

Production and Price Development of Agricultural Commodities: Wheat, Corn and Sunflower Seeds in 2022

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Abstract. Agricultural commodities prices skyrocketed during the first quarter of 2022, mainly driven by the escalation of the situation between the Russian Federation and Ukraine, but also by extreme climate conditions in certain geographies and protectionist measures introduced by governments to protect domestic supplies.

Within this paper the authors would like to provide an overview of the biggest producers and exporters of the selected agricultural commodities, being wheat, corn, and sunflower seeds and oil, and their price development in 2022. For all of them, the two conflicting countries, the Russian Federation and Ukraine, play an important role in world production and export.

The production and export volumes should be analyzed along with the price developments in the first months of 2022. As the products are traded on the commodity market the comparison is based on the traded prices.

Keywords: Agriculture, Export, Wheat

JEL classification: *F10, Q17, E31*

1 INTRODUCTION

Inflationary pressures on agricultural commodities started already in 2021, driven by the strong demand as a result of global economic recovery after the COVID-19 pandemic and reduced harvests due to the extreme climate conditions and lack of labor force. This pressure is certainly not limited to agricultural commodities but is visible in various goods and services. Nonetheless, the impact on the prices of agricultural products is immense.

In addition to the recovery after the pandemic, in February 2022 the escalation of the conflict between the Russian Federation and Ukraine created true havoc on commodity markets. Quite unexpectedly, the conditions in the commodity market changed.

Even though the Russian Federation, as well as Ukraine, are both not large in output terms, they are among the largest producers and exporters of some of the essential food products, energy, and minerals. Ukraine is, for example, one of the world's largest exporters of wheat and maize and the world's largest exporter of sunflower oil. The ongoing conflict between Russia and Ukraine disrupted the production and the export of these commodities, bringing their prices to all-time high levels, but also a risk of a strong undersupply in some countries, including Africa.

At the current moment, the conflicting parties have not found a viable solution for exporting harvested proceeds located in Ukraine, including its occupied territory, from the last harvesting period while it is expected that the production in the current period will decline. As a result, the prices of agricultural commodities are still expected to rise or remain at their high levels.

2 DATA & METHODOLOGY

The aim of this article is to provide an overview of the largest producers and exporters of selected agricultural commodities, being wheat, corn, and sunflower seeds (oil,) and their price development in 2022, before and during the conflict between the Russian Federation and Ukraine. In order to achieve this aim, the data used in this article is obtained from various sources. Reports and statistics retrieved from different organizations and international agencies (such as www.usda.gov, www.fao.org, etc.) were sources of data concerning the biggest producers and exporters of selected agricultural commodities. Countries included in our research are Brazil, China, EU, Russia, Ukraine, and the USA as they are the most important players in the production and export of these commodities. The data on price development was gathered from Bloomberg terminal and statistical data from World Bank (www.worldbank.org), OECD (www.oecd.org), The Global Economy (<https://www.theglobaleconomy.com>), etc.

The period in which price development of selected agricultural commodities was analyzed includes the start of the Russian invasion of Ukraine on 24 February 2022 which triggered faster inflation of these commodities. Online text analysis was also used to keep pace with the newest information regarding the ongoing war situation between Russia and Ukraine and its impact on the global economy.

3 THE GLOBAL PRODUCTION OF WHEAT, CORN and SUNFLOWER SEEDS

Wheat, corn, and sunflower seeds are among the key crops cultivated around the world. It can be noted that for all three types of agricultural products both production and exports are largely predominated by a few major players [9]. The top two players generally hold a considerable share of the world's production and exports. For instance, in the 2021/2022 marketing year the European Union and China accounted each for approximately 18% of wheat production. (see Table 1 Wheat Production, metric tons mn).

TABLE 1 – WHEAT PRODUCTION, METRIC TONS MN

Country	2020/2021	2021/2022 Preliminary	2022/2023 Projected
EU	126.69	138.42	136.50
China	134.25	136.95	135.00
India	107.86	109.59	108.50
Russia	85.35	75.16	80.00
USA	49.75	44.79	47.05
Others	271.82	274.38	267.78

Source: USDA

Considering the overall volume of production Ukraine with 25.42 million tons in 2020/2021 is not one of the largest producers. The volume is rather similar to Pakistan (25.25 million tons), and less than Australia or Canada [19].

