



# AGRICULTURAL OUTLOOK UKRAINE

## 2050 PROJECTIONS FOR CROPS

MAY 2023

The world is looking ahead concerned with climate change and “greening” policies that challenge the conventional way of farming, with growing population and the increase in food demand and changing consumer preferences towards plant-based diet. With Ukraine fighting for life in the unprecedented attack onto its independence by RF, it is important to locate the expectations about its crop production on the map of global food supply and trade. The country is one of the leading wheat, corn, barley and sunflower seed commodities exporter in the world. In the last decade it supplied around 10% of the world wheat, 15% of corn and barley and more than 50% of the sunflower oil exports. **Thus, the current Agricultural Outlook issue presents the long-term projections of the crop markets development in Ukraine, i.e., until 2050.**

### BACKGROUND INFORMATION

The price of the Russian full-scale war against Ukraine is already immense. It continues to increase every day and spills over to every corner of the globe by means of food and energy inflation and shortages. **The total damage to Ukrainian agricultural sector was 9 bln USD as of April 2023**, or more than **26% of its physical assets**. Since the first days of Russian invasion, the Black Sea ports of Ukraine were either occupied or blocked by Russian naval fleet. Huge mass of exportable surpluses of grains and vegoil have stuck in Ukraine’s ports and in inland elevators. The land and river export routes have been more expensive and with a limited scope for topping up the shipments. Respectively, the total shipment capacity fell substantially short of the demand and of the pre-war monthly shipments<sup>1</sup>, which led to oversupplies exhausting<sup>2</sup> the existing domestic storage capacities. Therefore, in May 2022 the global wheat price spiked to 444.16 compared to 278.45 USD per metric ton. By April 2023, more than one year after the invasion, the global wheat price fell to **312.8 USD per metric ton** remaining nevertheless extremely high. Even with around 20% lower production volume<sup>3</sup> of grains compared to 2020 (compared to 2021 - production record year, the difference is around 36%) the quantities produced are considerably higher compared to the export capacities. Due to more expensive and longer alternative export routes, export costs surged<sup>4</sup> **from the pre-war 30-40 USD/t to 150-200 USD/t**, and thus severely depressed domestic grain prices. Launching the Grain Deal and establishing a so-called grain corridor from the three

<sup>1</sup> <https://www.ifpri.org/blog/suspension-black-sea-grain-initiative-what-has-deal-achieved-and-what-happens-now>

<sup>2</sup> [https://www.vox.com/23171151/ukraine-grain-wheat-russia-black-sea-odesa-food-crisis?fbclid=IwAR275N4CeFDx4h96\\_6PM3ryN2P5w1MxUKH2k0pAcciuaP3ANo9\\_FjNm9jSg](https://www.vox.com/23171151/ukraine-grain-wheat-russia-black-sea-odesa-food-crisis?fbclid=IwAR275N4CeFDx4h96_6PM3ryN2P5w1MxUKH2k0pAcciuaP3ANo9_FjNm9jSg)

<sup>3</sup> <https://kurkul.com/spetsproekty/1406-yak-viyna-vplinula-na-vrojaj-zernovih-ta-oliynih--pidsumki-sezonu-2022>

<sup>4</sup> [https://www.youtube.com/watch?v=bYSv\\_oBAbZk&t=511s](https://www.youtube.com/watch?v=bYSv_oBAbZk&t=511s)



deep-water Black Sea ports<sup>5</sup> (Odesa, Chornomorsk, and Pivdennyi) allowed increasing agricultural exports from Ukraine substantially, with, however, only marginal effect on domestic prices, i.e. it improved farmers' incomes only marginally<sup>6</sup>.

