding. It is reported, the funds will be used to finance MHP's seasonal working capital needs for sunflower oil production.
 - The European Bank for Reconstruction and Development is providing a €10 M loan to Grain Alliance Group to improve and expand the company's overland export supply chain. In the 2022 spring, the company acquired a grain logistics hub in the city of Cerna nad Tisou (Slovakia). The EBRD loan will finance the expansion of the Slovak hub to ensure its capacity of 400 K mt per year.

Ukrainian agriculture long-term outlook

- Focus on domestic processing. Projects for advanced processing of grains and oilseeds

The 2022-23 trends have once again confirmed the country's high grain and oilseeds production potential and critically large dependence on access to the global markets.

Anyway, logistics problems encourage not only Ukrainian commodity producers but also key global markets players to localize goods production from available grains and oilseeds. The producers realize more and more,

margins increase is possible through processing and investing in modernization of existing food industry facilities.

New foreign private investments are critically unstable due to the military risks, with a significant portion of Ukrainian companies' funds being frozen in commodity stocks. Due to these factors, we do not exclude modernization of the food industry facilities might be financed by international programs aimed to increase the global food security.

Reconstruction and new food industry projects will be primarily launched in more safe western regions to compensate for the losses in war-affected regions. This tendency corresponds to the pre-war trend to expand agribusiness in western and northern part of Ukraine due to climate change.

It is the west of Ukraine which is likely to see a boom in the construction of new grain and oilseed processing facilities. Investments will possibly finance the industry of advanced grain and oilseed processing and products with high added value. Such products enjoy significant advantages:

- Cheaper logistics/transportation due to proximity to the main export destinations, i.e., to the EU markets;
- Higher competitiveness, as the available raw materials are priced lower;
- Rising prices for the ready-made goods.

Despite a number of risks, investment in the Ukrainian economy will become more attractive, and the country will consequently turn from a commodities exporter into a supplier of deeply processed products.

➤ Bioenergy projects

The high energy costs could be both an obstacle for growth of goods production and an incentive for the development of bioenergy generation with usage of sunflower husks, grain straw, and other production wastes. The deficit and high cost of fossil fuels will likely stimulate investments in the bioethanol and biodiesel industries. While rising world food prices call into question the feasibility of producing fuel from agricultural commodities, in Ukraine the biofuels industry to meet the domestic demand may be relevant. Moreover, 10 years ago, during the biodiesel boom, several biofuel producers were put into operation in Ukraine.

There are two ways to produce biofuels. The first is to build a certified plant. There are about 14 of them in Ukraine. The leftover biodiesel that is not used for self-consumption can either be sold on the domestic market or, if there is a certificate, exported to the EU.

The second way is the production of mixed fuels. As a rule, bioethanol plants (where corn is processed into bioethanol) are built next to oil refineries. Nearby, there is facility for rapeseed oil production. The bioethanol is piped to oil refineries for blending and production of mixed fuels.

The development of bioethanol and biodiesel production is possible subject to appropriate changes in legislation, incl. the excise taxes.

➤ Livestock projects

The expansion of exports to the EU amid a slump in the domestic compound feed costs could be a powerful driver for the development of the meat industry, especially poultry production. Investment in pig raising pays off over a longer time but the pig meat project looks promising as well. However, investing in dairy operations would be much more risky business.

➤ Development of alternative export routes and multifunctional hubs

As Ukraine's agriculture is export-oriented, enormous efforts made to ensure large scale grains, oilseeds, vegetable oils, and meals export.

The seaports blockade and export chains disruption revealed a huge problem. For the previous 10-15 years the lion's share of logistics investments was directed in the construction of the Black Sea and Azov Sea ports infrastructure, leaving alternative export routes out of proper development. In contrast with the mentioned trend the exporters now try to find efficient alternative ways how to increase the capacity of existing land crossings and launch new export outlets.

The drop in operational capacity of the Black Sea and Azov Sea ports stimulates the development of new export terminals both on the western land border and in the Danube river ports of Ismail and Reni. Several large and medium-sized Ukrainian exporters are seeking to set up their own railway crossings with the possibility of changing the car gauges wheel or bringing the narrow gauge into Ukraine.

