UKRAINE WHEAT FLOUR AND SUNFLOWER OIL VALUE CHAINS

Analysis of value chains with a focus on smaller farmers and processors near the frontline

SUMMARY REPORT

APRIL 2024

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Background

Ukraine is a major agricultural producer and a crucial global exporter of commodities such as wheat and sunflower oil. The Russian Federation's invasion in February 2022 sent shockwaves through both global food markets and Ukraine's domestic economy. The total damages and losses inflicted on the agricultural sector is estimated at USD 80.1 billion[1] .

Understanding how the war is impacting key agricultural commodities is critical. This report, prepared by the **Kyiv School of Economics (KSE) in collaboration with the World Food Programme** (WFP), summarises analysis of the impact on the wheat grain and flour and sunflower oil and seeds value chains since the escalation of the war in February 2022. It gives specific attention to the war-related challenges facing value chain actors in areas closer to the frontline. The two commodities are selected for their importance domestically and for Ukraine's export, as well as for their particular interest as key commodities in WFP's humanitarian food procurement and response, within Ukraine and globally.

Established in 2021, the **KSE Center for Food and Land Use Research** (the KSE Agrocenter) is one of the main thinktanks in Ukraine focusing on agri-food and land policy. Since the onset of the war, the KSE Agrocenter has been dedicated to providing up-to-date information on the agribusiness and land market situation. In collaboration with the Ministry of Agrarian Policy and Food of Ukraine, the KSE Agrocenter has initiated analytical projects such as the Agricultural War Damages Review, Food Security and Agricultural Policy Review, Rapid Needs Assessment and other studies aimed at informing a wide audience and policymakers about compensation and rehabilitation needs. The center is actively involved in building and strengthening the resilience of Ukraine's agri-food sector during the war, serving as a thinktank and analytical partner for government institutions, international agencies, and NGOs.

WFP, operational in Ukraine since the escalation of the war in February 2022, implements a broad portfolio of response activities including emergency assistance, social protection, school feeding and land rehabilitation through mine action and support to local food systems. In 2024, WFP aims to support 3.2 million people with emergency and recovery interventions. Since February 2022, WFP has injected approximately USD 1.12 billion into the Ukrainian economy, through distribution of cash assistance to Ukrainians increasing their purchasing power, through local food procurement, contracting of logistics services, and other procurement of local goods and services. To ensure that its activities and investment in Ukraine facilitates a transition towards self-reliance of vulnerable communities impacted by the war, WFP is incorporating a **food systems approach** into its activities. Understanding the war's impact on local food system actors and their challenges is critical to to the design of any WFP interventions and support and to maximise positive impact.

Through partnering with KSE, WFP seeks to build the evidence base underpinning its food systems strategy and activities. In September 2023, WFP commissioned the Kyiv School of Economics (KSE) to the summarized in this report. The analysis has been carried out by specialists from KSE, in collaboration with WFP Ukraine.

Objectives of the study

This assessment analyses the value chains for wheat grains and flour and sunflower seeds and oil, with particular focus on smaller farmers and processors near the frontline. The analysis is guided by three overall objectives:

- Describing the status of Ukraine's agricultural market since the Russian Federation invasion in 2022, including updated information on logistics and export costs, with a focus on wheat flour and vegetable oil.

[1] The World Bank, the Government of Ukraine, the European Union, the United Nations, February 2024. *Ukraine – Rapid Damage and Need Assessment. February 2022 – December 2023.*

- Identifying the main war-related challenges wheat flour and vegetable oil farmers and producers face.
- Providing recommendations for WFP and national and international stakeholders to increase the efficiency and competitiveness of the wheat flour and vegetable oil value chains and identifying strategies to support small-scale farmers and processors.

Specifically, the analysis focuses on the following specific outcomes:

- Identification of the war-related challenges faced by farmers, wheat flour producers and sunflower oil producers with a focus on those operating in the frontline oblasts.
- Determination of the most important cost drivers for farmers and processing enterprises and their development since the beginning of the war.
- Identification of the wheat flour and vegetable oil value market players.
- Price transmission analysis along the wheat flour and vegetable oil value chains.
- Analysis of the programs in place to support small farmers and producers of grain and oils.

Research methodology

The research used a **mixed-methods approach**, combining analysis of secondary data with primary qualitative data collections.

The first part of the research involved analysis of the latest available statistics on the multiple topics to analyze context and background understanding. This included: key agricultural market indicators such as harvested area, production volume, price and export volume; farming cost structure and profitability by key crops; wheat flour production statistics such as production capacity, export volume, prices, market fragmentation and cost structure; sunflower oil production statistics such as production capacity, export volumes, prices, market fragmentation and cost structure.

The second part of the research consisted of in-depth interviews (*n = 12*) with small farmers in areas close the frontline and in-depth interviews (*n = 4*) with producers of wheat flour and sunflower oil.

Farmer classification in Ukraine

In Ukraine there are two groups of farmers - legally registered commercial agricultural enterprises and not legally registered rural household farms.

There are more than 4 million household farms, cultivating each 2.8 ha of land on average, producing food both for own consumption needs and for the markets, managing around 38 percent of the Ukraine's total agricultural land (2018 data)[2].

The commercial agricultural enterprises consist of two types: corporate farms and individual small-scale commercial farmers. These individual small-scale farms, unlike household farms, are registered legal entities. As of 2018, there were about 30,441 much smaller individual farmers with an average 105 ha of arable land per farm, altogether cultivating about 13 percent of Ukraine's arable land (KSE based on UKRSTAT data[3]). In this report, the term 'small-scale farmers' is used to refer to this category.

[2] Based on KSE, *Assessing the role of smallholder farmers and households in agriculture and the rural economy and measures to support their sustainable development*

[3] Based on KSE, *Assessing the role of smallholder farmers and households in agriculture and the rural economy and measures to support their sustainable development*

Changes of the Ukrainian agricultural market in the times of war

The Ukrainian agricultural market has been hit hard by the war. Prior to the escalation of the war in February 2022, the agricultural sector (including forestry and fishery) contributed to around 10 percent of GDP, employed 14 percent of the country's workforce, and accounted for 41 percent of total exports[4]. If upstream and downstream industries of agriculture (input supply, food processing, trade) are also considered, the contribution of the sector to the Ukrainian economy before the war amounted to 20 percent of GDP[5]. The agri-food sector is also critical for country's trade balance and earning foreign exchange.

Following the escalation, **Ukraine's experienced a lower agricultural production in 2022-2023** due to the loss (about 18%[6]) and contamination (about 10%[7]) of arable land (**Figure 1**) and rising prices of inputs, in particular fertilizers and fuel. Combined with the blockade of the Black Sea ports during the early months of the war in 2022, this led to a sharp drop in agricultural exports and significantly reduced domestic farm incomes (**Figure 2**). Export routes through the Russian Federation and Belarus have closed while the time for border crossing over land has become unpredictable due to border blockades (**Figure 3**). These adverse conditions have had several negative implications for the market, leading to a significant surge in the cost of production for both farmers and processors. With reduced export volumes, the local supply of most agricultural products exceeded the domestic demand, resulting in a downward pressure on domestic prices. The launch of the **Black Sea Grain Initiative (BSGI)** in July 2022 helped enhance exports, but persistent high logistics costs exerted pressure on farmgate output prices. On July 17, 2023, the Russian Federation chose not to renew the BSGI; its termination significantly impacted export and global food prices.

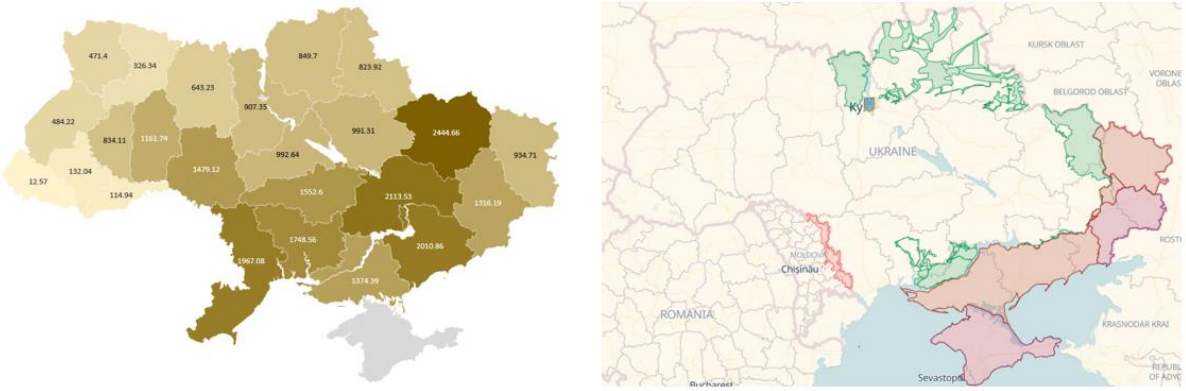

Figure 1: LEFT: Pre-war wheat production, 2021 (thsd tonnes); RIGHT: occupied(red)/liberated(green) territories (Sources: State Statistics Service of Ukraine, Deepstate)

Since the escalation of the war, the Ukraine agriculture sector and supply chains have demonstrated great resilience. **However, some challenges persist:**

➔ **Most land and sea borders remain blocked and logistics costs have increased significantly, complicating agricultural exports**

[4] Agriculture, forestry, and fishing, value added (% of GDP) from USDA, *Ukraine Agricultural Production and Trade April 2022*

[5] Based on KSE, *Assessing the role of smallholder farmers and households in agriculture and the rural economy and measures to support their sustainable development*

[6] Foreign Affairs, 18 January 2024, *The Quiet Transformation of Occupied Ukraine*

[7] ACAPS Thematic Report, January 2024, *Ukraine - Humanitarian implications of mine contamination*

Despite significant challenges since February 2022, Ukraine's maritime export has seen considerable improvement recently (**Figure 4**), with export levels in 2024 nearing those seen before the war. As of February 2024, approximately 80 percent of exports are managed through Black Sea ports, and 10 percent via Danube ports.