In terms of the world's corn production, the USA is the definite leader in producing almost one-third of the global corn. It is followed by China, with 22% of the world's corn production. (see Table 2 Corn Production, metric tons mn). The corn production of Ukraine, being 30.30 million tons in 2020/2021 is expected to decrease by more than fifty percent to 19.5 million tons in 2022/2023 [19].

TABLE 2 – CORN PRODUCTION, METRIC TONS MN

Country	2020/2021	2021/2022 Preliminary	2022/2023 Projected
USA	358.45	383.94	367.30
China	260.67	272.55	271.00
Brazil	87	116.00	126.00
EU	67.14	70.50	68.25
Argentina	52	53.00	55.00
Others	303.74	319.63	293.17

Source: USDA

As for sunflower seed production, Ukraine has been the world leader until 2022 with 30% of the world's total production. However, the recent local conflict disrupted the country's agricultural production, and its sunflower seed output is expected to experience a decline of 37% in 2022/2023.

The country is expected then to account for approximately 22% of the global production of sunflower seeds. In 2021/2022 number two sunflower seed producer was Russia with 27% of the world's sunflower seed production. It is expected to become the leader of the sector in 2022/2023, as Ukraine's production is likely to experience a considerable decline. European Union is also a major sunflower seed producer, in 2021/2022 it accounted for 18% of the global output. (see Table 3 Sunflower seed, metric tons, mn) [19].

TABLE 3 – SUNFLOWER SEED, METRIC TONS MN

Country	2020/2021	2021/2022 Preliminary	2022/2023 Projected
Ukraine	14.10	17.50	11.00
Russia	13.27	15.57	14.50
EU	8.92	10.43	10.50
Argentina	3.43	3.35	4.20
China	2.57	2.90	2.80
Others	6.96	7.63	7.72

Source: USDA

4 THE LARGEST EXPORTING COUNTRIES OF WHEAT, CORN, AND SUNFLOWER SEEDS

For the three agricultural products in the analysis, it is important not only to consider the annual production but also the export volumes. Not focusing on the local consumption in the country of production the following overview highlights some of the largest producing countries.

4.1 China

China is among the world's leaders in the production of several agricultural products. It holds a strong agricultural sector, which is, however, mainly aimed at satisfying the country's internal needs. Consequently, being the world's number two producer of wheat and corn, and number five producer of sunflower seed, (see Figure 3 Sunflower and Seed exports, 2020) the country does not show considerable export volumes.

This is mainly due to limited land resources: the county's arable land per capita is 0.073 hm², which accounts for less than one fourth of the world per capita arable land [5].

Food security is one of the priority issues for the country, considering its large population and limited arable land available. Several governmental policies are thus aimed at stimulating the country's agricultural production in order to be able to feed the country's population. According to USDA forecast, wheat production in China is expected to go through a slight decrease in 2022/2023 (approx. 1%). However, the average dynamic over the last five years is positive (1% increase). Production of corn in China is also forecasted to go down, however, by less than 1%. China's sunflower seed production is expected to decrease 3.4% [19].

4.2 Russia

Russia is one of the largest agricultural producers in the world, with 10% of global arable land on its territory [14]. It is the world's number four wheat producer, number two sunflower seed producer, number one wheat exporter and number two exporter of sunflower seed. (see Table 1 Wheat Production, metric tons mn; Table 3 Sunflower seed, metric tons mn; Figure 1 Wheat exports, 2020; Figure 3 Sunflower and seeds exports, 2020).

One of the main characteristics of agricultural production in Russia is its high level of concentration in certain regions. It is mainly concentrated in the Central, North Caucasus and Volga Federal districts. Grains are mainly produced in Krasnodar, Rostov, Tatarstan, Voronezh, Bashkortostan, and Volgograd regions [14]. Russia's agricultural output in general has experienced a steady growth during the recent years. It receives a considerable support from the government in the framework of the country's import substitution policy aiming at increasing the level of Russia's self-sufficiency, incl. in agricultural products. According to the USDA forecast, Russia is expected to produce 80 metric tons mn of wheat in 2022/2023 marketing year. This would mean a 6% increase compared to the previous year, and an average growth of approx. 2% over the last five years [19]. Production of sunflower seed is expected to experience a slight decrease. However, the country is still forecasted to become the leader in terms of the volume of produced sunflower seed.

