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Article

Rebuilding Ukraine: The agricultural perspective

EconPol Forum

Provided in Cooperation with:

Ifo Institute – Leibniz Institute for Economic Research at the University of Munich

Suggested Citation: von Cramon-Taubadel, Stephan; Nivievskiy, Oleg (2023) : Rebuilding Ukraine: The agricultural perspective, EconPol Forum, ISSN 2752-1184, CESifo GmbH, Munich, Vol. 24, Iss. 2, pp. 36-40

This Version is available at:

<https://hdl.handle.net/10419/272165>

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Rebuilding Ukraine – the Agricultural Perspective

KEY MESSAGES

- **Given its national and global importance, agriculture in Ukraine is a key sector to consider when assessing both the damages and losses caused by Russia's attempted invasion and the associated post-war reconstruction needs and challenges**
- **As of September 2022, total war damages and losses for Ukrainian agriculture were estimated to be US\$ 40.9 billion**
- **Using the Post Disaster Need Assessment methodology, KSE Agrocenter (2023) estimates that reconstruction and recovery of Ukrainian agriculture will cost at least US\$ 23.5 billion**
- **Key priorities include demining and re-cultivating agricultural land, rebuilding on-farm and local storage facilities, and repairing export infrastructure**
- **Policy makers should focus on eliminating bottlenecks for private investments to drive sectoral growth, not selecting specific products or value chains for support**
- **Investments in agriculture and public administrative capacity in agriculture should be carried out with a view to compatibility with EU regulation in agriculture and supporting Ukraine's EU accession perspective**

Agriculture is a key sector of the Ukrainian economy. In 2020, the farm sector accounted for roughly 10 percent of Ukrainian GDP. If upstream (e.g., agricultural machinery) and downstream (e.g., food processing) industries are factored in, the entire agri-food sector's share of Ukrainian GDP amounts to roughly 20 percent. In addition, agriculture accounted for 45 percent of Ukraine's exports in 2020 (Gagalyuk et al. 2022).



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Ukrainian agriculture is also of vital global importance. After a difficult initial decade of transformation from a planned to market economy environment, Ukrainian agriculture has since the turn of the century become an increasingly important source of staple food exports. On average over the 2018-20 period, Ukraine accounted for 10 percent of global wheat exports, 16 percent of global maize exports, and 50 percent of global sunflower oil exports (Glauber and Laborde 2022). Ukraine has roughly one-third of the world's most fertile so-called chernozem (black) soils, and year-round access to ice-free harbors in relative proximity to major markets in Africa and the Middle East. Per hectare yields and total production of grains and oilseeds in Ukraine have increased considerably over the last two decades but still fall short of potential. Hence, Ukraine has an essential role to play in addressing the challenge of sustainably feeding a growing global population (von Cramon-Taubadel 2022).

Given its national and global importance, agriculture in Ukraine is a key sector to consider when assessing both the damages and losses caused by Russia's attempted invasion and the associated post-war reconstruction needs and challenges. Russia's war has caused massive damage and losses to Ukrainian agriculture, which has halted and reversed the positive trends and contributions outlined above. It will require resources and careful planning to recover lost ground, both figuratively and literally, and set Ukrainian agriculture back on a path to increased sustainable productivity growth.

DAMAGES AND LOSSES

The price of Russia's aggression is immense for Ukraine and increasing daily. Beyond the terrible human toll, the most recent estimate of total economic war damages to Ukraine, dating from September 2022, is US\$ 136 billion or almost 64 percent of the country's 2021 GDP (KSE 2022).¹ This estimate does not include damages caused by Russia's stepped-up missiles attacks on critical infrastructure since October 2022. Total war damages and losses for Ukrain-

¹ Damage and losses calculated using the Post Disaster Need Assessment methodology developed by the Global Facility for Disaster Reduction and Recovery (GFDRR), the World Bank, the EU, and the United Nations (GFDRR 2017). War damages are calculated as the monetary value of physical assets that were destroyed (or stolen) or partially damaged (but still suitable for repair/recovery). War losses are calculated as the foregone revenues or additional costs caused by the war. Updated estimates through the end of February 2023 (after one year of war) are in preparation.

ian agriculture were estimated to be US\$ 40.9 billion as of September 2022 (Nivievskiy et al. 2023). This estimate includes US\$ 6.6 billion in damages and US\$ 34.3 billion in losses.