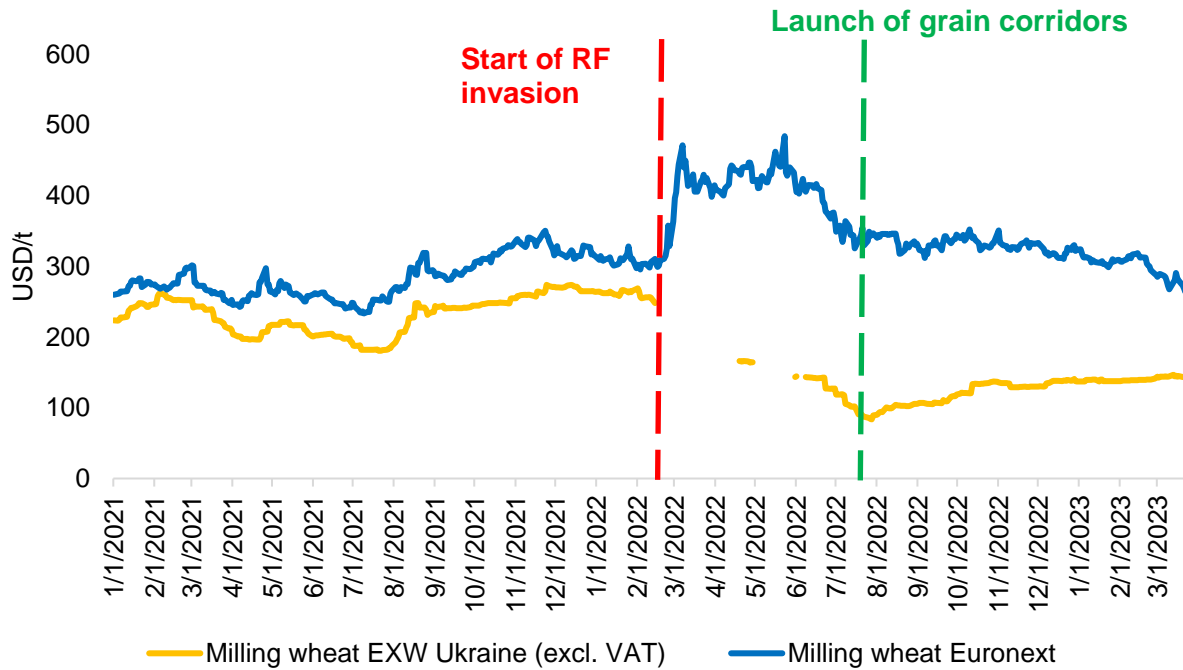


Figure: Wheat prices in Ukraine and EU before and after the full-scale Russian invasion

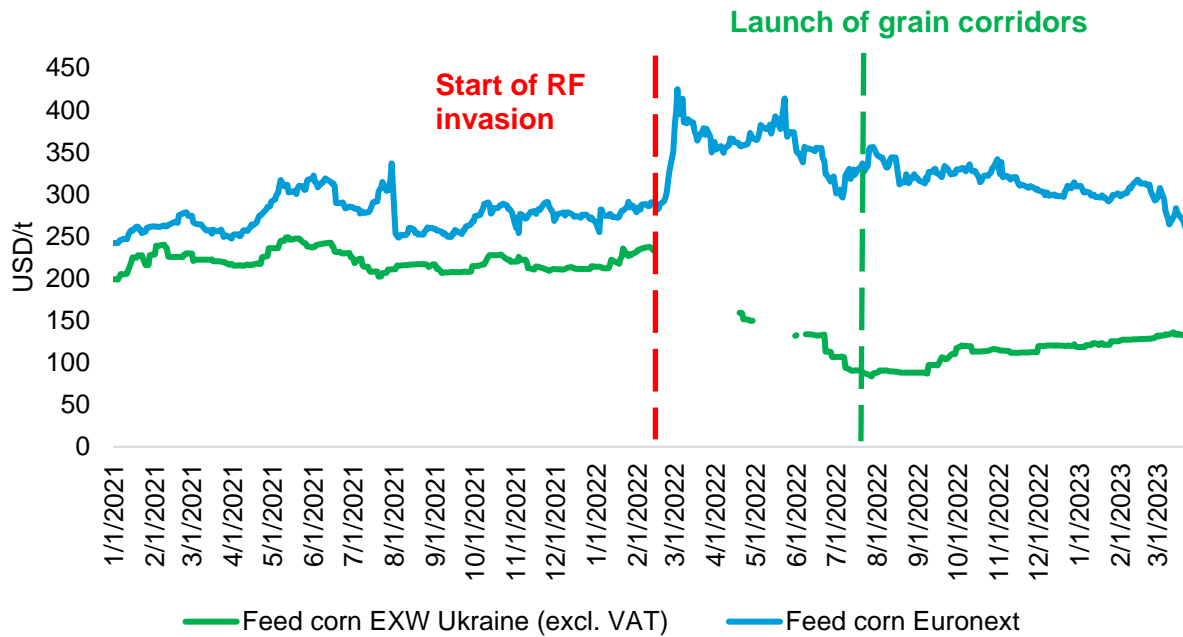


Figure: Corn prices in Ukraine and EU before and after the full-scale Russian invasion

<sup>5</sup> <https://www.un.org/en/black-sea-grain-initiative>

<sup>6</sup> See the report on the state of agricultural sector at <https://kse.ua/wp-content/uploads/2023/05/KSE-Digest-May.pdf>



## METHODOLOGY AND ASSUMPTIONS

To assess the future perspectives of the Ukrainian agricultural sector and markets, the AGMEMOD model is applied (see KSE Agrocenter working paper<sup>7</sup>). The assumptions presented in the Annex are used to simulate the current scenario. They correspond to the ones used in our previous Outlook issue<sup>8</sup>.

## GRAINS AND OILSEEDS AREAS

In the Figure below we present the grains (wheat, barley, rye, oats and corn) and oilseeds (sunflower, rapeseed and soya) areas harvested in 2018-2050.

