



AGRICULTURAL WAR LOSSES REVIEW UKRAINE Rapid Loss Assessment

9th of June, 2022

INTRODUCTION: \$23.3 BILLION OF AGRICULTURAL WAR LOSSES

After three months of Russia's full-scale war against Ukraine, the damage toll to Ukraine's agriculture reached \$4.3 billion, or nearly 15% of its capital stock. Agricultural War Damages Review regularly provides details on the structure and estimates of damages¹. Damages, however, should be complemented by losses accrued to cover all the costs of the war to Ukrainian agriculture. So by launching the agricultural war losses review, we will close this gap through the rapid losses assessment.

While damages reflect the destruction of tangible assets and inventories, the losses estimate the foregone revenue due to lower quantities of goods produced and additional costs the producers bear because of the war. The foregone revenue is the difference between the actual revenues and the revenues that could have been realized had there been no Russia's invasion of Ukraine. Thus, estimating losses is vital to assess the needs required

to rehabilitate and restart production. It is especially important in the agricultural industry, where most of the production has a lengthy production cycle, and disrupting the cash flow for one year affects the ability to continue operations even after the original shock is gone.

APPROACH

The rapid agricultural losses assessment was conducted in accordance with the World Bank and FAO methodologies². Similarly to the agricultural war damage assessment, we estimated the losses using the indirect method. We started with establishing a baseline scenario - what would the production be without the war. We used the production levels in the calendar year 2021 to set a baseline scenario - the production volume without any disruption caused by the Russian invasion. We then applied area-specific

¹ https://kse.ua/wp-content/uploads/2022/06/Damages_report_issue1-1.pdf

² GFDRR, World Bank Group, European Union, United Nations. 2017. *Agriculture, Livestock, Fisheries & Forestry. PDNA Guidelines*

Volume B 49 pp. <https://www.gfdr.org/en/publication/post-disaster-needs-assessments-guidelines-volume-b-2017>

Conforti, P., G. Markova, and D. Tochkov. "FAO's methodology for damage and loss assessment in agriculture." *FAO Statistics Working Paper Series (FAO) eng no. 19-17* (2020). <https://www.fao.org/3/ca6990en/CA6990EN.pdf>

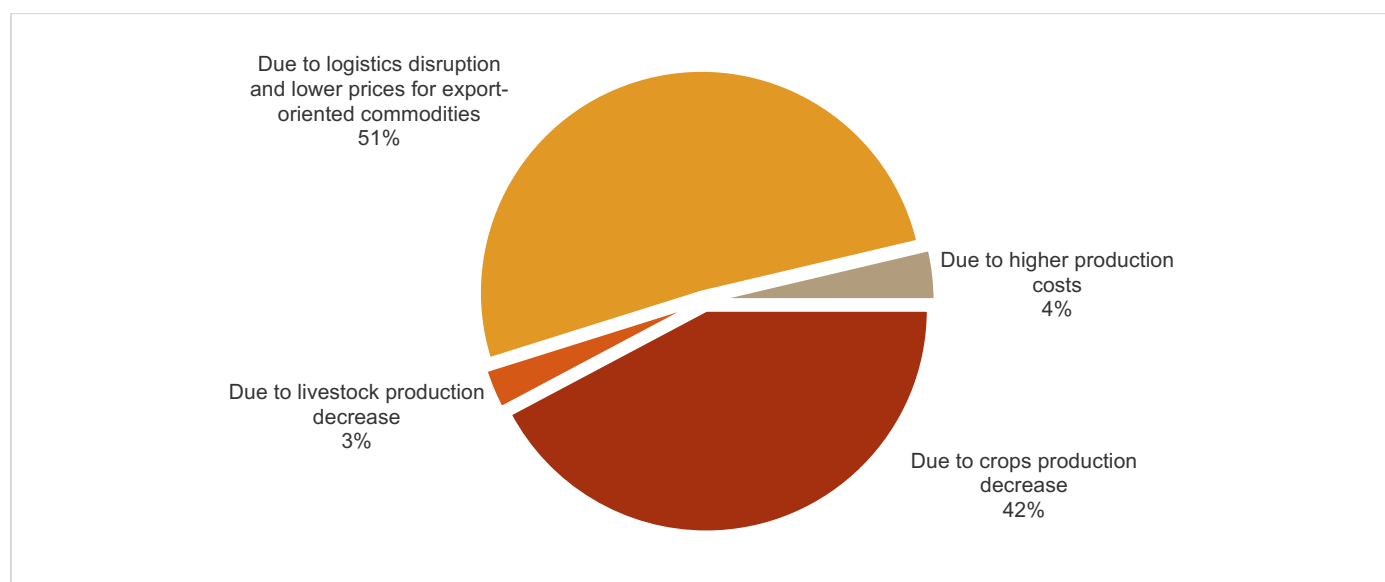
losses coefficients based on the supposed severity of the fall in production³.