Not surprisingly, the damages have been heaviest in the Ukrainian oblasts in the east and south that have seen the most fighting, i.e., in Luhansk (US\$ 1.8 billion), Donetsk (US\$ 1.1 billion), Kharkiv (US\$ 992 million), Kherson (US\$ 976 million), and Zaporizhzhya oblasts (US\$ 759 million). The two largest categories of losses are agricultural machinery (84,200 thousand units of machinery valued at US\$ 2.9 billion) and stored products (US\$ 1.9 billion including 2.8 and 1.2 million t of grains and oilseeds, respectively). The remaining categories include damage to storage facilities (9.4 million t of storage capacity valued at US\$ 1.1 billion), reductions in livestock numbers (95,000 sheep and goats, 212,000 head of cattle, 507,000 pigs, and almost 11.7 million chickens, valued together at US\$ 362 million), 14,300 hectares of damaged perennial crops such as fruit orchards (US\$ 346 million), and finally destroyed and stolen inputs (600,000 t of agricultural chemicals such as pesticides, 124,000 t of fertilizers, and 11.5 million t of fuel, valued together at US\$ 95 million).

The losses in Ukrainian agriculture are due first to lower yields as farmers were unable to adequately care for their crops (reduced applications of fertilizer and agricultural chemical) and, in some cases, harvest or properly store them (the latter leading to quality losses). Second, disruptions in export flows due to the destruction of transportation infrastructure and harbor facilities led to a large backlog of grains and oilseeds and reduced domestic prices in Ukraine. Where exports were possible (for example, via the land route through the EU to ports in Germany, Poland, and Romania), high transport costs increased the margin between world market and domestic Ukrainian prices. While world market prices for wheat exceeded 300 US\$/t for much of 2022, farmers in Ukraine generally received less than half that amount.

The negotiation of the Black Sea Grain Initiative in late July 2022 (United Nations 2023) increased export flows considerably, but trade costs remained high and domestic prices in Ukraine correspondingly low. Grain that leaves the remaining Ukrainian ports in and near Odesa under this initiative is subject to inspection by joint teams. The Russian members of these teams work unreliably and slowly, which leads to large backlogs of ships in the Bosphorus, lengthy delays, and inflated shipping costs.² Altogether, the war-related losses of US\$ 34.3 billion through September are equivalent to roughly 75 percent of the previous year's gross agricultural output, and it is esti-

mated that slightly over one-half of these losses were due to reduced domestic prices.

POST-WAR NEEDS ASSESSMENTS

Estimates of damages and losses to date would provide a basis for an assessment of needs if the war had just ended and reconstruction could begin immediately. However, there is little indication that Russia will end its hostilities and withdraw from Ukrainian territory in the near future. Hence, damages and losses can be expected to accumulate further before sustained reconstruction, as opposed to temporary repair and improvisation, can begin.

As the 2023 harvest approaches, there are signs that especially losses will continue to grow. While Ukrainian farmers typically planted over 9 million hectares of winter crops (especially wheat and barley) in the years prior to the invasion, statistics on the planting campaign released by the Ukrainian Ministry of Agrarian Policy and Food indicate that only 4.5 million hectares of winter crops were planted in 2022. This reduction is partly due to the fact that some Ukrainian farmland is currently occupied or cannot be farmed because it is damaged or mined. However, the seeded area has also been reduced in regions that are far from the fighting. When winter crops were being planted in August and September of 2022, many farmers were suffering from a lack of liquidity due to the revenue losses described above. They were therefore unable to purchase inputs such as seed and fuel that are required for planting. Some farmers who might have been able to plant winter crops in 2022 have chosen instead to wait until April-May of 2023 and plant more summer crops (especially maize and sunflower), which could compensate to some extent for the reduction in winter crops.

In any event, the total harvest of all crops in 2023 will likely be substantially smaller than the harvest in 2022, which was itself roughly one-third smaller than expected in mid-February 2022 prior to Russia's attack. As a result, losses will continue to accumulate, the farms' financial situation will deteriorate further, and Ukraine's contribution to global food supplies will fall further below potential. Hence, the assessment of needs presented below, which is based on current estimates of damages and losses, represents a lower bound that will increasingly underestimate true needs with every additional day of destruction and loss caused by Russian military aggression.

Post-war needs can be broken down into three broad categories:

- Reconstruction – the replacement and repair of destroyed and damaged assets.
- Recovery – the provision of resources, including public services that will enable farmers to restart agricultural production.

² On October 31, 2022, Russia announced that it was withdrawing from the Initiative, but two days later on November 1, 2022, it re-joined. In the two days without Russian participation, 85 ships were inspected; since Russia has re-joined the average daily rate of inspection has been roughly 10 ships per day.

- Modernization – taking advantage of the opportunity to not just return Ukrainian agriculture to its pre-war state but, where appropriate, to “build back better” (Hallegatte et al. 2018) to increase the sector’s economic and environmental efficiency.