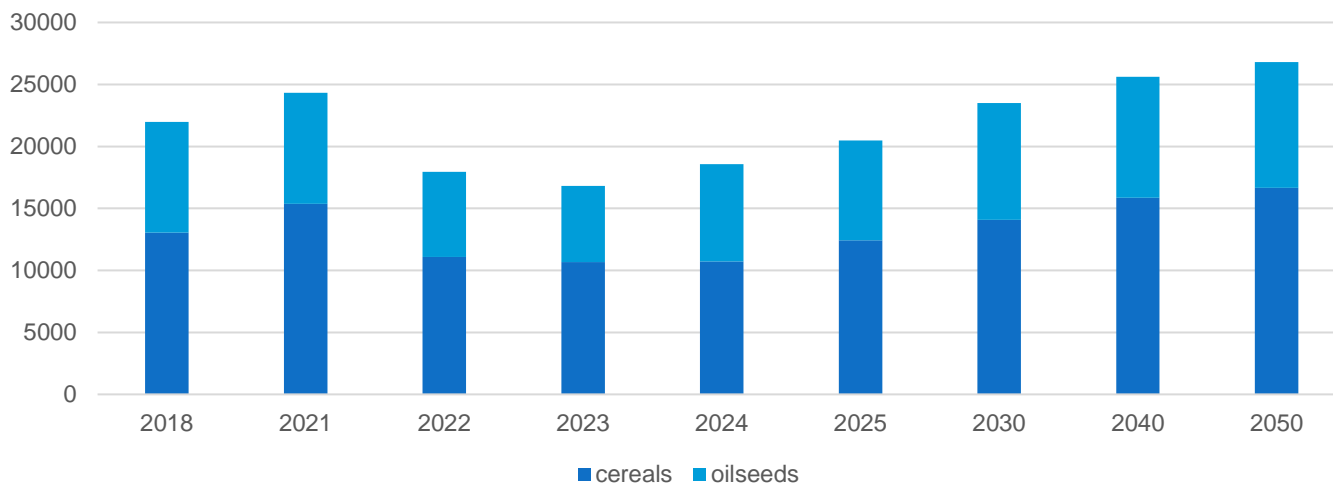
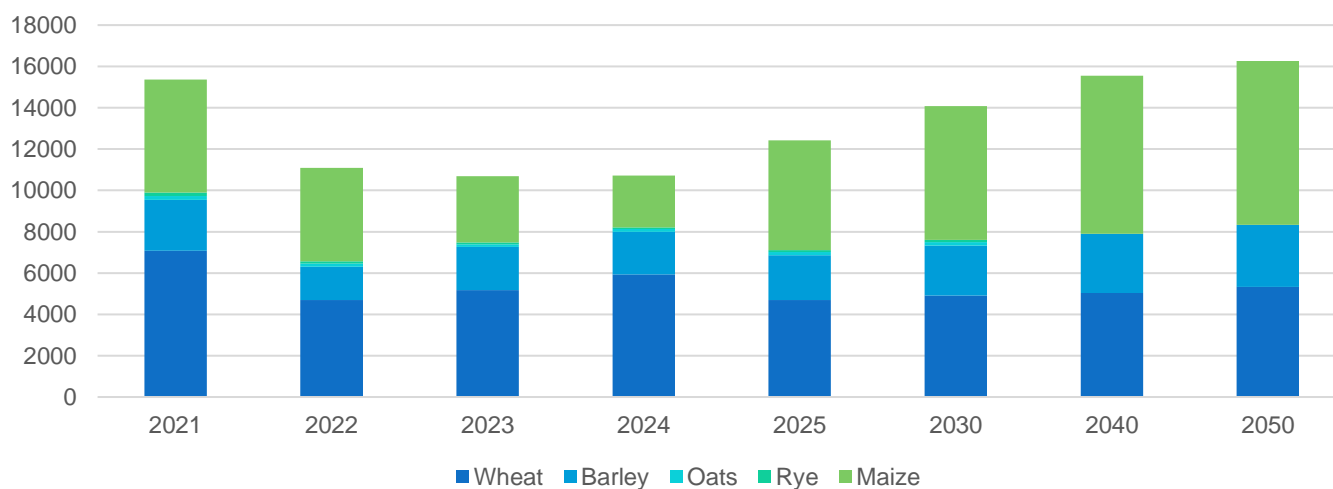


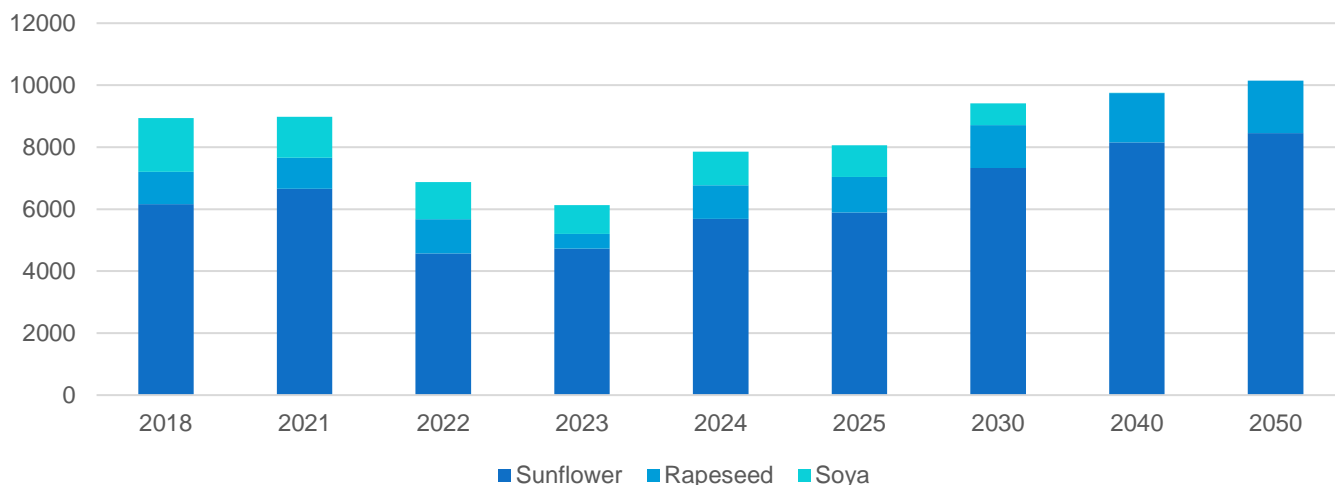
Figure Acreage of cereals and oilseeds in 2021-2050, thsd ha **Source** SSSU for 2021-2022, own estimation for 2023-2050