4.3 European Union

Agriculture of the European Union is managed under the CAP (Common Agricultural Policy) established back in 1962 in order to support the development of agricultural production in the countries of the EU. The EU agricultural sector is highly subsidized. Gathering agricultural production of 27 countries, it is one of the strongest agricultural sectors in the world. The EU became indeed the world's leader in production of wheat in 2021/2022 and is expected to keep this position in 2022/2023, in spite of potential yield decrease due to climate conditions. It is the world's fourth producer of corn, and number three producer of sunflower seed. Several EU countries are also major exporters of agricultural products. For instance, France is the world's fourth wheat exporter, accounting for 10% of the global wheat exports. Romania is number five in terms of corn exports (3% of global volume), and is the world's leader in sunflower seed exports, holding 21% of the total export volume of sunflower seed.

According to the USDA, the production of wheat in the EU is expected to decrease by 1.9 million tons in 2022/2023. However, the average dynamic over the last five years is a 3% increase. EU's corn production is also forecasted to decrease slightly (3%), while its sunflower seed production will remain stable [8].

4.4 USA

Agricultural production is a major sector for the USA. The country is also a massive exporter of agricultural products. It is number one producer of corn worldwide, as well as number five wheat producer.

Corn is the most cultivated crop in the USA. It accounts for 95% of feed crops grown in the country. The core corn cultivation region of the country is Heartland region (incl. Illinois, Iowa, Indiana, eastern portions of South Dakota and Nebraska, western Kentucky and Ohio, and the northern two-thirds of Missouri). Iowa and Illinois are the top producers of corn, which account for approx. one-third of the country's corn production volume [7]. Corn planted land has been growing over the recent years. Corn production has thus also experienced an increase, due both to larger planted land areas, technological development, and improvement of production practices. Wheat is number three most cultivated field crop in the country. Wheat production, a traditionally strong segment of agriculture in the country, has been slowly declining since 1980s, both in terms of planted land and production volumes. This trend is mainly due to the growing competition coming from Russia and European Union, whose wheat exports are on the rise, as well as to the profitability for the farmers of selling wheat inside the country has been going down as well. However, the demand for wheat, which has been rising lately, might push the farmers to keep or develop their wheat production capacities [6].

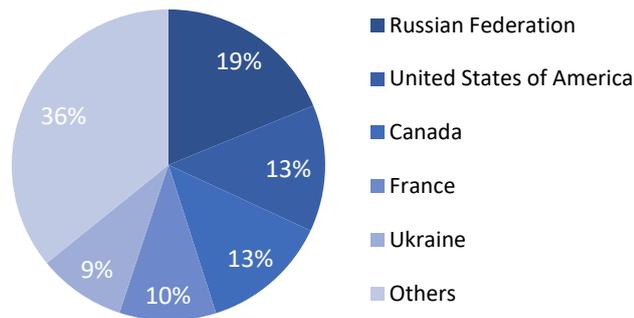
In terms of exports, the USA is number two in wheat exports, with a 13% of total volume, and the leader in corn exports, accounting for 27% of global corn exports. As for the dynamic of the agricultural production of grains in the country, production of

wheat in the USA is forecasted to go up (according to USDA) 5% in 2022/2023, while corn production is expected to experience a 4% decrease.