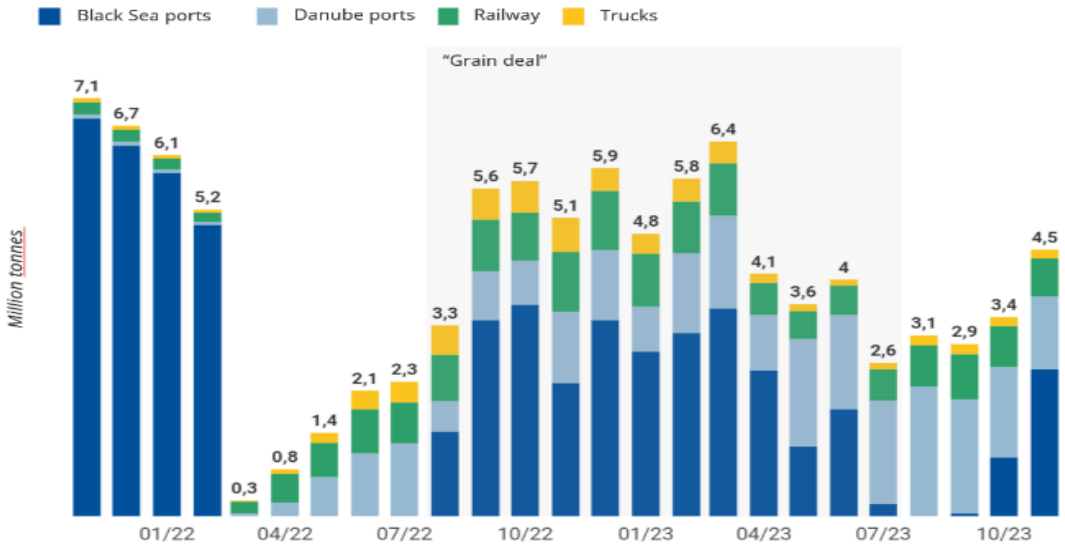

Figure 2: Export volume of crops and oil seeds from Ukraine from January 2022 to October 2023 (Sources: National bank of Ukraine, Ministry of Agrarian Policy and Food of Ukraine, Centre for Economic Strategy)

However, this recent improvement is taking place on a backdrop of persistent logistical, security and cost challenges. Most of Ukrainian land and sea borders remain blocked, hindering import or export of goods (**Figure 3**), while the remaining transit routes are frequently attacked by missiles or drones or facing threats from the Russian fleet. While Danube ports are in use, they cannot fully substitute for the Black Sea ports. **The closure of container terminals in Ukraine exacerbates the situation**, leading to **significant increases in maritime transportation and logistics costs** and a notable shortage of container shipments.

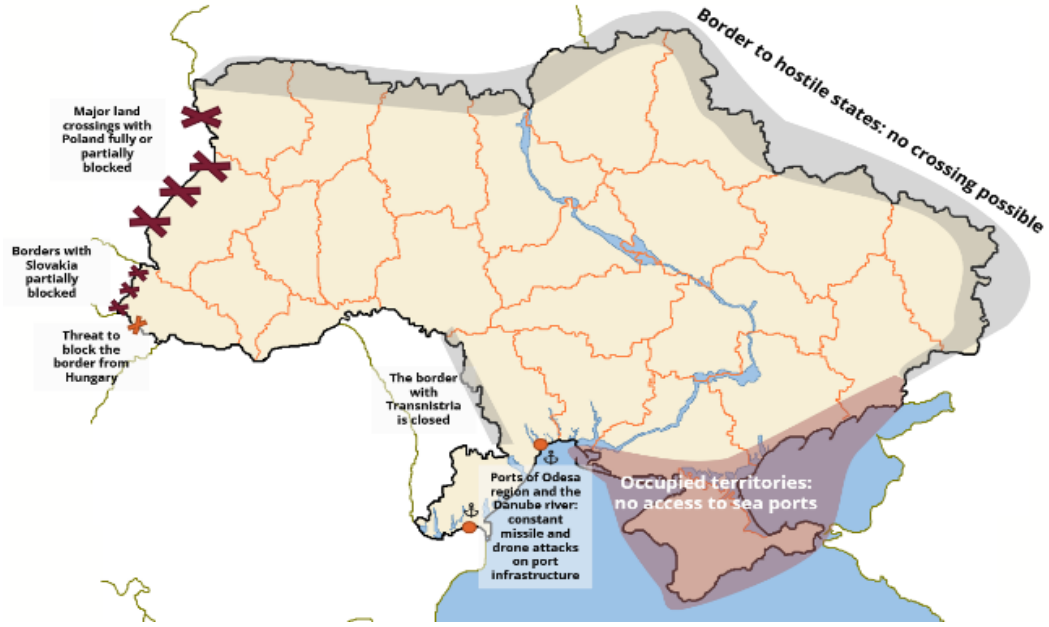

Figure 3: Illustrative map of borders blocked / restricted

While the government insures bulk shipments of raw food commodities for transportation along temporary sea corridors, container shipments of processed food have yet to receive war insurance coverage. The hurdles extend to severe bottlenecks in railway and truck transportation, making the substitution of sea/river transportation impractical and notably more expensive.

Taken together, these significant challenges to consistent and predictable export conditions will continue to affect production decisions, trade, and farm gate prices in 2024 and beyond.

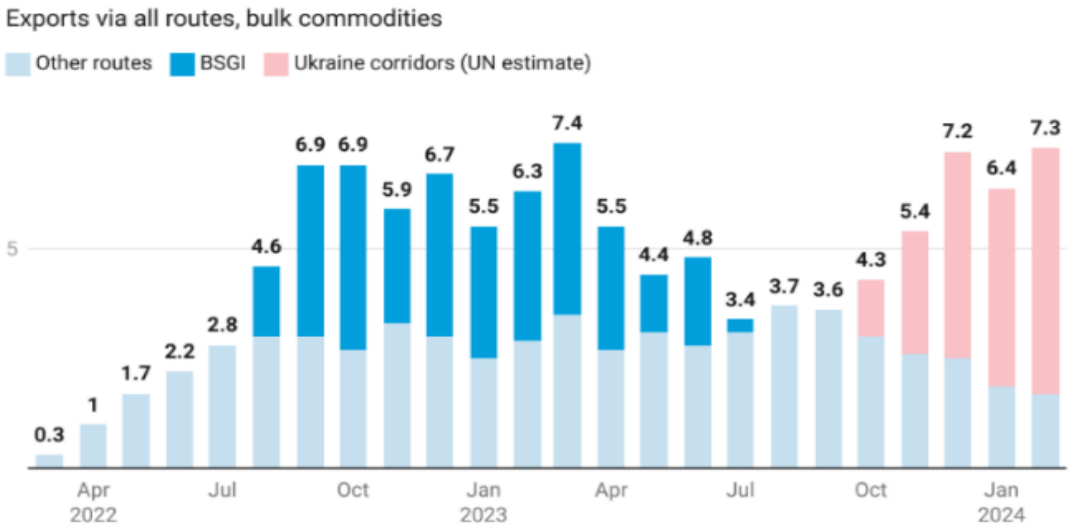

Figure 4: *Food export volume from Ukraine, including the opening of the new Ukraine maritime corridors in October 2024 (Sources: Ukrainian government, the Joint Coordination Centre, and UN)*

➔ Farming profitability is decreasing

The cost of farming has experienced a substantial increase compared to the pre-war time. In response, farmers have sought to reduce expenses by cutting back on fertilizer quantities, opting for more affordable seeds, and postponing equipment maintenance among others. These cost-saving actions has resulted in lower yields and decreasing quality for both wheat and sunflower farming. **A significant spike in costs in 2022 made farming for wheat and sunflower unprofitable for farmers**. Throughout the summer 2023, prices remained relatively stable and with a slight decline in costs, but still with near-zero profitability for farmers. By October 2023, commodity prices declined, pushing farmers into negative profitability for all key crops (**Figure 5**).

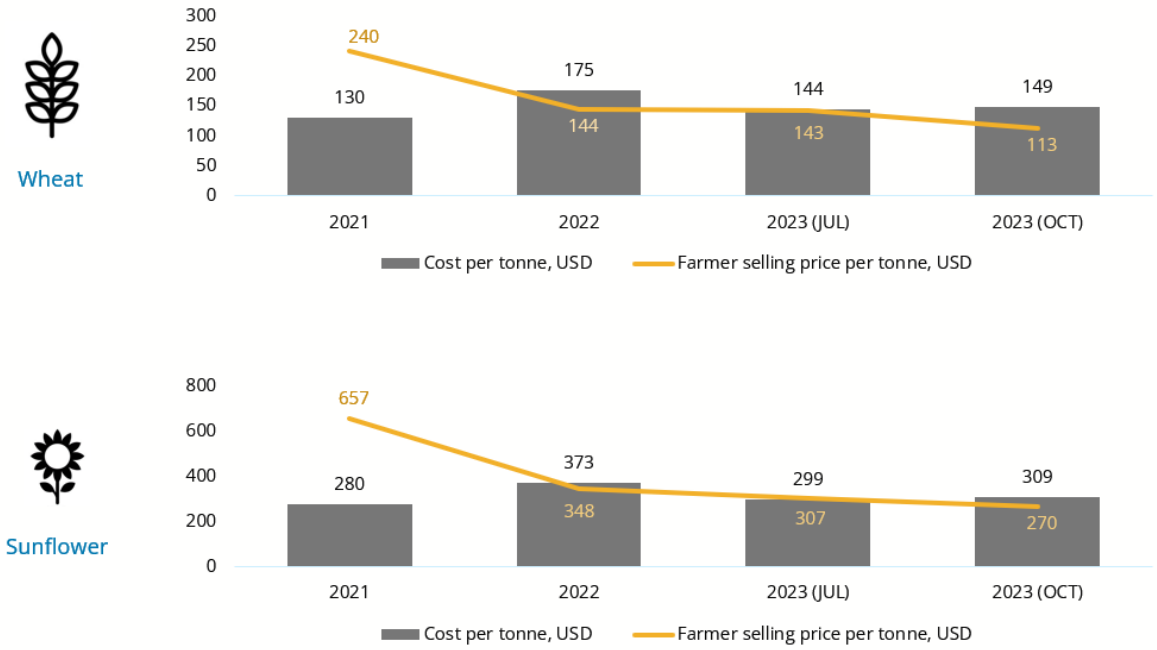

Figure 5: Cost of production of a tonne of wheat and sunflower seeds and the average market selling price (Source: Ministry of Agrarian Policy and Food of Ukraine)