Before the RF invasion, areas of grains and oilseeds were, respectively, around 15 and 9 million hectares. In 2022, they dropped to around 11 and 7 million ha. With the war ongoing, further drop in the areas is expected: to 10.6 and 6 million ha. The model estimates, that if the war ends in 2023, the areas will reach the prewar levels by 2030 and by 2050 may total 27 million hectares. The additional land for oilseeds and cereals will be reallocated from other agricultural land uses such as vegetables and industrial crops.



<sup>7</sup> [https://kse.ua/wp-content/uploads/2022/09/short-term-outlook\\_issue-1.pdf](https://kse.ua/wp-content/uploads/2022/09/short-term-outlook_issue-1.pdf)

<sup>8</sup> [https://kse.ua/wp-content/uploads/2023/06/outlook\\_issue-2.pdf](https://kse.ua/wp-content/uploads/2023/06/outlook_issue-2.pdf)

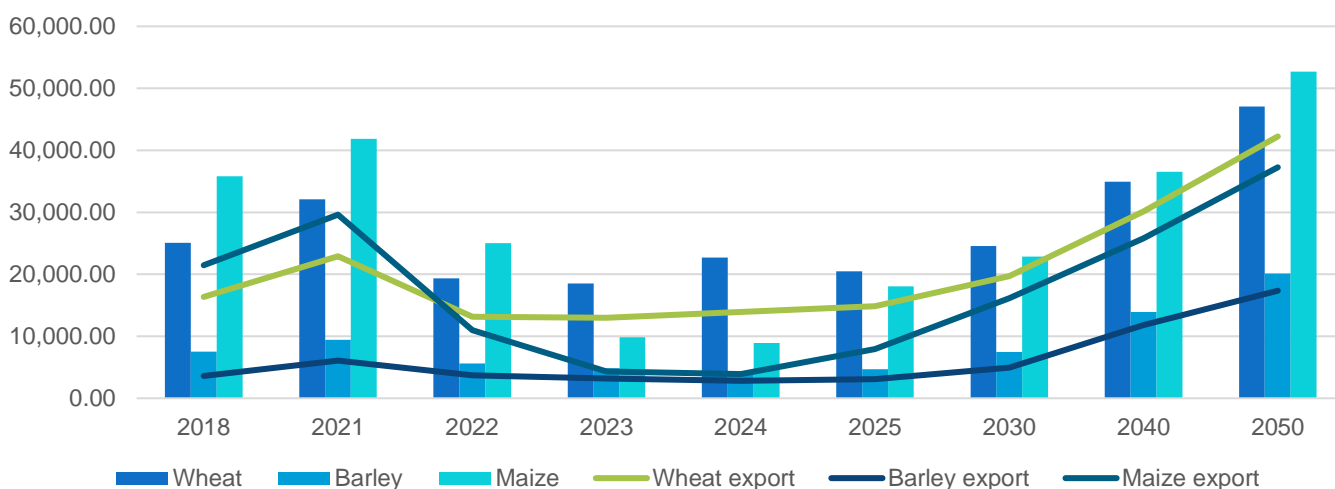


**Figure Acreage of cereals and oilseeds crops in 2021-2050, thsd ha** Source SSSU for 2021-2022, own estimation for 2023-2050