Based on the current damages and losses estimates and the Post Disaster Need Assessment methodology (see Footnote 1), KSE Agrocenter (2023) projects that Ukrainian agriculture would need US\$ 23.5 billion. This estimate includes US\$ 7 billion for reconstruction and US\$ 16.5 billion for recovery.

Reconstruction (and Modernization)

The estimated costs of reconstruction in KSE Agrocenter (2023) are based on the damage estimates presented above. A 20 percent premium to account for modernization has been added to each of the individual damage categories (e.g., replacement and repair of storage facilities, replanting perennial crops, and restocking farm animal herds) except agricultural machinery. Since damages to agricultural machinery are estimated using new equipment prices rather than depreciated current value, the damage values already include a modernization component.

These reconstruction needs do not include an estimate of the costs of demining or re-cultivating agricultural land that has otherwise been damaged by the military conflict (i.e., removal of unexploded ordnance, pollution, destroyed military equipment, craters, trenches and other fortifications). It is estimated that 5 million plots of land (13.5 million hectares) could suffer from mining and pollution, and that of these 1.3 million plots will require technical inspection and re-cultivation before they can be safely used (Nizalov et al. 2022). Meeting these needs and processing the presumably millions of compensation claims will be a difficult task. The Ukrainian State Land Cadastre records land ownership and rental data, but it is incomplete. Documents have been lost due to the destruction and looting of public and private offices and archives. Property belonging to thousands of Ukrainians who have lost their lives will need to be transferred; many of the millions of displaced Ukrainians have lost documents and will have a difficult time establishing their claims to damaged land and other property. These problems will be especially acute in the occupied and de-occupied regions of Ukraine.

Recovery

Replacing damaged and lost productive assets is important but not sufficient for recovery in Ukrainian agriculture. Farmers need working capital to purchase seed, fuel, and fertilizer, and to pay workers and landowners. Due to the losses that they have sustained since the war began, most farms are heavily

indebted to the suppliers of these inputs, and many are effectively bankrupt. KSE Agrocenter (2023) estimates that of the US\$ 34.3 billion in total losses suffered by Ukrainian agriculture, farms would require US\$ 12.6 billion to restart production, i.e., to purchase necessary inputs, and pay suppliers of land and labor. In addition, US\$ 0.9 billion would be required to cover non-performing loans and enable banks to issue new short- and medium-term loan to farms.

Finally, to support the provision of public services that are essential for a resumption of production and exports, KSE Agrocenter (2023) estimates that roughly US\$ 300 million per year will be required. This amount is equal to 120 percent of the 2021 aggregate budget of several important public institutions, including the Ukrainian Ministry of Agrarian Policy and Food, the State Service of Ukraine for Food Safety and Consumer Protection, the various institutions involved in the land cadastre and registration system, and the National Academy of Agrarian Science.

POLICY CONCLUSION

The reconstruction and recovery needs outlined above may be lower-bound estimates, but they nevertheless add up to substantial sums of money. Ukrainian agriculture will be competing with other important sectors such as electricity and other utilities, housing, health care, transportation, and the military for funding. It is therefore safe to assume that Ukrainian agriculture will ultimately have to work with less than estimated above. It is therefore important to ensure the most efficient use of whatever funds are available by focusing especially on the elimination of bottlenecks that threaten reconstruction and recovery.

As discussed above, demining and re-cultivating agricultural land is an obvious priority. Repairing on-farm and local storage facilities is also important. Of Ukraine’s estimated 75 million tons of crop storage capacity, 14 percent were listed as damaged or destroyed and 10 percent were located in Russian-occupied territories as of August 2022 (FAO 2022). The lack of storage facilities was a major concern in mid-2022 as the 2022 harvest approached. Looking forward, if Ukraine’s 2023 harvest turns out as low as some expect, and as long as the Black Sea Grain Initiative continues to operate, rebuilding storage facilities may be less urgent in the short run. Nevertheless, in the medium term, storage capacities will have to grow in line with the recovery in crop production.

Repairing export infrastructure to ensure that farmers get the highest possible share of world market prices for their crops will also be crucial. The infrastructure in question (railways and harbor facilities) is also important for other sectors that depend on trade, so this is a priority not only for agriculture but for the economy as a whole.