Changes in business practices by farmers and processors

In addition to the main challenges related to export challenges and profit losses, the war also brought about some substantial changes in typical business practices that had sizeable impact on the agricultural producers and processors. Namely:

- There has been a noticeable **increase in the share of the shadow grain market**. Pre-war, the 'grey' sector accounted for approximately 40 percent of the grain market. During wartime, this figure rose significantly due to multiple factors, including to the suspension on tax invoices and the absence of VAT refunds for farmers. The discrepancy between official and real UAH/USD exchange rates, negatively affecting the profitability of Ukrainian grain exporters, also contributed to this rise.
- **The emergence of barter operations** between farmers, traders, and suppliers of agricultural inputs is another development. Some traders launched the "Barter+" scheme, enabling farmers to sell their crops at higher-than-market prices in exchange for seeds, fertilizers, and pesticides[8]. Major input suppliers have adopted these barter programs, which are closely linked with the concept of non-cash financing.
- The adoption of **a tolling system in the sunflower crushing process** has streamlined procurement. Kernel's tolling program for sunflower producers, catering batches starting from 1000 tonnes, serves as an illustration[9].
- **Processors are grappling with shrinking working capital** due to increasing indebtedness from retail chains, with current debts exceeding UAH 10 billion. Deliberate extensions in settlement terms, often up to 90 days or more, drain liquidity from the processing sector.
- The sector is grappling with the **absence of a leasing market for equipment for food processing**. Foreign lessors do not risk working in Ukraine because of war risks. This raises the bar for capital investment in the industry: to upgrade capacity, refiners are forced to purchase equipment at full cost, often taking out expensive loans.

[8] Kurkul, 11 May 2023, *New options for grain sales*

[9] Kernel Holding S.A. *FY-2023 Kernel Annual Report*

Wheat and sunflower: Production and market overview

Wheat and wheat flour

Since the war escalated in 2022, the dynamics of the wheat market have changed significantly. **The production of wheat fell sharply in 2022** (**Figure 6**) due to territory occupation, hostilities, interruption of supply chains, and lack of fuel and electricity. The Black Sea blockade furthermore contributed to an oversupply of wheat for the domestic market as export capacity weaned**.** The situation improved as the BGSI launched in July 2022. However, in July 2023, Russia pulled out from the BGSI, which caused renewed disruptions to grain exports, including wheat. This situation has led to substantially increased domestic supply, putting **downward pressure on domestic prices**. The resulting lack of profitability for wheat forces farmers to plant less of this crop for the next season. **Figure 6** shows the decline in area for wheat cultivation.

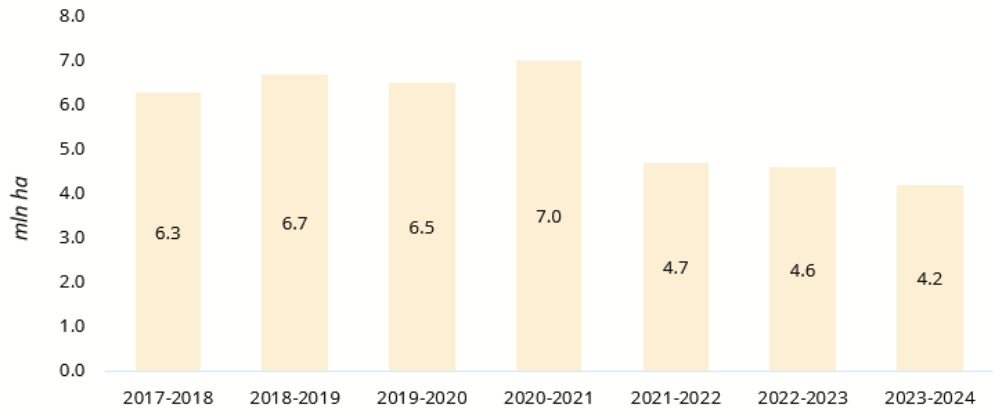

Figure 6: Wheat harvested area in Ukraine (Source: Ministry of Agrarian Policy and Food of Ukraine)

Farmers are forced to minimize the cost of farming to keep business running. Since they cannot cut expenses on the rent or amortization, **they are cutting operational expenses** as much as possible by declining inputs of fertilizers and plant protection, buying cheaper seeds, and skipping some of the cultivation procedures (see Annex 4).

Deteriorating quality of the locally produced wheat is a great challenge for Ukrainian millers who require high quality wheat for wheat flour production (**Figure 7**). There is speculation that in 2024, millers ultimately may rely on importing high-quality grain; even as domestic supply is overall high, it suffers from increasing constraints to provide these higher grades.

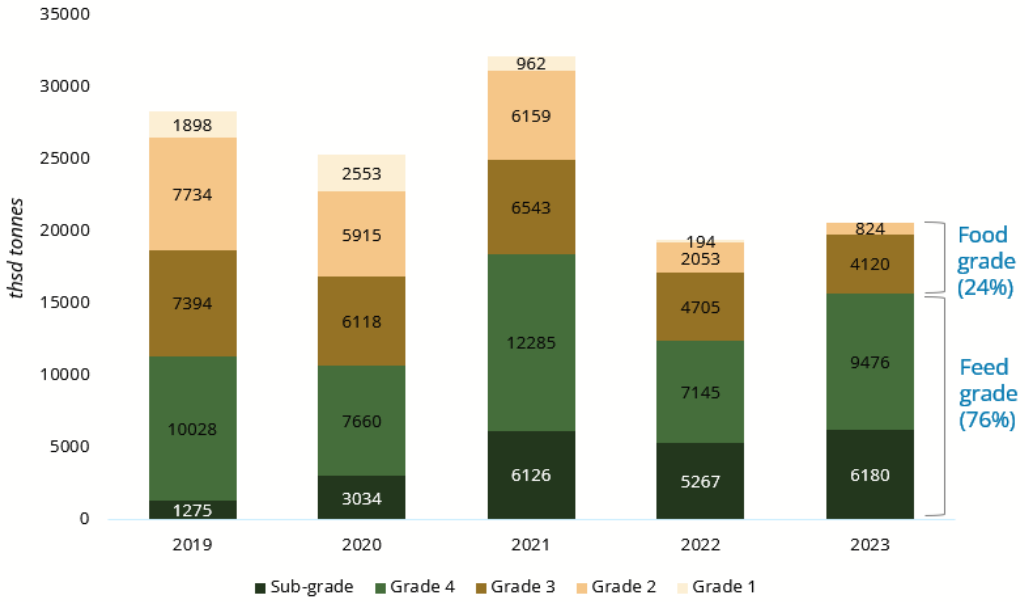

Figure 7: Wheat production split by quality grades: 1,2,3 = food grade; 4 and sub-grade = feed grade (Source: Union of Millers of Ukraine)

Historically, wheat flour has not been a key export product for Ukraine. Local millers are typically small and oriented at local markets, with **processing capacities are not fully exploited** due to several reasons including old and inefficient production equipment among other factors. Despite a potential for wheat flour production in Ukraine at 6.5 million tonnes per year, the sector faces challenges in expansion due to low profitability, restraining the ability of Ukrainian millers to scale up production. **Figure 8** shows the breakdown of wheat flour production by local consumption and export:

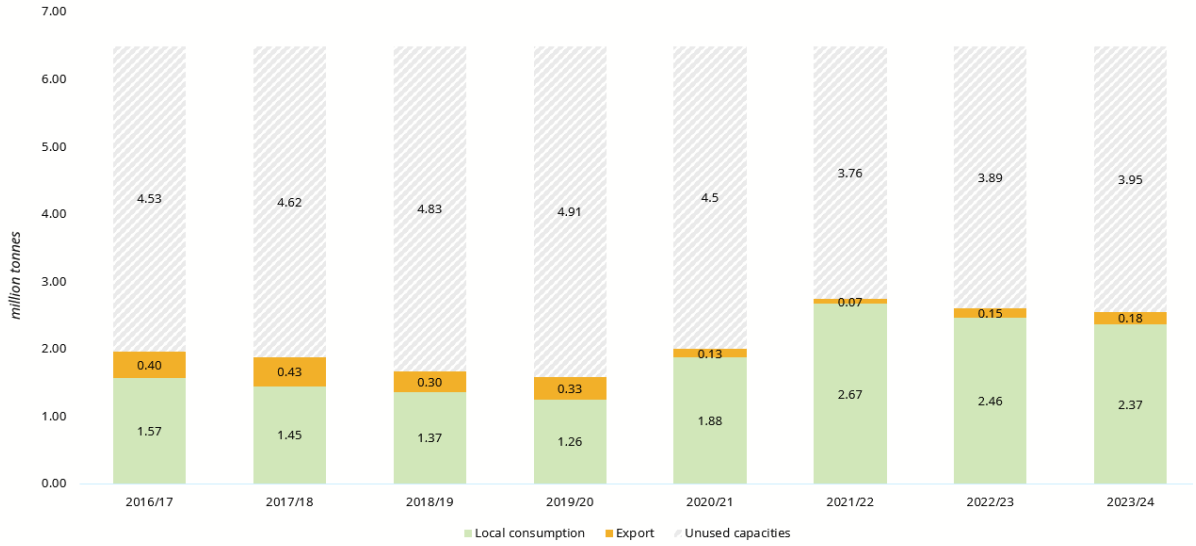

Figure 8: Wheat flour production: split by local consumption, export and unused capacities (Source: Union of Millers of Ukraine)

Sunflower seeds and oil

Sunflower production and export have not been as heavily affected by the war as wheat. In 2023, both production and export of sunflower oil were at the pre-war levels. After the initial shock of the escalation, production of sunflower oil returned to pre-war numbers in the 2022-2023 season

and continued to grow. Despite some share of sunflower oil production facilities located on the occupied territories and hence lost to the Ukrainian economy, new production facilities emerged to replace the lost ones. Production of sunflower seeds, at the same time, is likely to decrease over the next two years, as farmers will not be able to grow the same volume of sunflower seeds due to the requirements of crop rotation.