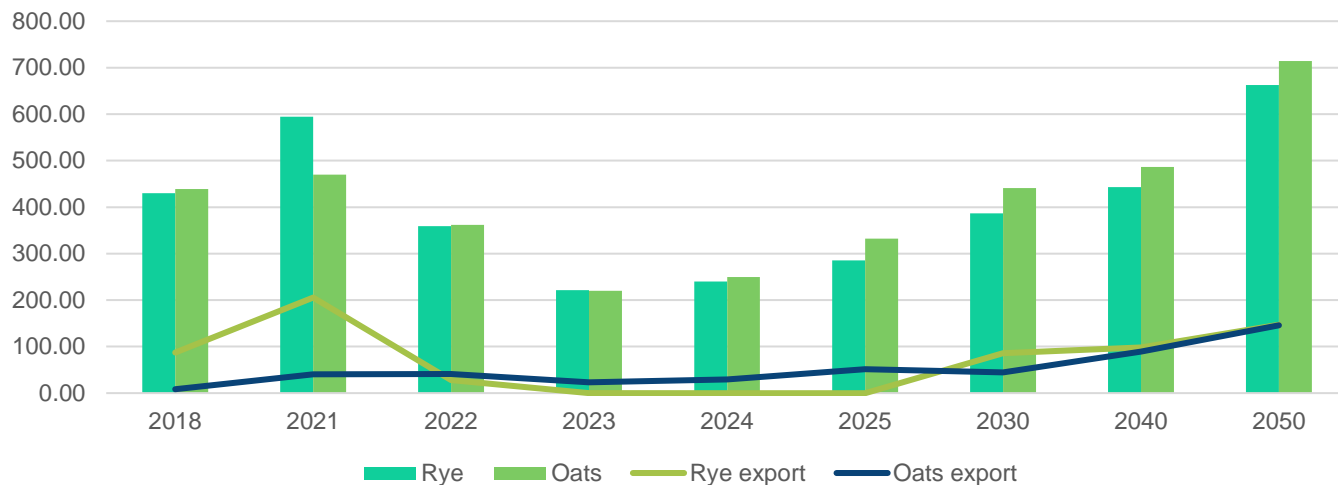
Maize, wheat and barley are expected to remain the major crops all the way to 2050. Maize is expected to gain a considerably greater importance compared to wheat and barley, as it is expected to occupy 8 million hectares of land as opposed to wheat with 5.3 million hectares and barley with 3 million hectares. Changing weather conditions, the world and domestic market prices will be the major causes of such distribution. Sunflower has been and will remain the major oilseed until 2050. Rapeseed area will grow slightly, whereas soya beans area seems to drastically reduce. Total area of oilseeds will increase at the expense of the grains, vegetables and industrial crops areas. Overall, **the total area harvested is expected to recover after the war by 2030 and to continue growing by 2050.**

## CROPS PRODUCTION AND EXPORT

During the war, in 2022-2023, the production of the cereals modelled drops. Starting from the first post-war year, assumed 2024, the production will recover but at different levels. Although acreage of maize is expected to prevail, due to the yield differences, Ukraine will produce more of wheat than of all other commodities until 2030. In 2040 and 2050 the model projects maize to be the main commodity in Ukraine. Another change will take place for oats and rye. Starting from 2024 Ukraine produce more of oats and then of rye. Overall, wheat, maize, rye, oats and barley production will grow. Export of wheat, maize and barley will the production trend, as it has been before the war. Orientation of rye and oats on the domestic market will remain, and exports will not play such an important role in this sector.

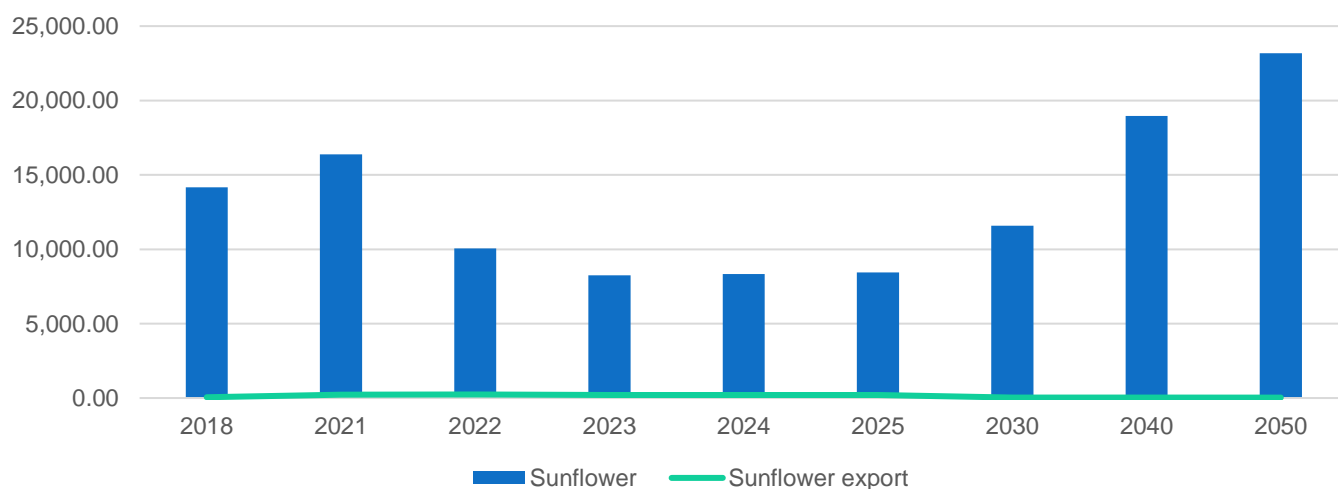


**Figure Production and export of cereals in 2021-2050, thsd t** Source SSSU for 2000-2022, own elaboration for 2023-2050