4.5 Brazil

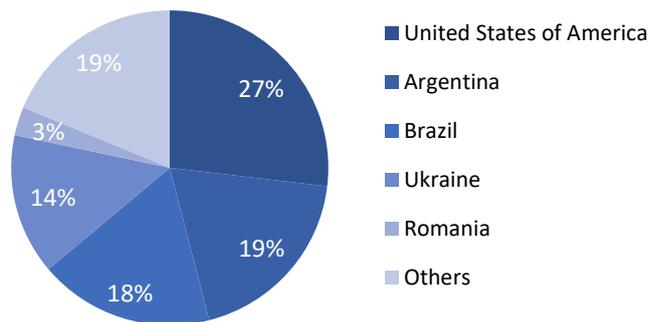
Agricultural sector plays a rather important role in Brazil's economy. The core crop is corn, of which the country is the third largest producer, and the third largest exporter in the world, accounting for 18% of the global corn exports. According to USDA, in 2022/2023 Brazil's corn production is expected to go up 8.6%. The country's wheat production and exports have also recently been on the rise due to the favorable climate conditions as well as rising demand. Traditionally being one of the world's biggest wheat importers, Brazil imports approximately 50% of its wheat consumption volume. A considerable increase in production of wheat could allow the country to reduce its dependence on imports and increase its self-sufficiency [17].

FIGURE 1. WHEAT EXPORTS, 2020



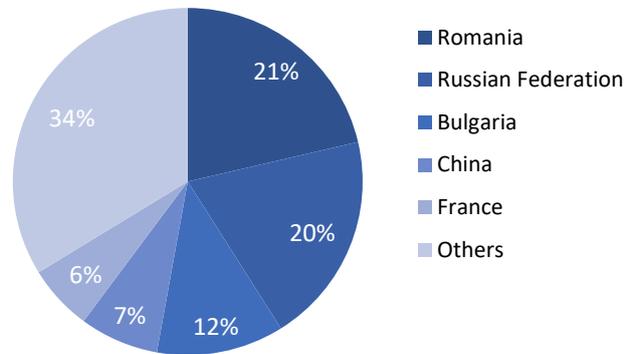
Source: FAOSTAT [11]

FIGURE 2. CORN EXPORTS, 2020



Source: FAOSTAT [11]

FIGURE 3. SUNFLOWER SEED EXPORTS, 2020



Source: FAOSTAT [11]

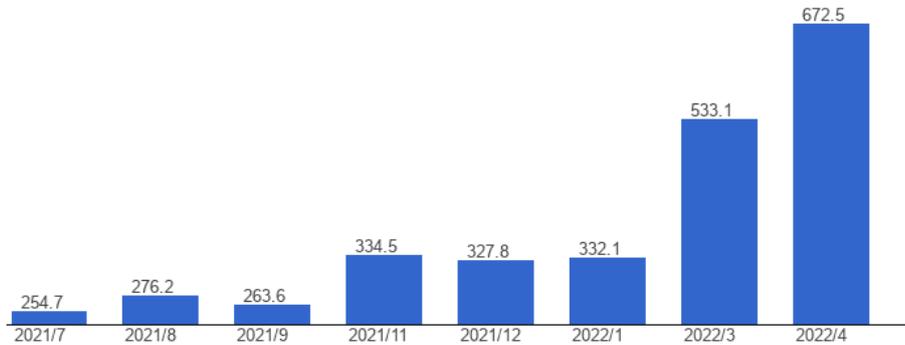
5 WHEAT, CORN AND SUNFLOWER OIL PRICE DEVELOPMENT IN 2022

Inflationary pressures on agricultural commodities started already in 2021, driven by the strong demand as a result of global economic recovery after the COVID-19 pandemic and reduced harvests due to the extreme climate conditions and lack of labor force. Then in February 2022 the conflict between the Russian Federation and Ukraine has started and created a true havoc on commodity markets.

5.1 WHEAT

Wheat prices in 2022 skyrocketed (see Figure 4 Wheat price development) due to the ongoing conflict between Russia and Ukraine, negative climate conditions, supply disruptions and imposed export bans (e.g. India). As to estimates that agricultural production in Ukraine will decrease from up to 50% and consequently keep wheat prices at historically high levels in the mid-term. The fear of famine and social unrest in poorer countries is likely to increase because many vulnerable countries, like Lebanon or Nicaragua, greatly rely on the Ukrainian wheat.