Figure 9 shows dynamics of sunflower seed production and export of sunflower oil in million tonnes from 2019 to 2023:

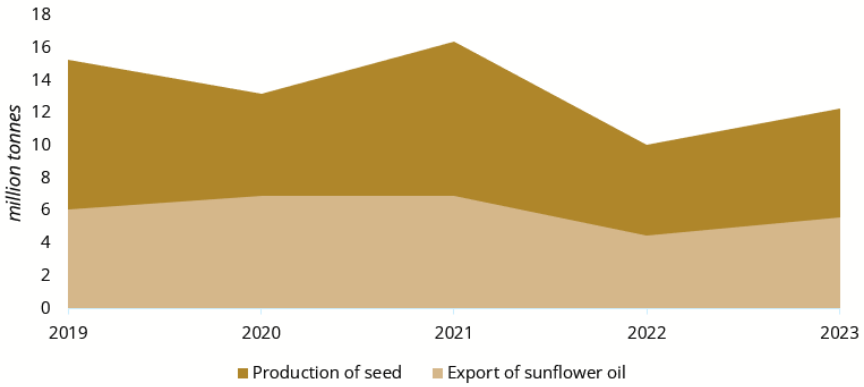

Figure 9: Sunflower seed production and export of sunflower oil from Ukraine in million tonnes (Source: Statistics Service of Ukraine)

The export of sunflower oil was not as heavily affected by the war as other agricultural commodities because of higher profitability compared to other agricultural products. Sunflower oil sellers were able to pay more for the transportation costs, while sellers of many other commodities were not. This resilience contributed to local sunflower seed prices not falling as much as prices for other crops. Local prices for both sunflower seed and sunflower oil remained relatively high and attractive for both farmers and processors up to the end of 2023. Sunflower seeds farming was hence more profitable than wheat farming, leading to a significant shift among farmers to opt for sunflower cultivation to offset losses incurred from other crops. Thus, the harvested area for sunflower seed did not decline much compared to other crops.

However, due to the substantial increase in cost of doing business, farmers were still forced to decrease inputs of fertilizers and crop protection to minimize expenditures. **The cost of sunflower seed farming experienced a substantial increase, mirroring the trends observed in wheat farming**. Farmers adopted similar copying strategies for sunflower seed as seen with wheat farmers - keeping costs as low as possible by saving on seeds, fertilizers and plant protection (see Annex 4)

Challenges faced by small-scale farmers near the front-line

Ukrainian small-scale farmers located near the frontline face enormous challenges in running their business. This section is based on numerous interviews with farmers operating in frontline oblasts. Their most widely mentioned challenges include:

- **Fast growing production costs** (seeds, fertilizers, fuel, plant protection, etc.). **Figure 10** illustrates the price increases for fertilizers. A similar trend is relevant for all material inputs of farming.
- **Decline in both local and international prices for grain and seeds**. In the beginning of 2023 sunflower seed cultivation was among very few crops which were profitable, so a lot of farmers switched by cultivation of sunflower. However, in the end of 2023, only a few oil crops, such as soybean and rapeseed, remained marginally profitable for framers, while profit margins for the majority of widely planted crops, such as wheat, rye, maize, and sunflower seeds become on average negative (**Figure 11**). For a while at the end of 2023, cultivation of sunflower seeds became less profitable than the cultivation of wheat for the first time in years.

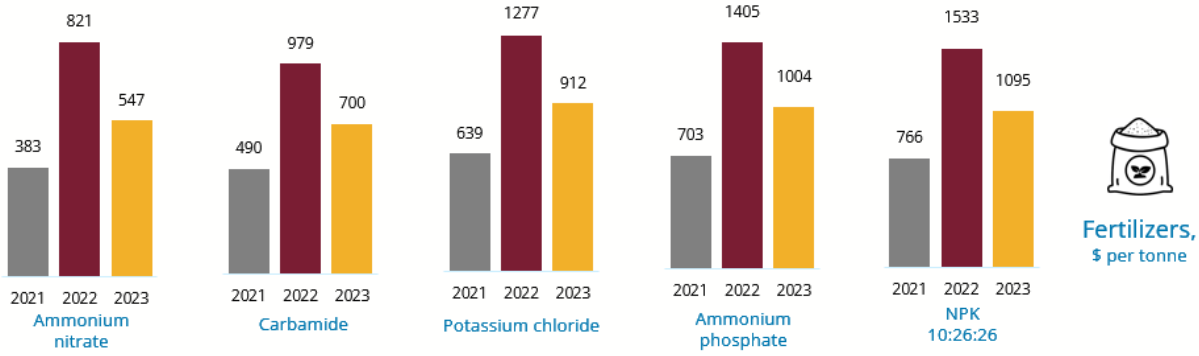

Figure 10: Cost of fertilizers for local farmers in Ukraine, USD per tonne (Source: Ministry of Agrarian Policy and Food of Ukraine)

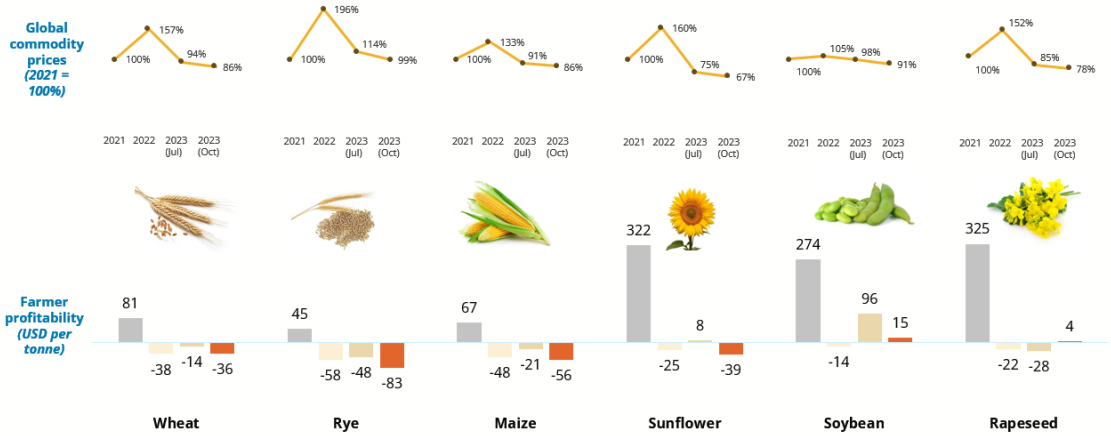

Figure 11: Index of global prices for key agricultural commodities and profitability of growing these commodities for Ukrainian farmers, USD per tonne (Sources: Ministry of Agrarian Policy and Food of Ukraine, tradingeconomics)

The situation faced by the farmers is dire: **costs of farming are increasing, while selling prices for the harvest are falling making farming unprofitable**. Some farmers find it more attractive not to plant anything in the current situation fearing that the losses they had in 2022-2023 will only multiply in 2024. Overall, farmers are forced to minimize the costs to keep the business running, by decreasing inputs of fertilizers and plant protection, buying cheaper seeds, and skipping some of

the cultivation procedures. The adoption of these coping mechanisms leads to lower yields and compromised quality. For some products, such as sunflower oil, the crop quality is not super critical, but for others, such as wheat flour, it is impossible to achieve high quality of the end product with inputs of inferior quality. So, declining quality of grain may soon lead to a shortage of high-quality wheat on the market forcing the wheat processors to import wheat.

> *We have to save money and sow without fertilizers, because the economic effect does not cover the costs. For example, in 2022 we received the 2nd grade of wheat, but the price difference between 2nd grade wheat and fodder were not significant at all, so in 2023 we decided to save on the cultivation of fields and received fodder.*
>
> Farmer, Zaporizhzhia region, less than 250 ha of land.

> *A 2.5-fold increase in the price of fertilizers, fuel, plant protection spare parts for machinery and tires. We have to save money, so plants get sick more and the yield is lower.*
>
> Farmer in Kharkiv region, less than 200 ha of land

In addition to the critical issue of negative profitability, other commonly mentioned challenges associated with farming in areas close to frontline include:

- Lack of qualified workforce, as many men are enrolled to the army. Finding a replacement for the mobilized workers is very difficult.
- Difficulty in renting or leasing equipment due to increased prices and low availability of the equipment
- Contamination with landmines and explosive remnants of war and risk of missile/artillery strikes.
- Inability to participate in many of the support programs by the government and the private sector due to 'high risk' status.
- Lack of internet and mobile connection and curfew hours.

Small-scale farmers face **additional specific challenges**:

- **Difficulties in getting a bank loan** with a reduced interest rate ('5-7-9' program[10]), as farmers with less than 200ha are considered too risky and banks are reluctant to give loans. Small farmers who are considered too high risk by the banks to participate in the support programs have no choice but to take extremely expensive regular bank loans (e.g., interest rate of 23 percent). Extensive required paperwork is another challenge associated with receiving a loan.
- **Inability to 'reserve' workers from mobilization**. According to Ukrainian laws a legal entity can 'reserve' less than 50 percent of its workforce. Thus, small farmers who work alone or have only one worker, have no opportunity to reserve any workers from mobilization. In case a small farmer is mobilized to the army, he still needs to pay rent for the land and taxes; he needs to pay back loans and pay salary to the workers (if any). A small farmer mobilized

[10] Diia.gov.ua - *Marketplace of financial opportunities for business*

to the army has a very real chance of losing the land, equipment, and workforce unless he lends his land to other farmers or has someone running the business in his stead.