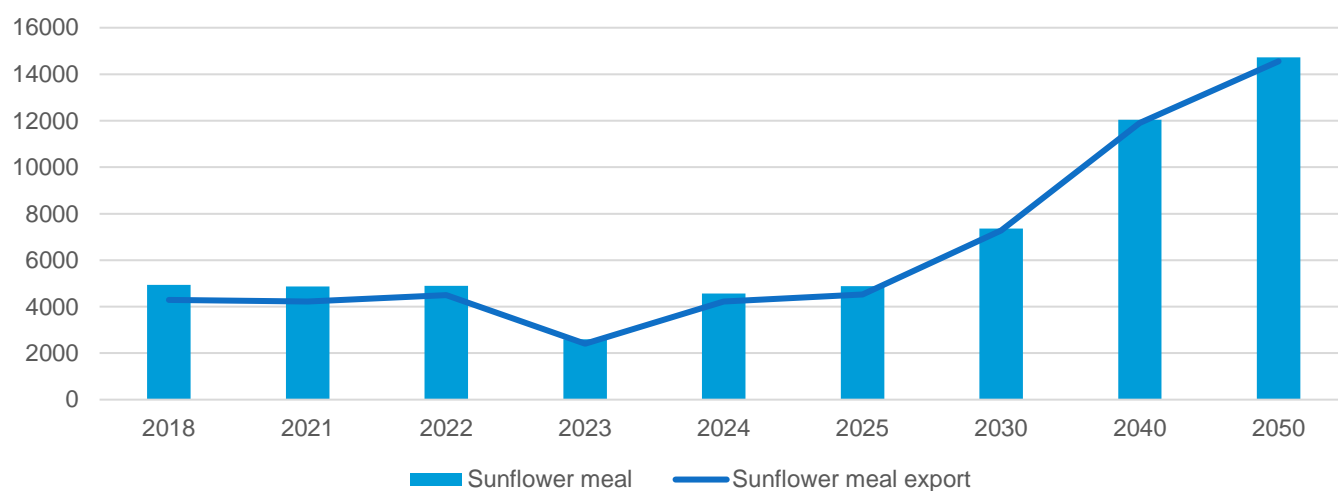
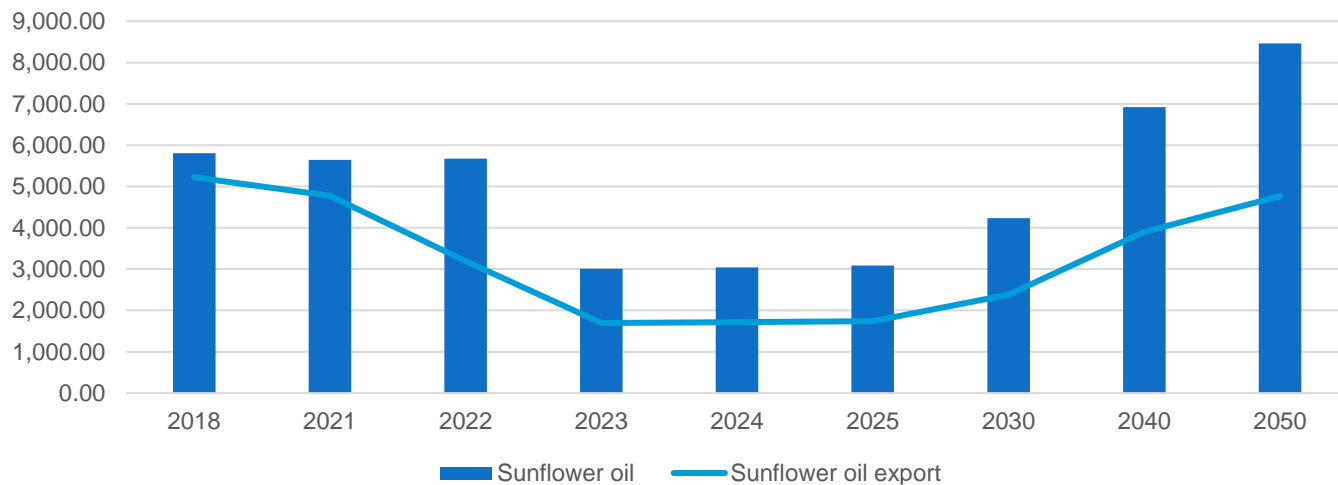


**Figure** Production and export of cereals in 2021-2050, thsd t **Source** SSSU for 2000-2022, own elaboration for 2023-2050

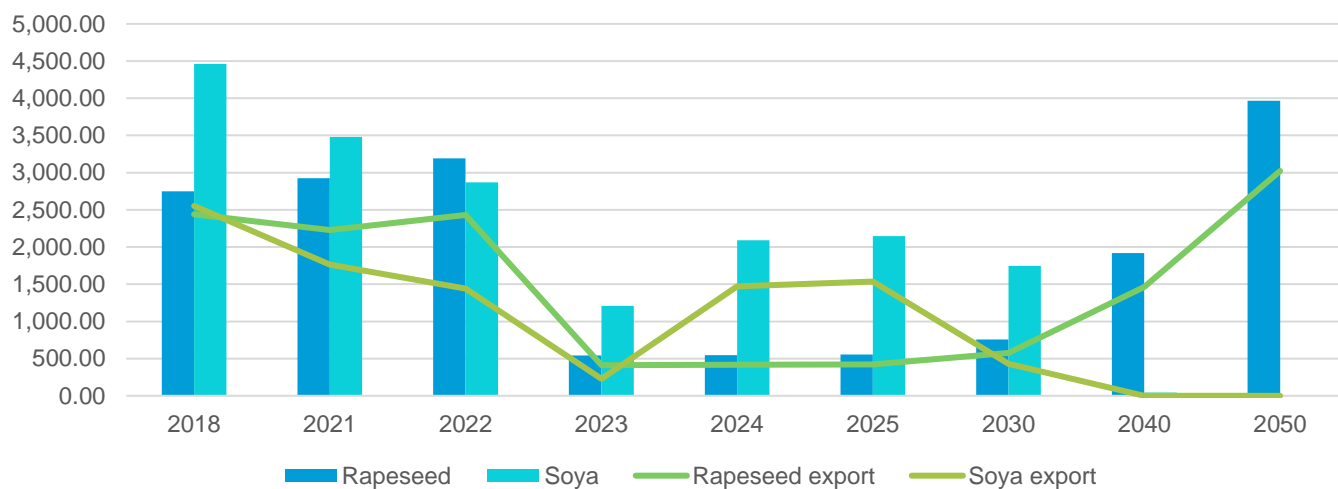
Sunflower production is projected to reach and exceed the pre-war level by 2040, and by 2050 generate 23 million tones of volume. Severe production shock in 2023-2024 and given absence of external support (e.g., subsidies) the producers will struggle to reaccumulate the necessary resources to invest in greater oilseeds yields. Thus, sunflower production in 2030 is expected to be 18% less than in 2018. Production of rapeseed seeds and soya beans will drop by 70% and 60% in 2030, but rapeseed is expected to recover by 2050, whereas soy – not. Production of oils and meals, as well as exports of seeds, oils and meals will follow the production of the oilseed seeds.