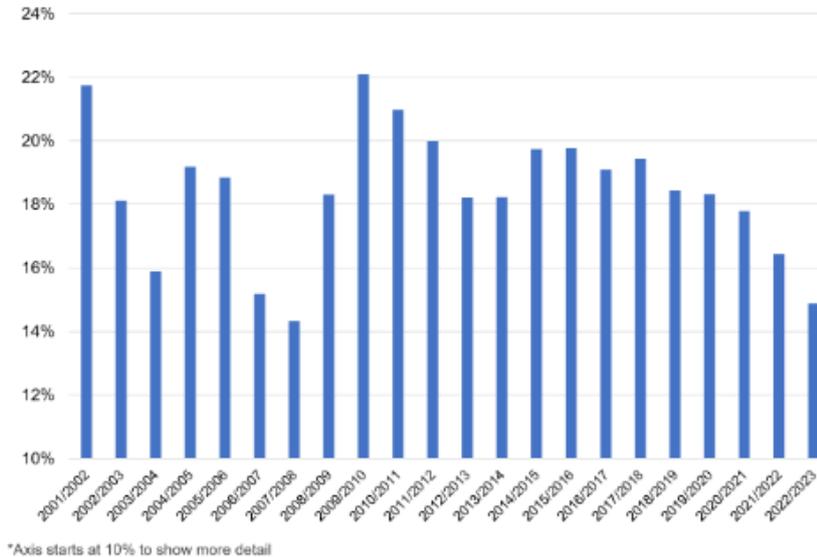
FIGURE 4 WHEAT PRICE DEVELOPMENT, USD PER METRIC TONS



Source: https://www.theglobaleconomy.com/World/wheat_price/

On the one side we are seeing wheat prices at historic all-time-high levels and on the other side world wheat stocks at one of the lowest levels in the recent history. The record low of 14.3% is from 2007/2008 and for 2022/23 we are seeing wheat stocks at 14.9% comparing with the average of 19%.

FIGURE 5. WORLD WHEAT STOCKS-TO-USE (EXCL. CHINA)



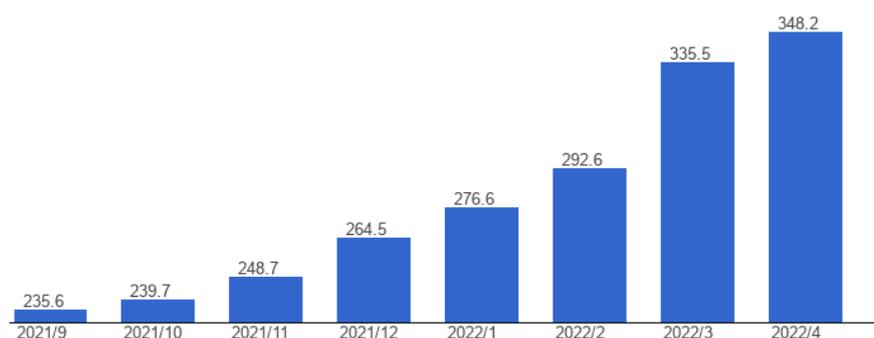
Source: <https://www.reuters.com/markets/commodities/>

The outlook for wheat remains bullish due to the high levels of uncertainty coming from the ongoing war, worsening climate conditions, supply disruptions and lack of work force in many countries.

5.2 CORN

During April 2022 corn price reached record high levels as a result of a strong demand on the one side and the situation in Ukraine, the dryness in parts of Europe and Americas and protectionist measures being taken by governments to protect domestic supplies on the other side. The outlook for corn remains bullish due to the aforementioned factors (war, climate conditions, etc.) that cannot be changed in a short term and a high level of uncertainty.

FIGURE 6. CORN PRICE DEVELOPMENT, USD PER METRIC TONS



Source: https://www.theglobaleconomy.com/world/maize_prices/

5.3 SUNFLOWER OIL

In 2021, Ukraine was the world's largest exporter of the sunflower oil and together with Russia it accounted for almost 75 percent of total sunflower seed oil production. Even before the escalation in Russia-Ukraine conflict, global vegetable oil supply was under pressure because of unfavorable weather conditions in countries that have an important role in vegetable oil production (e.g. drought in South America and Canada, Typhoon Rai in Malaysia).

The start of the war in February 2022 disrupted harvests and export from Ukraine but also put in danger agricultural production in 2022, especially for commodities that are planted in spring, e.g. sunflower seed. Another pressure on the price and supply of vegetable oils is the growth of biodiesel capacity driven largely by regulations. As a consequence, we are seeing sunflower oil, but also other vegetable oils at their historic high levels (see Figure 7 Daily vegetable oil prices, current USD). The outlook for sunflower oil remains bullish based on the prior mentioned factors that are not likely to diminish in the short term.