For territories previously occupied/attacked and then liberated from the Russian army, i.e., Kyiv, Sumy, Chernihiv, and Mykolaiv regions, we assume a 15% fall in annual crops and livestock production based on the share of the land suffered from the mining pollution in these areas. For regions that were occupied or suffered heavy fighting during the sowing season, we impose a loss coefficient that reflects the share of the occupied territories or share of the region with active fighting, i.e., 50% for the Zaporizhzhya and Kharkiv

regions and 100% for Kherson, Donetsk, and Luhansk regions. The loss coefficient for perennial crops reflects the damage coefficient for this category.

We also assume that the yields would be 10% lower than in the baseline scenario. The productivity decrease is expected primarily due to the logistics disruptions. Such disruptions caused fuel shortages and the inability to get the required spare parts for the machinery and other agricultural inputs in time, resulting in a suboptimal course of the sowing campaign, fertilization, and crop protection products application.

FIGURE 1. LOSSES STRUCTURE BY CATEGORY



CROP LOSSES DUE TO LOWER OUTPUT **\$9.6 BILLION**

The most significant drop in the estimated 2022 harvest is for the wheat (expected 33% fall in the 2022 harvest, compared to the baseline), sunflower (32% fall), and barley (31% fall) since a substantial share of these crops is produced in the areas directly affected by the war. Compared to the previous year, a relatively less pronounced decrease in the 2022 harvest is

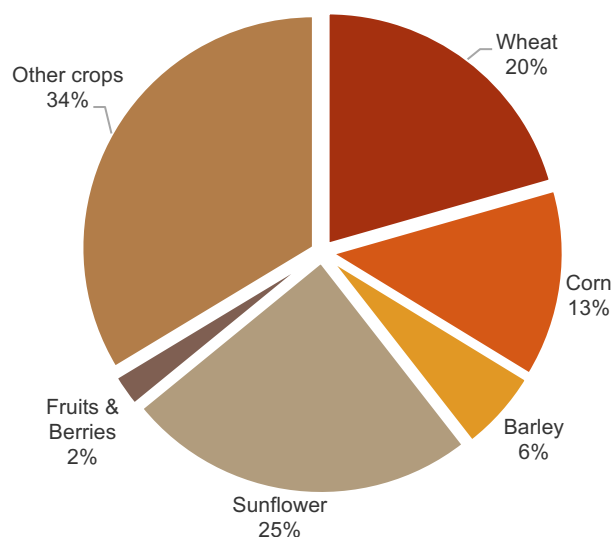
expected for corn, i.e., 18% fall. This is mainly because the corn belt of Ukraine is located in the center of the country - above the occupied South and below the liberated North of Ukraine.

The monetary value of such a decrease in the harvests is immense. The foregone revenue for these four export-oriented crops alone accrues to \$6.3 billion at current farm-gate prices, which are 30-50% below the prewar prices, despite the fact that world market prices have nearly doubled since the war outbreak. The naval

³ All estimations are accessible via link <https://kse.ua/kse-impact/tsentr-doslidzhen-prodovolstva-ta-zemlekoristuvannya/>

blockade of Ukrainian ports by Russia and a consequent increased domestic supply pressure and logistics disruption drive farm-gate prices down.

**FIGURE 2. STRUCTURE OF LOSSES IN CROP PRODUCTION
(DUE TO LOWER OUTPUT)**

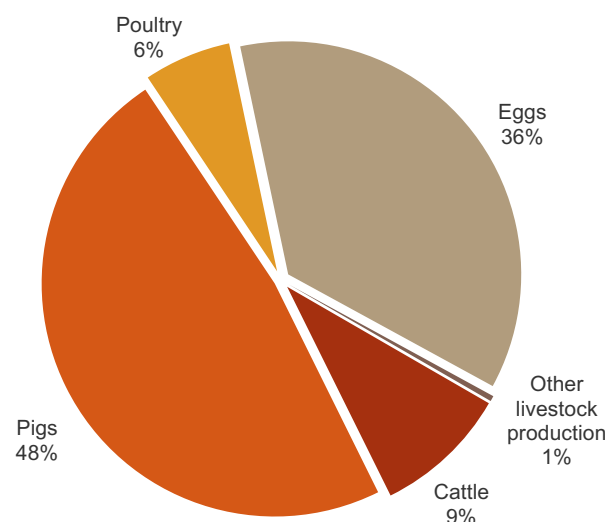


LIVESTOCK LOSSES DUE TO LOWER PRODUCTION \$682 MILLION

We estimate yearly foregone production for the cattle, sheep & goat, hog, and poultry in foregone live weight. As a part of the livestock production, we also evaluate the yearly decrease in milk and egg production. Livestock losses are different from crop production, where we estimate the monetary value of losses for only one year of lower harvest. While you can replant and get a new harvest from annual crops within a year - a fall in the livestock leads to lower production for multiple years since recovering the livestock production will take longer. Therefore, we estimate losses for the livestock sector for two years of lower production. The total losses for the livestock sector are estimated at \$682 million.

According to our estimates, the harvest for other annual crops in the 2022 calendar year is expected to be 22% lower compared to the 2021's harvest, resulting in another \$3.3 billion of losses.