An important related issue is what role to assign to the land route for future agricultural exports from

Ukraine. Under normal circumstances, transporting bulk agricultural commodities by ship is much less costly than by land. Hence, Ukrainian farmers are assured a higher share of the world market prices for their products if export takes place via the Black Sea rather than by land via the EU. In the years before Russia's attempted invasion, Ukraine exported an average 5 to 6 million tons of grain and oilseeds per month, almost exclusively via its Black Sea ports. Following the occupation and destruction of many of these ports, however, exporters have been forced to turn to the land route. Even after the Black Sea Grain Initiative began to operate and exceed expectations, traders continued to move Ukrainian grain and oilseeds to world markets overland to the Romanian port Constanta or to Baltic ports in Poland (e.g., Gdansk) and Germany (e.g., Rostock). A French shipping company has even suggested developing an "Adriatic Land Bridge" from Odesa in Ukraine via Slovakia and Austria to the Italian port Trieste (CSIS 2022).

It is difficult to assess the merits of investing in land route alternatives. On the one hand, investing in such routes could act as an insurance policy, making Ukrainian agriculture less vulnerable to interruptions of the sea route. This could prove extremely valuable if the war with Russia develops into a protracted, frozen conflict with constant threats to the openness and safety of maritime traffic. Furthermore, with a view to Ukraine's goal of EU membership, some investments into improving westward road and rail connections (e.g., reducing the difficulties caused by the use of different rail gauges on either side of Ukraine's western border) appear inevitable, not only with a view to agricultural trade. On the other hand, if it is possible to reach a stable post-war situation in which Ukraine once more controls its Black Sea ports, specific infrastructure for moving grains and oilseeds westward by rail could end up as a white elephant. It is unlikely that private investors will be willing to assume the associated risks, so this will ultimately be a policy decision.

Another priority will be facilitating access to finance. Private sector investments are essential not just for reconstruction, but also for the long-term development of a sector (Wessel and Asdourian 2022). As outlined above, Ukrainian farms face severe liquidity problems as a result of the war. This is especially true for many small farms that lack a credit history and only keep simplified and incomplete accounting records. In many industrialized countries farmland serves as collateral and improves farmers' access to credit, but most farming in Ukraine takes place on leased land. A partial credit guarantee system that has been developing in Ukraine (World Bank 2022) can encourage commercial lenders to engage in agriculture despite the lack of collateral, while ensuring that decisions to lend are still based on sound investment criteria. Matching public grants from the state or donors could also be incorporated into such a scheme.

All of the priorities listed above are general in the sense that they eliminate bottlenecks and provide benefits to the sector as a whole rather than focusing on specific product markets, value chains, or farm types. Policy makers should avoid the temptation to pick winners and leave the selection of specific investment priorities to commercial decision makers. For example, a perennial theme in agricultural policy debates in Ukraine has been the call for public investments to support increased value added in Ukrainian agricultural production and exports, for example by expanding livestock production.³ Proponents argue that rather than exporting raw products such as grains and oilseeds, it would be better for Ukraine to feed these raw products to livestock and export value-added dairy and meat products instead. There are risks involved in such a strategy, however. When Ukraine becomes an EU member it will become subject to EU regulation in the areas of animal welfare, the transport of live animals, standards for slaughterhouses, food safety regulations, etc. This would increase production costs in Ukraine and might reduce or eliminate some of Ukraine's apparent comparative advantage. Moreover, as the example of African Swine Fever has shown, animal production can be extremely vulnerable to outbreaks of disease. This is not to say that investing in animal production is necessarily a bad idea for Ukraine. However, the decisions to do so should be taken, and the resulting risks borne by private investors, while the state focuses on providing generic export infrastructure and necessary inspection and certification services.

Post-war reconstruction and recovery in Ukraine will be coupled with EU integration and Ukraine's EU accession perspective. Agriculture is one of the most integrated sectors in the EU, with extensive EU-wide regulation of markets and standards in the areas of farming practices, food safety, environmental protection, and animal welfare. The EU will be a major source of donor funding for reconstruction and recovery, and other donors such as the World Bank and the EBRD will presumably coordinate their assistance with the EU. Hence, much assistance will be targeted at rebuilding Ukrainian agriculture in a manner that is compatible with the EU's comprehensive agricultural *acquis communautaire*. An important task will be developing the regional administrative capacity in Ukraine that is required to implement the Integrated Administration and Control System (IACS) that is the basis for the provision of the various form of support to farms in the EU, e.g., that controls whether farms are fulfilling criteria such as sufficiently diversified crop rotations that are a condition for receiving per hectare support payments. Launching the State Agrarian Registry in August 2022 (which is essentially a prototype of the IACS) (World Bank 2022) was a good first

³ See, for example, the current blueprint National Recovery Plan that was presented in Lugano in July 2022 (NCR 2022).

step towards this goal in Ukraine.⁴ The prospect of EU accession will foster reconstruction and recovery by making Ukraine attractive for foreign investment, but it will also restrict the agricultural policy options available in Ukraine to those that are compatible with accession.

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⁴ <https://www.dar.gov.ua/about-dar>.