FIGURE 7 DAILY VEGETABLE OIL PRICES; CURRENT USD



Source: www.ifpri.org

6 CONCLUSION

Wheat, corn and sunflower seeds are among the key crops cultivated around the world and their importance in human nutrition is tremendous. The USA, China, and the EU are the biggest producers of wheat and corn, while the production of sunflower seeds is strongly concentrated in Ukraine and Russia.

To understand better the current situation in the agricultural commodities market it is important to emphasize that some of the key producers of corn and wheat, like China, do not show considerable export volumes (mainly due to limited land resources and satisfying the country's internal needs) and consequently do not participate in the global supply of these commodities. On the contrary, Russia and Ukraine, which are not among the biggest producers, have a very important role in the export of corn and wheat, especially sunflower seeds where they hold together almost 75% of the production.

Food prices were under pressure already in 2021 due to the disrupted supply chains, strong demand triggered by the COVID-19 pandemic recovery, extreme climate conditions, and a lack of labor force. After the escalation of the conflict between Ukraine and Russia in February 2022, agricultural commodities prices skyrocketed, especially those where Russia and Ukraine are large exporters, e.g. wheat, corn, and sunflower oil. In Ukraine, a country known as the “breadbasket of Europe”, the war raised concerns over whether crops will be harvested and if and how will they be exported globally since a lot of inland transport infrastructure and seaports in Ukraine were destroyed. Also, planting for the season 2022/23 is at huge risk because Ukraine is facing war conditions, a lack of labor force (a lot of farmers are fighting in the war, and a certain number of them fled or died), and restricted access to fertilizers. Russian export and production of agricultural products are fully operational (international

sanctions exclude food and fertilizers), but imposed economic sanctions on Russia could hinder the import of agricultural inputs such as pesticides and seeds, which could result in less planting and lower yields, meaning less production in the end. As Russia is one of the key players in the global energy market, the imposed sanctions on Russian oil and gas export sent energy prices to historic highs and triggered further increase in food prices. Agriculture was extremely hit by inflated energy prices as it is highly-energy intensive industry, especially in developed countries. Higher overall input prices increased the production cost, and in the end, resulted in higher food prices. Countries like Egypt, Argentina, India, Indonesia, Serbia, and Hungary already imposed a certain level of control over the export of essential commodities in order to stabilize the prices and domestic supply. This kind of policy made the already bad situation even worse, pushing food prices only higher. Despite disruptions in the export market, no food shortages are expected in the terms of global supply as the gap caused primarily by the extreme reduction of production and export of agricultural products in Ukraine will be filled by increased export from countries like Argentina, Brazil, and the USA. Poor and developing countries like Nicaragua or Tunisia are most vulnerable because they are highly dependent on imports from these conflicted countries. The prices of analyzed agricultural commodities are expected to stay at elevated levels and therefore governments are facing an immense challenge to protect the most vulnerable groups from these price shocks.