The small river ports are overloaded and extremely busy handling grain transited through these ports. New loading facilities are being launched on the Danube river ports, and dredging is underway, almost over.

One of the options for overland export logistics could be the developing of multifunctional hubs near the border crossings. Such facilities at the western border could be similar to storage and handling hubs near seaports.

The trend towards the silo construction in Western Ukraine will likely continue. Such silos could serve as transshipment bases for grain exports through the western border crossings. Even if Ukraine's seaports get unblocked, it may take months for exports to recover to the pre-war levels through the ports.

The significant investment in the multifunctional hubs will be of short term returns (3-6 years) if various development scenarios / factors are thoroughly considered, including the possibility of unblocking the Black and Azov seaports.

The 2022 logistics grabbed all the market attention and showed its weakest points. Despite the war, logistics has become an investment area and this tendency will continue in the short and long term. But the geography of investment is shifting westward and is not limited to Ukraine only. For example, Ukrzaliznytsia intends to set up a freight forwarding company to operate in Europe by the end of 2023.

In the medium term, it is unlikely that the seaports will account for 95 % of grain exports again. Considerable volumes of grain will be exported by the crisis-time logistics routes, especially if investments were made in railways connections and agricultural hubs.

➤ Stable and long-term trend for development of localized electricity generation

The energy independence, primarily related to crushing plants, became firstly actual and relevant in 2014. Due to the growth of tariffs for traditional energy sources (primarily gas), sunflower oil producers gradually began to re-equip their plants by installing new modern equipment to burn sunflower husk to generating steam needed for the crushing.

Moreover, there are large oilseed crushers (currently there are 3 of them) that have gone further and installed turbines to generate electricity. Of course, such arrangement requires large investments, and proper permissions from authorities.

But now, due to the numerous destructions of the country's energy system, the energy independence has become even more acute. We predict the expansion of localized energy generation will become the number one trend for not only crushing industry, but also for elevator industry and animal breeding.

Switching to alternative electricity generation has become one of the most important trends in Ukrainian grain storage. The use of heat generators allows elevators and farms to save significant costs on grain drying.

According to market estimates, an elevator using an alternative fuel heat generator spends three times less money per ton of grain drying. Currently, elevators use wood pellets, straw from various crops, including corn and sunflower, and waste from grain and oilseeds cleaning and processing as fuel.

➤ Restoration and improvement of irrigation systems

Due to global climate change, the deficit of soil moisture is observed on more than 2/3 of the territory of Ukraine. This is explained by local climate change and the reduction of surface water reserves suitable for irrigation. There are 5.5 M ha of moisture deficit lands in Ukraine (out of total 22-24 M ha under cultivation), but in fact, much less is effectively irrigated:

- unsatisfactory conditions of the existing irrigation and drainage equipment;
- 70 % deterioration of the engineering infrastructure.

Almost 5 M ha of agricultural land in Ukraine need new irrigation systems. According to estimates, USD3 K of investment required to develop irrigation of 1 ha.

In 2021, about 600 K ha of agricultural land were watered, incl. about 250 K ha which were effectively irrigated. However, on the first stage the investments should be put primarily to recover the existing water management and infrastructure, as intake and supply water are sufficient for irrigation of at least 1.8 M ha, and to drain excess water over an area of more than 1 M ha.

We counsel business that feeds the world!

Consulting agency UkrAgroConsult was founded in 1994 and has over 25 years of expertise in agricultural markets of Ukraine and the Black Sea region. The company is based in Kyiv, Ukraine.

UkrAgroConsult serves global agribusiness operators from 50+ countries worldwide, delivering quality market information and analysis for effective decision making. The company provides a range of services, including analytical reports on grains, oilseeds and pulses, food industry, agri market research, investment consulting, individual business plans and projects etc.

UkrAgroConsult is an organizer of the major international conferences on grains and oilseeds, such as the annual conferences "BLACK SEA GRAIN" and "BLACK SEA OIL TRADE" in Kyiv.



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