**Figure** Production and export of sunflower seeds in 2021-2050, thsd t **Source** SSSU for 2000-2022, own elaboration for 2023-2050



**Figure** Production and export of sunflower oils and meals in 2021-2050, thsd t **Source** SSSU for 2000-2022, own elaboration for 2023-2050



**Figure** Production and export of rapeseed and soya in 2021-2050, thsd t **Source** SSSU for 2000-2022, own elaboration for 2023-2050

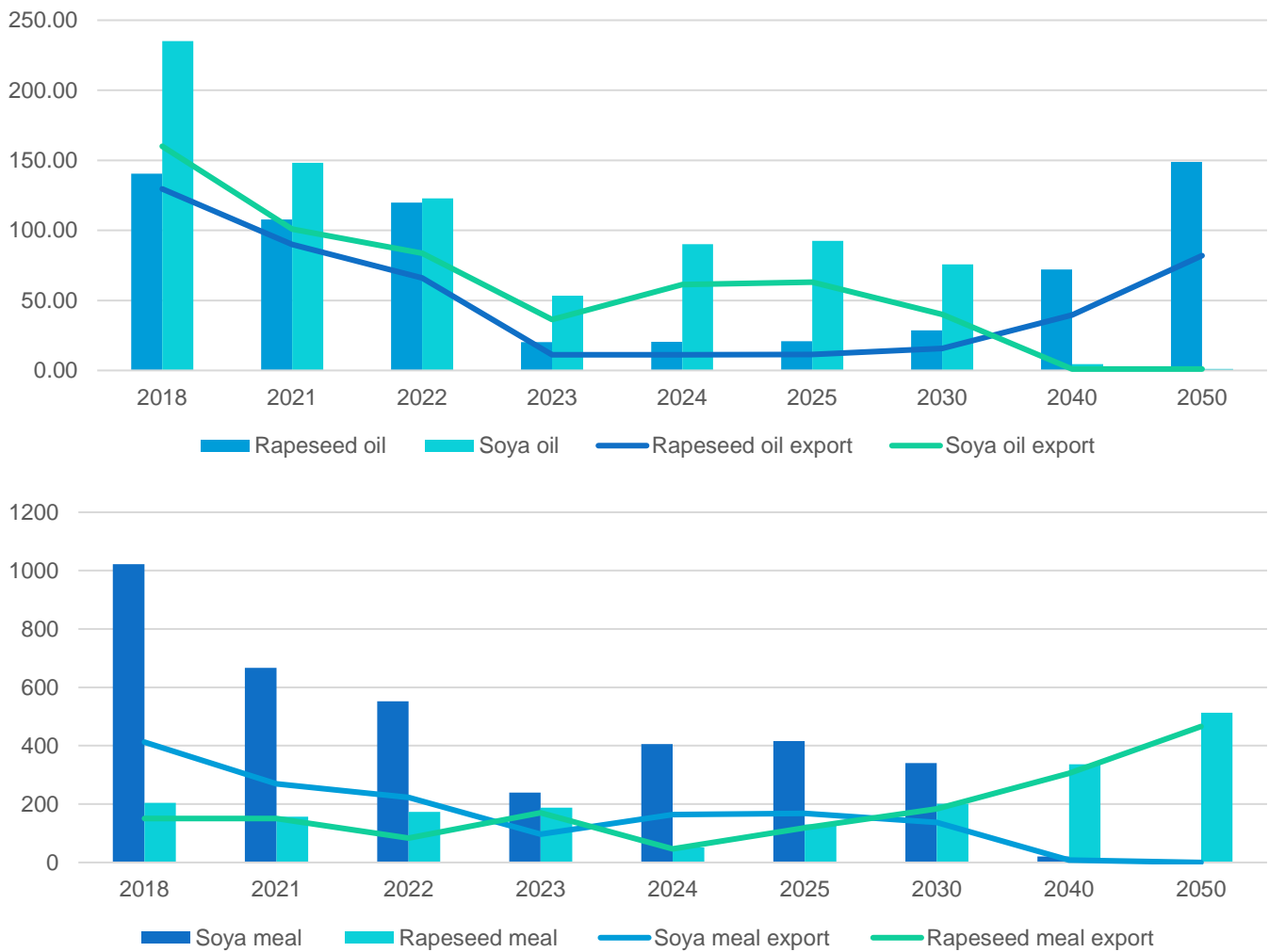


Figure Production of oilseed oils and meals in 2021-2030, thsd t Source SSSU for 2000-2022, own elaboration for 2023-2030