7 REFERENCES

1. Balsamo, E., Stasys, S., *Agricultural Volatility Then and Now: Comparing 2022 to the Emerging Market Commodity Boom 2023* [online]. 01 May 2022 [viewed date: 24 May 2022]. Available from <https://www.cmegroup.com/openmarkets/agriculture/2022/Agricultural-Volatility-Then-and-Now-Comparing-2022-to-the-Emerging-Market-Commodity-Boom.html>
2. Braun, K., *World wheat squeeze set to worsen into 2023, price risks remain* [online]. 12 May 2022 [viewed date: 24 May 2022]. Available from <https://www.reuters.com/markets/commodities/world-wheat-squeeze-set-worsen-into-2023-price-risks-remain-braun-2022-05-12/>
3. Byrne, J., *Analysts see high corn prices continuing into 2023* [online]. 24 May 2022 [viewed date: 25 May 2022]. Available from <https://www.feednavigator.com/Article/2022/05/24/Analysts-see-high-corn-prices-continuing-into-2023>
4. Chepeliev, M., Maliszewska, M., Seara e Pereira, M.F., *Agricultural and energy importers in the developing world are hit hardest by the Ukraine war's economic fallout* [online]. 06 May 2022 [viewed date: 27 May 2022]. Available from <https://voxeu.org/article/developing-world-agricultural-and-energy-importers-hit-hardest-ukraine-war-economic-fallout>
5. Chinese Academy of Agricultural Sciences. *Agriculture in China* [online]. [viewed date: 29 May 2022]. Available from https://www.caas.cn/en/agriculture/agriculture_in_china/
6. Economic Research Service U.S. Department of Agriculture. *Wheat Sector at a Glance* [online]. 02 February 2022. [viewed date: 29 May 2022]. Available from <https://www.ers.usda.gov/topics/crops/wheat/wheat-sector-at-a-glance/>
7. Economic Research Service U.S. Department of Agriculture. *Feedgrains Sector at a Glance* [online]. 28 June 2021. [viewed date: 29 May 2022]. Available from <https://www.ers.usda.gov/topics/crops/corn-and-other-feedgrains/feedgrains-sector-at-a-glance/>
8. European Commission. *The common agricultural policy at a glance* [online]. [viewed date 30 May 2022]. Available from https://ec.europa.eu/info/food-farming-fisheries/key-policies/common-agricultural-policy/cap-glance_en
9. FAO. *FAO Statistical Yearbook – World Food and Agriculture*. Rome: FAO, 2021. ISBN 978-92-5-134332-6
10. Federal Service for State Statistics. *Agriculture in Russia* [online]. [viewed date: 30 May 2022]. Available from <https://rosstat.gov.ru/folder/210/document/13226>
11. Food and Agriculture Organization of the United Nations. *Crops and livestock products* [online]. [viewed date: 30 May 2022]. Available from <https://www.fao.org/faostat/en/#data/TCL>
12. Glauben, T., Svanidze, M., Götz, L., Prehn, S., Jaghdani, T.J., Đurić, I., Kuhn, L., *The War in Ukraine, Agricultural Trade and Risks to Global Food Security* [online]. 07 June 2022 [viewed date: 10 June 2022]. Available from <https://link.springer.com/article/10.1007/s10272-022-1052-7>
13. Glauber, J., Laborde, D., Mamun, A., *The impact of the Ukraine crisis on the global vegetable oil market* [online]. 03 May 2022 [viewed date: 31 May 2022]. Available from <https://www.ifpri.org/blog/impact-ukraine-crisis-global-vegetable-oil-market>

14. International Trade Administration U.S. Department of Commerce. *Agribusiness* [online]. 2021. [viewed date: 30 May 2022]. Available from <<https://www.trade.gov/country-commercial-guides/russia-agribusiness>>
15. Leiva, M., *What impact will the Ukraine invasion have on wheat prices?* [online]. 25 February 2022 [viewed date: 26 May 2022]. Available from <<https://www.investmentmonitor.ai/special-focus/ukraine-crisis/ukraine-wheat-invasion-agriculture-russia>>
16. OECD Library, *Economic and Social Impacts and Policy Implications of the War in Ukraine* [online]. March 2022 [viewed date: 26 May 2022]. Available from <<https://www.oecd-ilibrary.org/sites/4181d61b-en/index.html?itemId=/content/publication/4181d61b-en>>
17. Successful Farming. *Brazil's wheat exports bring funds to boost domestic production, reduce imports* [online]. 03 March 2022. [viewed date: 30 May 2022]. Available from <<https://www.agriculture.com/markets/newswire/brazils-record-wheat-exports-bring-funds-to-boost-domestic-production-reduce>>
18. Terazono, E., *Global wheat crop likely to fall for first time in four years, US forecasts* [online]. 13 May 2022 [viewed date: 25 May 2022]. Available from <<https://www.ft.com/content/23e3d8ed-dbfa-4823-a237-a67a65255834>>
19. United States Department of Agriculture. *World Agricultural Production: Circular Series, 2022. WAP 5-22*
20. World Bank Group, *Commodity Markets Outlook* [online]. April 2022 [viewed date: 28 May 2022]. Available from <<https://openknowledge.worldbank.org/bitstream/handle/10986/37223/CMO-April-2022.pdf?sequence=3&isAllowed=y>>