- Lack of cooperation between farmers leading to substantially lower business effectiveness. There are obvious upsides for cooperation in collective purchases of fertilizers, plant protection, fuel, etc. However, farmers **tend to not cooperate fearing that other members may not pay in time** undermining the approach. Cooperation in selling harvest can result in a better deal for farmers. However, only a few farmers use this tool due to a lack of trust.
- Intensified **competition with large agrarian holdings.** Small farmers have higher costs across the board: fertilizers, plant protection, fuel, equipment cost and rental, admin costs, etc. Larger companies can 'reserve' staff from mobilization unlike smaller farmers. They are also at a disadvantage in terms of access to credit and negotiating terms with landowners.

Relationship between small-scale farmers and traders/processors

A small farmer located not far from the frontline typically has relatively few options of traders/processor that are willing to buy harvest from the farmer, as the small production volume and unfavorable/risky location make it impossible for a farmer to sell the harvest directly to the larger players. High cost of grain logistics may force the farmers to accept the unfavorable prices offered by local grain traders.

During the war, the harvest volume is highly uncertain, so the vast majority of small farmers in Ukraine sell their crop on spot and have no means to protect themselves against the price fluctuations. In prior years the farmers could afford not to sell the harvest when the prices are the lowest and wait for the better market conditions. Now, however, most of the farmers have very low liquidity and are forced to sell their harvest when they need money to pay taxes or cover other operating expenses that cannot be delayed. Thus, the farmers are forced to sell at time when the prices are low, which deteriorates farmers' margins even further.

Overall, there has been an excessive local supply of crops in Ukraine since the beginning of the war, as the grain that was supposed to be exported remained in the country. In this situation traders and processors have enormous bargaining power and dictate their terms for the farmers (price, payment arrangements, etc.).

Challenges faced by producers and market dynamics

Millers

Ukrainian wheat milling business is very fragmented with no producer having more than five percent of the market share (**Figure 13**). The milling facilities are typically located in urban centers and primarily oriented toward satisfying local demand for wheat flour. While certain producers have historically been geared towards exporting wheat to The Russian Federation and Belarus, a notable observation is **the absence of major players strategically positioned near seaports** with the capacity to produce wheat flour on a large scale.

In addition to the business' low profitability, millers confront challenges such as the **persistently declining quality of locally produced wheat**, the risk of a shortage in food-grade wheat for the next season the mobilization of key production personnel, and the difficulty in securing loans with reasonable interest rates for the expansion or upgrade of equipment.[11]

The price of electricity has been steadily growing over the past years pushing production costs higher[12].

Ukrainian wheat flour is currently not competitive on the international markets. Achieving competitive pricing will require massive investments in the creation of effective high-volume production facilities favorably located for export. Paths to profitability include:

- Creation of a vertically integrated business that includes not only milling, but further processing lines of value-added products (e.g., pasta, and bread production.
- Focusing on market specialization by promoting wheat flour types with higher value addition such as specialized and fortified wheat flour.

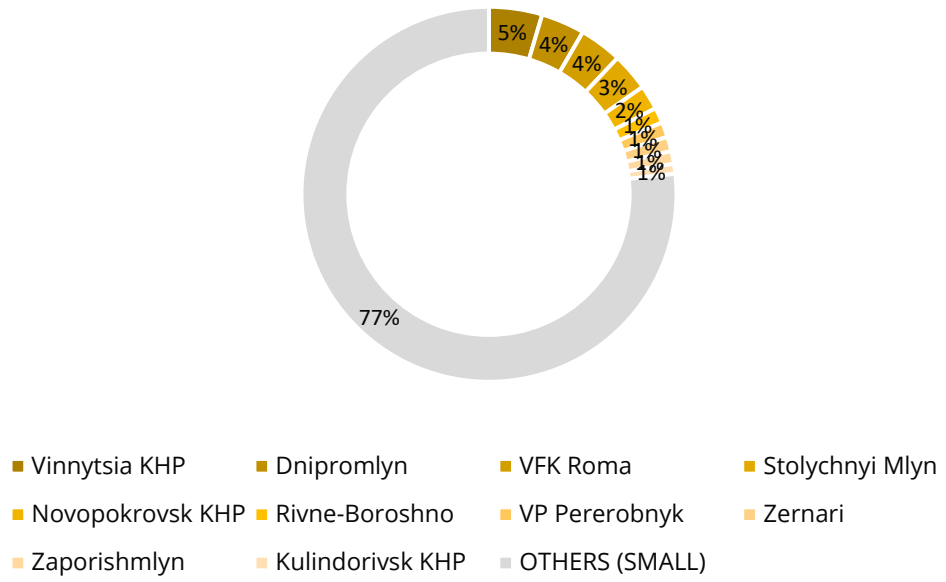

Figure 13: Market shares of wheat flour producers in Ukraine, 2022 (Source: Union of Millers of Ukraine)

Sunflower oil producers

[11] Elevatorist, 23 August 2023, *Not enough milling wheat – SGS Ukraine*

[12] Medium, *Electricity prices in Ukraine*

Sunflower oil is among the primary agricultural export commodities of Ukraine, with Ukraine providing about half of the global sunflower oil supply in 2021/22.

Ukrainian sunflower oil production is rather consolidated: the market leader Kernel accounts for about 18 percent of the market, while small local players account for only about a third of the market (Figure 14).

Production process of sunflower oil is fairly complex. Costs of producing a tonne of sunflower oil (excluding the cost of the seeds) may differ by a factor of three depending on the technology. Larger players with more advanced technology have a clear market advantage.

As long as prices of sunflower oil both locally and internationally were quite high, even less effective small producers were profitable. However, **by the end of 2023, the prices for sunflower oil at Ukrainian ports fell below the costs incurred by smaller sunflower oil producers forcing them to stop operations**. In case the downward price trend continues, the market will consolidate even further as smaller and less effective players are forced to leave it.

Larger players are not only producing sunflower oil more effectively, but also have opportunity to fix the price through the forward contracts and not depend on the price fluctuations. Sunflower oil producers enjoyed years of high profit margins, so many of them did not require working capital loans and were not stimulated to upgrade their production facilities. However, as the business environment is changing, the producers will increasingly rely on support programs and loans to a much greater extent.

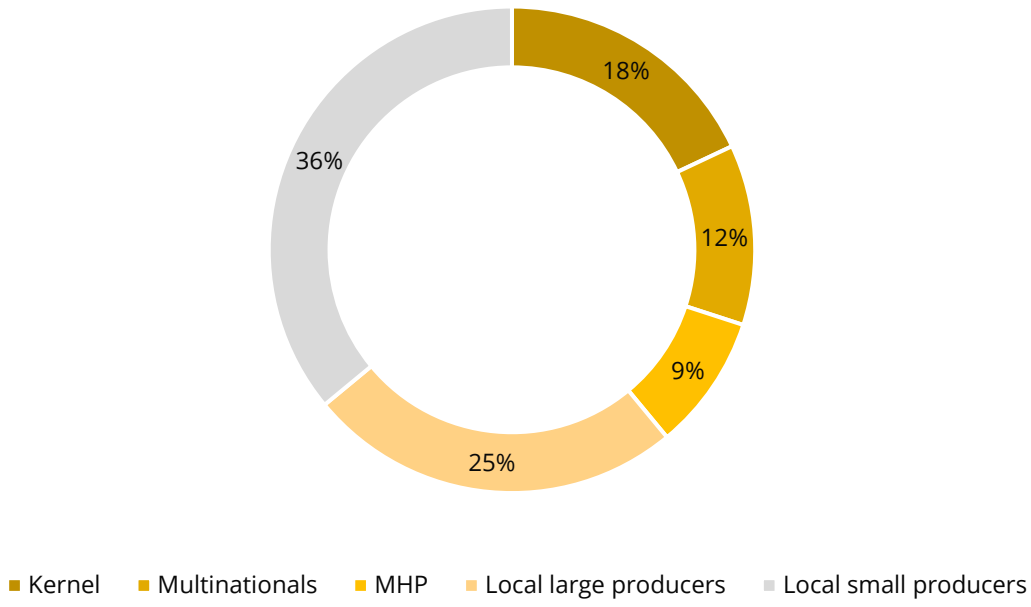

Figure 14: Market shares of sunflower oil producers in Ukraine, 2022 (Source: Kernel)

The **key challenges that sunflower oil producers** face include issues with logistics, production process and sourcing. Logistical challenges include blockades and damage to the ports that make logistics unpredictable and challenging. Additionally, occupation of territories makes the average route from the producer to the processor longer and more expensive. Finally, higher military-related risks increased logistics costs a lot. Production-related challenges include mobilization which take key personnel away from the business. Replacement for the qualified workers and engineers is very hard to find. Another production related challenge is ineffective equipment or unfavorable location. Both of these factors increase costs and, in some cases, push producers' profitability to the negative zone. Finally, upgrading equipment in the current economic environment is rather difficult, as access

to credit funds is limited and the risks are elevated. Sourcing challenges include increased costs of quality control and administration, as the oil processors have to work with smaller farmers who sell seeds in smaller batches of unpredictable quality. Another challenge is the fact that due to crop rotation requirements, the harvested area of sunflower will significantly drop in the next two years leading to a shrinking supply of locally grown sunflower seeds. Finally, sunflower seed quality is declining, as the seeds are increasingly contaminated. Contaminated seeds lead to lower oil quality and declined productivity of extraction.