## CONCLUSIONS

As the RF's war in Ukraine goes on, the Ukraine's agricultural sector loses the resources for recovery. The financial and labor inputs are already stretched in 2023. According to the modelling results, some of the sectors will not reach the pre-war levels even after seven years of peace. With the market forces only, sunflower, barley and wheat sectors are expected to recover by 2040. By 2050, under the current world market trends and the destruction level brought by the war, maize, rye, oats and rapeseed sectors are expected to recover, wheat, barley and sunflower are expected to grow, whereas soya production seem to drop tremendously. This means that **it may take as long as 20 years for Ukraine to regain its strength in agriculture** after the devastation brought by the Russian military assault.

**Table Projection basis and assumptions**

<b>Assumptions</b>	<b>Values</b>
Level of export	2023 as of today, 2024-2026 – only Odesa and Danube ports, 2027-2030 – all ports are available except of the Azov sea ports
Duration of war	2022-2023
Reduction of grains area due to occupation and active fighting	-13% from the 2021 grains area harvested in 2021
Reduction of oilseeds area due to occupation and active fighting	-20% from the 2021 oilseeds area harvested in 2021
<b>Production costs</b>	
Availability of financial resources for variable costs	the producers get the profit just to cover their expenses in 2023-2024, return to normal in 2025
Increase in fuel expenses compared to 2021	following annual average crude oil price change in 2022-2023 and projection for 2024 based on World Energy Outlook. For further years adjusted to inflation.
Increase in fertilizer expenses compared to 2021	80% increase in 2022 and 30% increase in 2023, further changes is annual inflation adjustment
Decrease in labor availability, and the resulting change in labor costs, due to mobilization, migration and war-related death*	in 2023-2024 30% less, starting from 2025 - gradual return to 2021 level*
Additional area of uncultivated arable land as an effect of increased production costs	-5%
World market prices in 2022–2030	OECD-FAO Outlook 2022
Crops storage assumption	Storage available
GDP projections 2022-2030 <i>IMF, April 2022</i> <i>SSSU projections</i> <i>Growth rate projected by USDA in 2021</i>	2022-2023: - 35% compared to 2021 2024: rebound by 12.5% 2025-2030: +3.1% annually
GDP deflator <i>As of July 2022, according to the National Bank of Ukraine</i> <i>According to the USDA 2021 projections</i>	- 2022: 30 2023–2030: +5% annual growth
UAH/USD currency exchange rate <i>As of July 2022, according to the National Bank of Ukraine</i> <i>According to the USDA 2021 projections</i>	- 2022–2023: 36.6 2024–2030: +0.2% annual growth
Population <i>Assuming 4 mil people left Ukraine considering 2021 USDA projections until 2030</i> <i>Return of all the war refugees, according to 2021 USDA projections until 2030</i>	- 2022-2023: -4 mil from the projected number 2024-2030: according to the former projections

Source Own elaboration

**Note** \*We assume Leontieff production function, and that one worker may extend their working hours by max  $\frac{1}{3}$  that translates into the daily workload of 10.7 hours

In order to introduce access to ports into the model, we assume the maximum export capacity in 2023-2024 to equal the quantity exported during March 2022-March 2023, which is 54.6 million tonnes<sup>9</sup>. The Odesa port is assumed to be able to transport 6.4 million tonnes<sup>10</sup> of agricultural commodities, and Azov ports are assumed to be able to transport up to 2.4 million tonnes of agricultural commodities.

<sup>9</sup> [https://export.gov.ua/news/4574-eksport\\_agroproduksii\\_ukraini\\_za\\_pershu\\_polovinu\\_bereznia#:~:text=%D0%97%20%D0%B1%D0%B5%D1%80%D0%B5%D0%B7%D0%BD%D1%8F%202022%20%D1%80%D0%BE%D0%BA%D1%83,%E2%80%93%204%2C3%20%D0%BC%D0%BB%D0%BD%20%D1%82%D0%BE%D0%BD%D0%BD](https://export.gov.ua/news/4574-eksport_agroproduksii_ukraini_za_pershu_polovinu_bereznia#:~:text=%D0%97%20%D0%B1%D0%B5%D1%80%D0%B5%D0%B7%D0%BD%D1%8F%202022%20%D1%80%D0%BE%D0%BA%D1%83,%E2%80%93%204%2C3%20%D0%BC%D0%BB%D0%BD%20%D1%82%D0%BE%D0%BD%D0%BD)

<sup>10</sup> <https://uga.ua/ru/news/top-5-ukrainskih-morskih-portov-po-obemam-perevalki-zerna-v-2020-godu/>





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