**FIGURE 3. STRUCTURE OF LOSSES IN LIVESTOCK
(DUE TO LOWER OUTPUT)**



PERENNIAL CROP LOSSES DUE TO LOWER OUTPUT \$89 MILLION

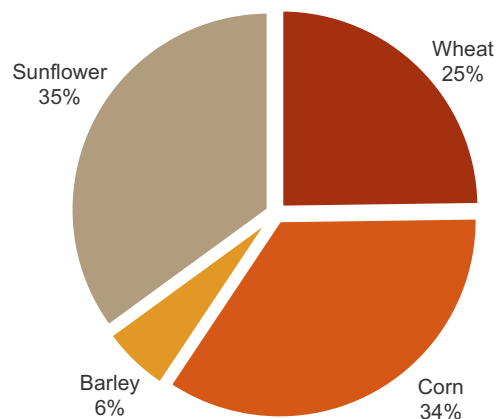
We estimate the projected production of perennial crops based on the relevant damage coefficients, namely based on the estimated share of perennial crops damaged by military actions. Similarly to livestock production, we assume that it takes time to return to the expected level of perennial crop production. An estimated average time needed for replanted gardens to start bearing fruits is five years. Thus, the losses caused by five years of lower perennial output are estimated at \$222.4 million.

CROP LOSSES DUE TO LOGISTICS DISRUPTION \$11.9 BILLION

One of the Russian invasion consequences is a decrease in the farm-gate prices for export-oriented

commodities. Because of the port blockade by the Russian naval forces, Ukraine has lost the ability to export commodities through the Black Sea and the Sea of Azov. Before the invasion - more than 90% of grain and vegetable oil exports was maritime export. Because of limited opportunities to export through other modes of transport, Ukraine suffers from a domestic supply shock. It leads to a corresponding nearly 30% domestic price decrease⁴. This is despite

FIGURE 4. CROP LOSSES DUE TO LOGISTICS DISRUPTION



almost doubled world market prices since the beginning of the Russian invasion. Thus, we estimate the losses caused by the lower farm-gate prices due to the logistics disruption as a difference between the pre-war farm-gate prices and the current farm-gate prices. The combined value of losses for top-four export-oriented crops (wheat, corn, barley, sunflower) is 11.9 billion US dollars.

LOSSES DUE TO HIGHER PRODUCTION COSTS \$859 MILLION LOSS

Supply disruptions also led to an increase in agricultural input prices, in particular for the key ones - fertilizers and fuel. Fertilizer costs have increased by 37% since the Russian invasion. After accounting for lower fertilizer application due to lower sowing area caused by Russian occupation and lower sowing rate in the active warzones, the increased fertilizer cost accrued an additional \$378.9 million in losses for Ukrainian farmers. The estimated 39 cents per liter of diesel increase in the fuel prices induced an additional \$480.4 million of losses for Ukrainian agricultural producers.

⁴ EXW price for the milling wheat in Ukraine was \$297 per ton before the invasion, while the current prices are just \$192 per ton - one-third lower than the pre-invasion level.

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Views expressed in the publication do not necessarily reflect the position of all involved parties.

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ANNEX. TABLE 1. LOSSES VALUE BY CATEGORY

Losses due to crops production decrease				
Item	Pre-war 2021 volume, million tonnes	After-war 2022 forecasted volume, million tonnes	Unit price, \$/Kg	Value of losses, million \$
Wheat	32.15	21.54	\$0.19	2,027
Corn	42.11	34.70	\$0.18	1,296
Barley	9.44	6.59	\$0.20	564
Sunflower	16.39	11.16	\$0.46	2,427
Pome fruits	1.45	1.42	\$0.21	35
Stone fruits	0.53	0.50	\$0.65	98
Berries	0.14	0.13	\$2.14	89
Other crops	71.06	56.06	\$0.22	3,315
Losses due to livestock production decrease				
Item	Pre-war 2021 forecasted volume, thsd. heads	After-war 2022 forecasted volume, thsd. heads	Unit price, \$/ Kg	Value of losses, million \$
Cattle	2,704	2,409	\$1.75	64
Pigs	5,559	4,769	\$1.34	327
Sheep & Goats	1,089	943	\$1.41	2,316
Poultry	193,940	176,637	\$0.87	41
Milk, thsd. tonnes	2751	2386.7	\$0.35	0.26
Eggs, mill. pcs	6928.6	5397.2	\$80.74 / thsd. pcs	247
Losses due to logistics disruption and lower prices for export-oriented commodities				
Item	Forecasted before the war volume, million tonnes		Difference in farmgate prices, \$/Kg	Value of losses, million \$
Wheat	32.15		\$0.09	2,958
Corn	42.11		\$0.10	4,127
Barley	9.44		\$0.07	670
Sunflower	16.39		\$0.26	4,180
Losses due to higher production prices				
Item	Amount needed for 2022		Increase in prices	Value of losses, million \$
Fertilizer	3.22 million tonnes		\$117.52 per tonne	379
Fuel	1,228 million liters		\$0.39 per liter	480
Total, million USD				23,327