Up until recently oil processors did not require bank loans or support programs. However, the situation is changing and increasing number of companies are looking into support programs like USAID Agro that can help them upgrade their production capacities.

Value chain price transmissions

The price transmission charts presented in the following sections represent **the average situation** for wheat flower and sunflower oil, respectively, **as of October 2023 for** a typical farmer **in the Central part of Ukraine**. They are based on KSE analysis using data and information from Ministry of Agrarian Policy and Food of Ukraine[13], Ukrainian Grain Association, UkrAgroConsult, Kernel, and Union of Millers of Ukraine. The charts illustrate how costs per tonne of wheat/wheat flour or sunflower oil are accumulated across the value chain (yellow boxes). The figures in brackets present the mark-up which is added by each actor along the value chain. Dark brown boxes represent the price per tonne paid at the different step of the value chain, while the ellipses show the loss/profit per tonne. The value chain starts from production of wheat grain/sunflower seeds (far left) and ends with the main market outlets for wheat flour/sunflower oil (far right).

WHEAT FLOUR VALUE CHAIN

The value chain price transmission analysis for wheat flour is presented in on **Figure 15**. On average**, it costed USD 125 for a farmer to produce a tonne of wheat grain which was sold at USD174 when leaving Odesa port** (overall incremental cost amount to USD 49). The yellow boxes at port level represent the costs paid by the supplier/trader, which include: loading and delivery to port, unloading and loading at port.

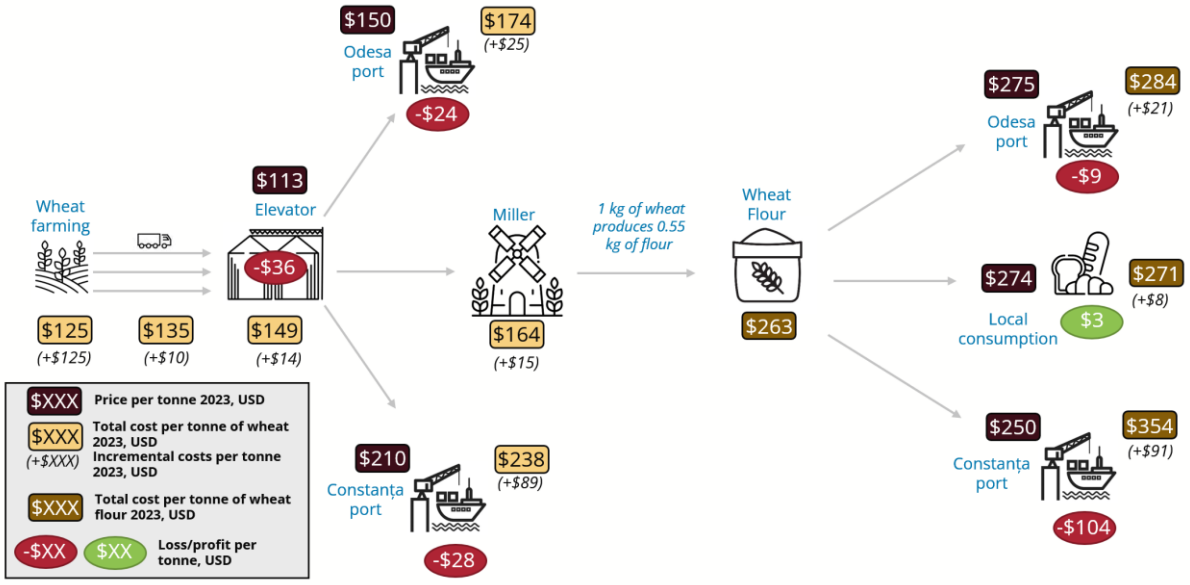

Figure 15: Illustration of the value chain for the wheat/wheat flour (Sources: Ministry of Agrarian Policy and Food of Ukraine, Union of Millers of Ukraine, KSE analysis)

The wheat flour value chain reveals that:

- **Wheat farming at the time of analysis was unprofitable for both farmers and traders oriented towards exports**. Farmers sell wheat to elevators at USD36 loss per tonne, while traders sell wheat in Ukrainian or Romanian ports at losses of about USD 23-24 per tonne.

[13] Ministry of Agrarian Policy and Food of Ukraine, 2023, *Ukraine: Impact of the war on profitability of agriculture*

- **The average cost of production of 1 tonne of wheat flour was USD 263**, which was higher than the wheat flour price in Romanian ports (USD 250). Such situation makes it **uneconomical to sell Ukrainian wheat on the international markets via Romanian ports.**

- The price of wheat flour in Odesa port was higher comparted to Constanta port (USD 275 per tonne versus USD 250 per tonne). However, the total cost of a tonne of wheat flour in Odesa port, including logistics cost, reached USD 284. Thus, **selling wheat flour in Odesa ports is also not profitable.**

- **Internal markets for wheat flour seem to represent the best option for farmers and millers as of October 2023 prices**. However, profitability remains low as strong competition and excessive supply of international and humanitarian wheat flour on the domestic market make it increasingly difficult to remain profitable while operating on the local market.

SUNFLOWER OIL VALUE CHAIN

The value chain price transmission analysis for sunflower oil in is presented on the **Figure 16**.

It costed on average **USD 274 for a farmer to produce a tonne of sunflower seeds**; the cost increased after being transported to an elevator and later to a port. For instance, the aggregated cost of a tonne of wheat in Constanta port reached USD 413. The yellow boxes at port level represent the costs paid by the supplier/trader, which include: loading and delivery to port, unloading and loading at port.

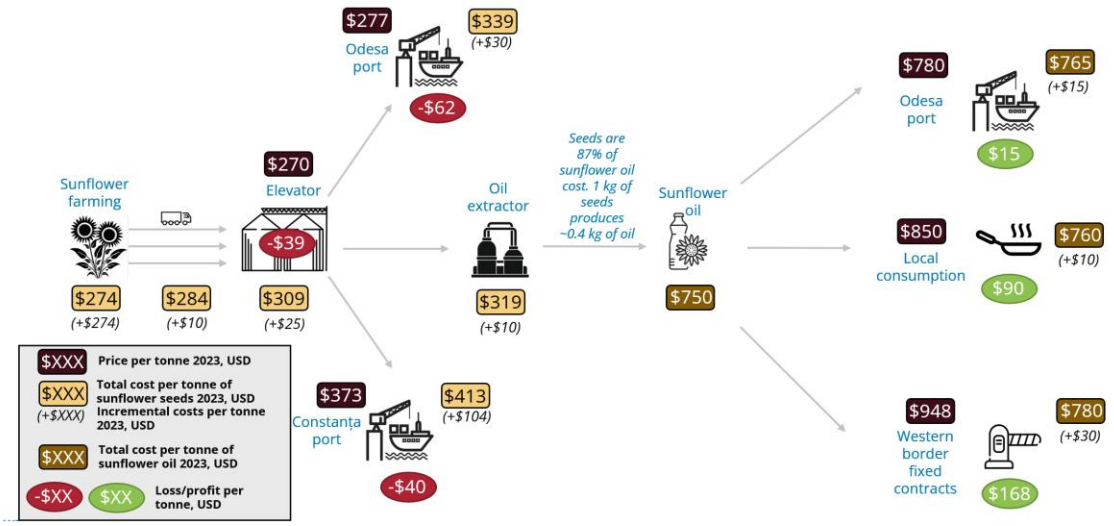

Figure 16: Illustration of the value chain for the sunflower seed/oil (Sources: Ministry of Agrarian Policy and Food of Ukraine, Ukrainian Grain Association, UkrAgroConsult, Kernel, KSE analysis)

Key highlights from the presented value chain:

- **Sunflower seed farming became unprofitable** in late 2023 as the global plant oil prices decreased. The farmers are now facing on average a loss of USD 39 per tonne of sunflower seeds sold. **Traders of sunflower seeds were also operating at a loss** both in Ukrainian

and foreign ports. The traders' losses were in the range of USD 40-62 per tonne of sunflower seed sold.

- Given the price of sunflower seeds, the average cost of producing a tonne of sunflower oils was around USD 750. **The cost varies greatly for different processors due to differences in the production methods**.

- Sunflower oil producers used to enjoy rather high profit margins. However, the global prices started to decline. As the price for tonne of sunflower oil decreased to USD 780 in Ukrainian ports, some of the **smaller sunflower oil producers stopped their operations**, as the price became too low for them. Only large players are competitive.

- **Larger players still enjoy relatively high profitability** thanks to the forward contracts that fix the price that is substantially higher than the current spot price.

- **Selling sunflower oil on the local market seems a profitable option for oil producers**. However, the demand is rather small compared to the export opportunities.

Conclusions

Ukraine is recognized as one of the leading global agricultural exporters, with its primary exports comprising grains, oilseeds, and vegetable oils. However, **during the war, the sector faces significant challenges** such as arable land loss, direct war-inflicted damage to logistics and storage infrastructure, high logistics costs, intermittent supply chain disruptions, escalating prices for fertilizers and crop protection products, lack of workforce, and other war-related challenges. Due to low export volume, local supply for most agricultural products exceeded demand pushing the prices down. These factors collectively **compel all value chain ecosystem players to navigate within narrow profit margins or even below them**.

Farmers are striving to reduce expenses by scaling back on inputs such as fertilizers, opting for cheaper seeds, and postponing equipment maintenance, among other measures. However, these cost-cutting actions have also **resulted in lower yields and deteriorated quality of grain and seeds for both wheat and sunflower farming**.

Farmers, especially those operating on a smaller scale near the frontline, are presently facing significant financial losses and **require urgent assistance to maintain their agricultural operations**. These farmers are faced with limited access to adequate financial resources, coupled with soaring operational costs and declining selling prices. Unless this unfavorable situation undergoes a significant transformation, there is a high likelihood that these farmers will be forced to downsize their operations or potentially face bankruptcy in the near to medium-term. Immediate challenges for farmers also include a severe lack of workforce due to mobilization and war-related risks (mines, missile attacks, etc.).

The **wheat flour industry in Ukraine has a highly fragmented structure**, **lacking prominent players with the capacity to effectively compete on the international market**. Many existing smaller and medium-sized entities within this sector are currently grappling with financial losses or minimal profitability. As their current business models prove ineffective, these entities are actively considering options such as vertical integration of their operations or the production of specialized flour with enhanced value proposition. However, securing high-quality locally sourced wheat has become progressively more challenging for these entities.

To enhance the profitability of wheat farming, farmers are reducing their production costs by economizing on inputs such as seeds, fertilizers, crop protection products, and fuel. This cost-cutting strategy often entails **shifting towards the cultivation of feed-grade wheat** instead of food-grade wheat.

Farming **sunflower seeds proved to be more profitable than wheat farming**, prompting many farmers to transition to sunflower cultivation in 2023 to mitigate losses from other crops. However, crop rotation considerations **will necessitate a shift to different crops in 2024**. Additionally, the decline in prices for sunflower oil on the domestic market and increased logistics costs are encouraging farmers to **explore alternative crops such as rapeseed and soybean** (even though the profitability of these crops is also declining).

In the past, sunflower oil producers experienced substantial profit margins, which attracted numerous small and less efficient producers to enter the market. However, with the **decline in international prices and the notable rise in costs, particularly logistics expenses, smaller producers are now facing unprofitability and struggling to compete with larger industry players**. The imminent challenge on the horizon lies in the anticipated shortage of locally grown, high-quality sunflower seeds. As a result, the already competitive market of sunflower oil production will become even more consolidated with only the most effective players remaining.

The pursuit of profit opportunities is driving **changes in traditional business practices**, including:

- Increasing participation in the **shadow grain market**.
- The rise of **barter operations** among farmers, traders, and suppliers of agricultural inputs.
- Adoption of a **tolling system** in the sunflower crushing process.

Farmers, millers and sunflower oil processors highly appreciate various support programs (both from government bodies and international donors) and are very willing to participate in them. However, small farmers near the frontline **sometimes face obstacles in accessing these programs** due to farmer's size of business and/or the perceived higher risks associated with their proximity to the frontline, as perceived by financial institutions.

Recommendations

The table below presents 11 recommendations developed by the KSE Agrocenter as the result of the research and anticipated benefits they can provide.

#	Name	Description	Anticipated benefits
1	**Mitigation of unfair trading practices along the entire agricultural supply chain**	According to Ukrfood (UkrKharchProm) association, the implementation of **Directive (EU) 2019/633 «On unfair trading practices in business-to-business relationships in the agricultural and food supply chain»** will eliminate the discriminatory business practices between the food retail sector and food processors. The directive prohibits 16 unfair business practices. In particular, the payment period is limited to 30 days for perishable products and 60 days for non-perishable products.	The implementation of this directive is expected to enhance liquidity and transparency within the food processing sector, ensuring alignment with established European Union (EU) business practices. This, in turn, will attract new investments and strengthen collaboration with European partners.
2	**Implementation of government-backed container transportation insurance**	Since November 2023, the ongoing initiative to reimburse shipping insurance expenses for bulk exports has been successfully executed. **Extending this program to cover docker exports** will significantly enhance shipping capacity accessibility for this specific mode of transportation.	The inclusion of docker export within the insurance program would lead to a noteworthy reduction in logistical expenses pertaining to the maritime transportation of flour and vegetable oils in containers and flexi tanks.
3	**Adoption of european educational standards in the food sector**	It is imperative to ensure that current **academic programs** in the food sector **align systematically with European requirements at the higher education level, while also accommodating ad-hoc provisions** such as short-term programs and study trips for employees engaged in food enterprises. This concerted effort will expedite the assimilation of Ukrainian processed food products' attributes to conform with the quality and safety standards set by the European Union (EU).	The successful implementation of European educational standards in the food sector is anticipated to lead to an increased demand for Ukrainian wheat-based products and vegetable oils, accompanied by a surge in investments and the consolidation of collaboration with European partners.
4	**Establishment of an equipment leasing consortium**	In order to facilitate capital investment recovery within the agricultural and food processing sectors, the **formation of a machinery and equipment leasing consortium is proposed**. This consortium, backed by a combination of public and private financing, along with the involvement of international funds, will ensure stable operations throughout both wartime and post-war periods.	The creation of the equipment leasing consortium can substantially boost capital investments within the Ukrainian agriculture and food processing industry.

5	**Encouraging integration between wheat producers and flour mills through linked public lending**	For better cooperation between wheat producers and flour mills, the implementation of linked public lending is suggested. **This approach incentivizes long-term trading relationships between millers and suppliers**, providing farmers with the opportunity to cultivate high-quality wheat with guaranteed demand. Grain clusters can be established by offering concessional lending to millers who enter into long-term delivery contracts with a select group of suppliers.	The implementation of linked public lending is intended to enhance supply chain sustainability, facilitate the implementation of the EU Farm to Fork Strategy, and provide access to premium flour markets.
6	**Facilitating export opportunities**	To expand the presence of Ukrainian producers in international food markets, it is proposed to streamline the process of participating in international exhibitions. Additionally, **enhancing business relations through the network of agricultural attaches** will help bolster international consumer awareness regarding Ukrainian food products.	These efforts is expected to result in increased demand for Ukrainian wheat-based products and vegetable oils by opening up new export markets.
7	**Employee mobilization exemption for processing enterprises**	The issue of military mobilization significantly impacts the food production and processing sector, particularly the potential loss of male employees. **Implementing a reservation system** for highly skilled workers with advanced education, specifically food industry engineers, would help mitigate the outflow of labor from this sector	The availability of skilled workers in food enterprises would be ensured through the implementation of a reservation system
8	**Enhanced financial support for agri-food sector transition to european green deal standards**	To facilitate the **smooth transition of Ukrainian agriculture and the food industry toward climate neutrality**, additional financing from international donors can be sought. Considering Ukraine's planned accession to the European Union, this financial support will further enable the agri-food sector to effectively achieve the declared Green Deal objectives by 2050.	Increased financial capacity within the agri-food sector through access to carbon markets and deep integration into the economic space of the European Union.
9	**Development of non-banking financing in the agri-food sector**	The integration of **alternative financing instruments for farmers and processors** addresses the gap in implementing the "5-7-9" program, particularly in frontline regions. Adoption of the draft law №9266, titled "On Electronic Agrarian Receipts," will facilitate the attraction of financial resources by utilizing capital assets and future output as collateral.	The agricultural and food processing sector's liquidity will increase through the introduction of non-banking financing options

10	**Tax exemptions for mobilized farmers**	Small-scale farmers who are called upon for military service **still bear the burden of fulfilling tax obligations related to their agricultural operations**. Therefore, it is recommended to implement a policy that grants a tax exemption to mobilized farmers who temporarily halt their farming activities.	This policy would allow mobilized farmers to maintain their businesses and resume agricultural operations upon their return.
11	**Stimulation of direct purchases from smaller farmers**	If larger processors are **motivated to directly procure from smaller farmers**, it would allow the farmers to retain the profit margin currently absorbed by multiple intermediary trades. Presently, smaller farmers often sell their produce to local traders who offer unfavorable prices.	Efficiently streamlining the supply chain will enhance the overall efficiency of the market and enhance farmer profitability.

Data sources and reports

ACAPS Thematic Report, January 2024 (Ukraine - Humanitarian implications of mine contamination)

Agro Portal (https://agroportal.ua/)

APK Inform (https://www.apk-inform.com/en)

Centre for Economic Strategy (https://ces.org.ua/en/tracker-economy-during-the-war/)

DeepState (https://deepstatemap.live/)

DIA (https://business.diia.gov.ua/marketplace/5-7-9-program/5-7-9-program)

Elevatorist (https://elevatorist.com)

Food and Agriculture Organization of the UN (FAO) (https://www.fao.org/home/en)

ITC trade map (https://www.trademap.org/Index.aspx)

Joint Coordination Centre (JCC) (https://www.un.org/en/black-sea-grain-initiative/background)

Kernel (https://www.kernel.ua/, *FY-2023 Kernel Annual Report*)

Kurkul (https://kurkul.com/)

Kyiv School of Economics (Assessing the role of smallholder farmers and households in agriculture and the rural economy and measures to support their sustainable development)

Latifundist (https://latifundist.com)

Medium (www.medium.com)

Ministry of Agrarian Policy and Food of Ukraine (https://minagro.gov.ua/)

National Bank of Ukraine (https://bank.gov.ua/)

State Agricultural Registry (https://www.dar.gov.ua/)

State Statistics Service of Ukraine (https://www.ukrstat.gov.ua/)

Tradingeconomics (https://tradingeconomics.com)

UkrAgroConsult (https://ukragroconsult.com/en/)

Ukrainian Grain Association (https://uga.ua/en/home/)

Union Millers of Ukraine (https://ukrmillers.com/en/)

US Department of Agriculture (USDA) (Ukraine Agricultural Production and Trade April 2022)

USAID Agro (https://www.usaid.gov/ukraine/agriculture-resilience-initiative-agri-Ukraine)

USDA PSD Online (https://apps.fas.usda.gov/psdonline/app/index.html#/app/home)

The World Bank, the Government of Ukraine, the European Union, the United Nations, February 2024 (Ukraine – Rapid Damage and Need Assessment. February 2022 – December 2023)

Annex 1: support programs to farmers and millers

Programs supporting farmers

There are several support programs for Ukrainian farmers including the government and NGO initiatives. The table below summarizes the government support programs according to the interviewed key informants:

Program name	Lower-rate credits "5-7-9"	Support of small farmers (SAR)	Partial compensation for the cost of agricultural machinery and equipment of domestic production
Description	Affordable Loans 5-7-9 program allows micro- and small farmers to receive relatively cheap financing with an interest rate of 5-9%. As of October 6, 2023, Ukrainian farmers received 34 billion hryvnias under this program. However, the share of the most war-affected regions (Sumy, Kharkiv, Zaporizhia, Kherson, Donetsk, and Lugansk regions) is relatively small – around 10%. This is because banks avoid crediting farmers on these territories due to war risks	In 2022, the government provided 1.5 billion hryvnias to small farmers (up to 120 ha) near the frontline regions affected by the war. Within this program, farmers received 3100 hryvnias per 1 ha of farmland. In 2023 the program was not renewed	The program allows the farmers to receive back 25% of the value of locally produced machinery. However, the Ministry audit of this program showed its low efficiency

International NGOs also introduced their support programs for Ukrainian farmers:

Program name	FAO Seed Initiative	FAO Sleeves for Grain Storage Initiative	USAID Agro Initiatives
Description	Providing wheat seeds for 2023 planting campaign to farmers with land area from 5 to 100 ha were eligible to receive seeds. The program encompasses farmers from 9 most war-affected regions except Donetsk and Lugansk regions (Sumy, Chernihiv, Kharkiv, Dnipropetrovsk, Zaporizhzhia, Mykolaiv, Kherson, and Odesa regions). All participants can receive 2 tons of spring crop seeds (mostly wheat) which is enough to plant at 10 ha. Overall, 5400 tons of seeds were provided by this program	In total, around 30 000 polyethylene grain sleeves of 200 tons each are distributed to Ukrainian farmers to increase their capacities for grain storage and reduce storage costs	Providing fertilizers for small farmers from (5 to 500 ha). Every participant will receive up to 2 tons of carbamide for the spring planting campaign 2024. Overall, 14000 tons of carbamide will be distributed

Programs supporting millers

The millers are aware of the USAID Agro support programs and are very willing to participate in them. One of the programs grants financing of 15 flour vitaminization (fortification) projects. It is aimed to make Ukrainian products competitive on the international markets and create value addition for local flour producers (especially small and medium businesses). The total budget is around 57 million UAH. Another program establishes system of non-bank financing for small and medium businesses. 36 million UAH will be provided to establish two projects which improve access of agricultural producers to finance via non-bank financing tools. There is also a co-financing of projects for grain and oilseed processing. Overall, 367 million UAH will be provided to finance 20 projects of expanding the existing processing capacities to ensure higher value addition for Ukrainian processors.

Annex 2: interview details

Farmers	Millers	Sunflower oil producers
12 interviews with farmers in total: - 2 with about 20 ha of land - 4 with about 100 ha or land - 5 with about 200 ha or land - 1 with about 300 ha or land	**3 interviews** with wheat millers: - Kryvyi Rig (Dnipropetrovsk region) - Trostianets (Sumy region) - Pervomayskyi (Kharkiv region)	**1 interview** with sunflower oil producer: - Mykolaiv (Mykolaiv region)
- 3 from Mykolaiv region - 3 from Dnipropetrovsk region - 2 from Kharkiv region - 3 from Sumy region - 1 from Zaporizhzhia region	Capacity - 6 thsd tonnes per month - 5 thsd tonnes per month - 12 thsd tonnes per month	Capacity - 15 thsd tonnes of seeds per month
- 2 farmers from the areas near the border / frontline - 2 farmers had their or neighboring lands shelled	- 2 purchase wheat directly from the local farmers (up to 300 suppliers) - 1 works directly with a few farmers that grow specific wheat types specifically for the miller	- purchases seeds directly from the local farmers (200 suppliers)

Annex 3: topics covered during the interviews with farmers and processors

1. Semi-structured in-depth interviews with farmers (up to 300 ha) close the frontline covered the topics of:

   - War-related (and non) challenges
   - Relationships between farmers and traders/processors (power dynamics, contractual arrangements, organizations/unions, support services/partnerships, etc.)
   - External support from the government and other development/humanitarian partners
   - Cooperation, role of organizations and associations
   - Most important cost drivers and their development since the beginning of the war
   - Profit margins

2. Semi-structured in-depth interviews with producers of wheat flour and sunflower oil covering the topics of:

   - War-related (and non) challenges
   - Procurement strategies and challenges
   - Production strategies and challenges
   - Sales of products strategies and challenges
   - Most important cost drivers and their development since the beginning of the war
   - Business profitability
   - Cooperation, role of organizations and associations
   - External support from the government and other development/humanitarian partners

Annex 4: wheat and sunflower seeds farming costs

Figures 17 and 18 provides an overview of evolution of the wheat and sunflower seeds farming costs from 2021-23, highlighting the changed practices adopted by farmers.

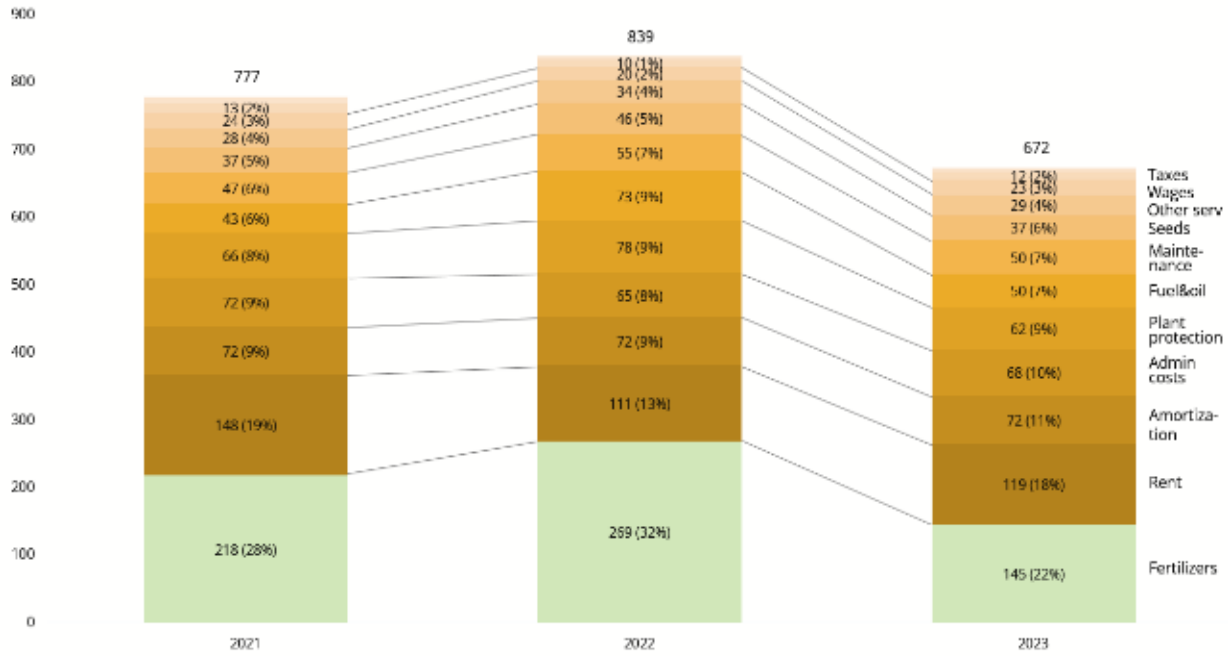

Figure 17: *Cost of wheat farming, USD per ha (Source: Ministry of Agrarian Policy and Food of Ukraine)*

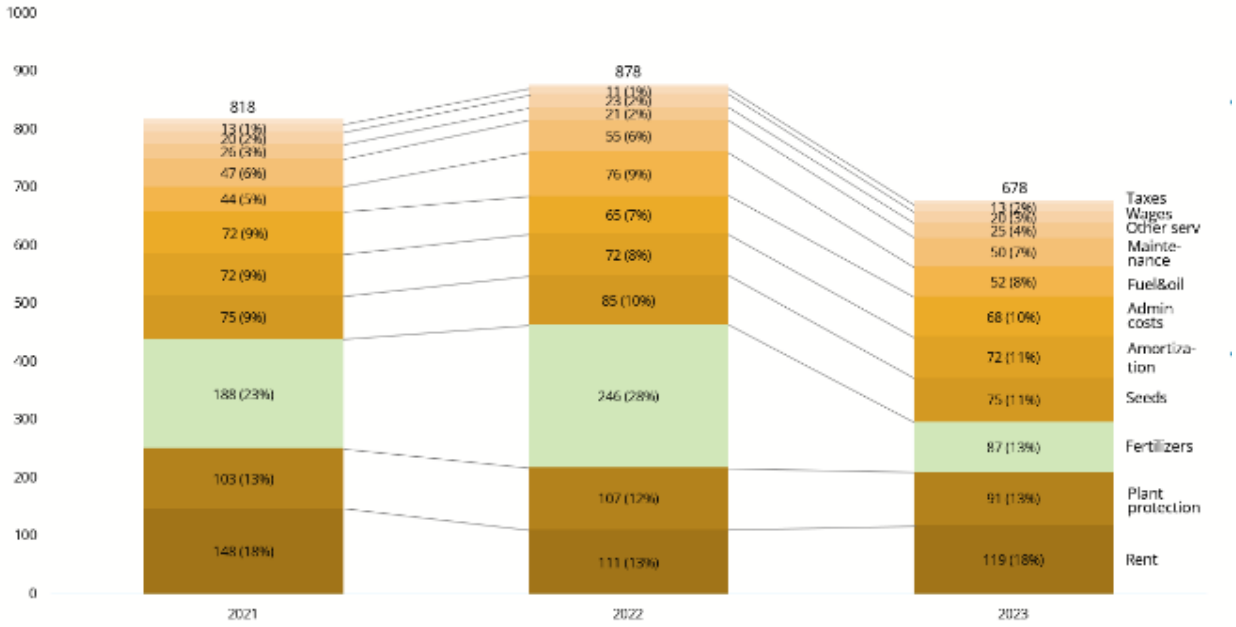

Figure 18: *Cost of sunflower farming, USD per ha (Source: Ministry of Agrarian Policy and Food of Ukraine)*