

Policy Paper

**Rebuilding Ukraine's Agriculture after
the Full-Scale War:
A Humanitarian and Economic
Imperative**

August 2023

Introduction:

CEMA is the European association of the agricultural machinery industry. With 11 national member associations, the CEMA network represents both large multinational companies and numerous European SMEs active in the sector.

The industry comprises about 7,000 manufacturers, producing more than 450 different types of machines with an annual turnover of about €40 billion (EU28 - 2016) and 150,000 direct employees. CEMA companies produce a large range of machines that cover any activity in the field from seeding to harvesting, as well as equipment for livestock management.

CEMA members often describe their purpose as feeding the world. In this context, CEMA is particularly concerned about the tragic consequences of the full-scale war on Ukraine, both for the Ukrainian population and for the populations of other countries whose survival depends on agricultural production from Ukraine.

CEMA expresses its full solidarity with the people of Ukraine and its inconsolable grief about the tragic loss of life and human suffering. Beyond all the tragedies caused by the war on Ukraine, CEMA sincerely hopes that a fair peace can be quickly established in Ukraine and its reconstruction can begin as soon as possible.

The purpose of this paper is to contribute to the thinking of all parties involved in the future reconstruction of Ukraine and, if possible, to accelerate its process. The acknowledged expertise of CEMA in the agricultural machinery sector leads the author of this paper to limit the scope of its analysis to agriculture. This is not to underestimate the efforts that will be required to rebuild all other sectors damaged or destroyed by the war on Ukraine.

In this paper we will briefly review Ukrainian agriculture and its economy, and the contribution it makes to world food security. Finally, we will outline some guiding principles that we believe are crucial to the reconstruction of a forward-looking Ukrainian agricultural sector that is more integrated into the European Union.

I. Ukraine's Exceptional Agriculture

Ukraine is well-known for being one of the largest food baskets in the world. It comes from the exceptional fertility of its black earth soils but also from the size of its agricultural land.

1.1 - A vast agricultural area

Ukraine's has a total of 42 million ha of agricultural land. 32 million ha are classified as arable land. In comparison the EU has 98 million ha of arable land. To put this in perspective: Ukraine's arable land is about a third of the EU arable land, but almost two times larger than the arable land of France (18 million). Ukraine's main grain crops are winter wheat, spring barley and maize.

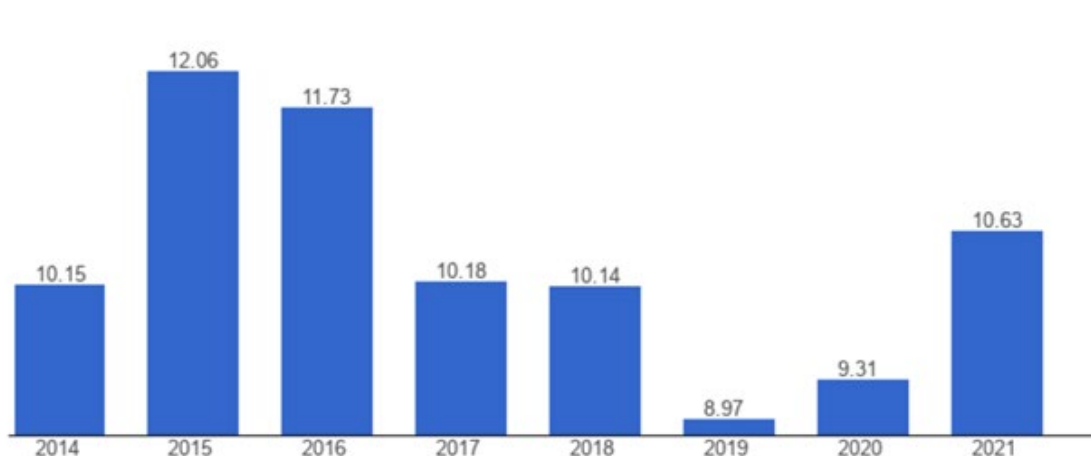
Sunflowers and sugar beets are the crops mainly transformed by the food processing industry. Additional 10 million ha are defined as cultivated land and include gardens, orchards, vineyards permanent meadows and pastures.

Since Ukraine declared its independence from the Soviet Union in 1991, the planted area dropped by about 5 percent, from 32.0 million hectares to 30.4 million, and this for almost every category of crop except for sunflowers. In other words, Ukraine has the potential to re-plant 1.6 million ha arable land used before the war, even there are some limitations of various kinds.

1.2 - Agriculture is a fundamental pillar of Ukraine's economy

These last years, Ukraine's agriculture accounted for about 10% of its GDP:

Value added in the agricultural sector as percent of Ukraine's GDP (2014-2021)



Source: theglobaleconomy.com

In 2021, the EU agricultural sector contributed to 2.5% of its GDP as an average (8% in France, 0.85% in Germany, 4.5% in the U.S., 10% globally).

Agricultural products are Ukraine's most important exports. In 2021 they totalled \$27.8 billion, accounting for 41 percent of the country's \$68 billion in overall exports.

Ukraine's agriculture sector also supports the livelihoods of about 13 million Ukrainians living in rural areas, who are involved in small-scale agricultural production. Small-scale farmers produce around 32% of the total agricultural output and about 50% of the production of livestock. This small-scale production is not registered but plays a pivotal role in ensuring food security and incomes of Ukrainian rural populations by providing for their own food as well as selling opportunities locally.

68% of the agricultural production is made by farm holdings and other enterprises acting in the agri-business.

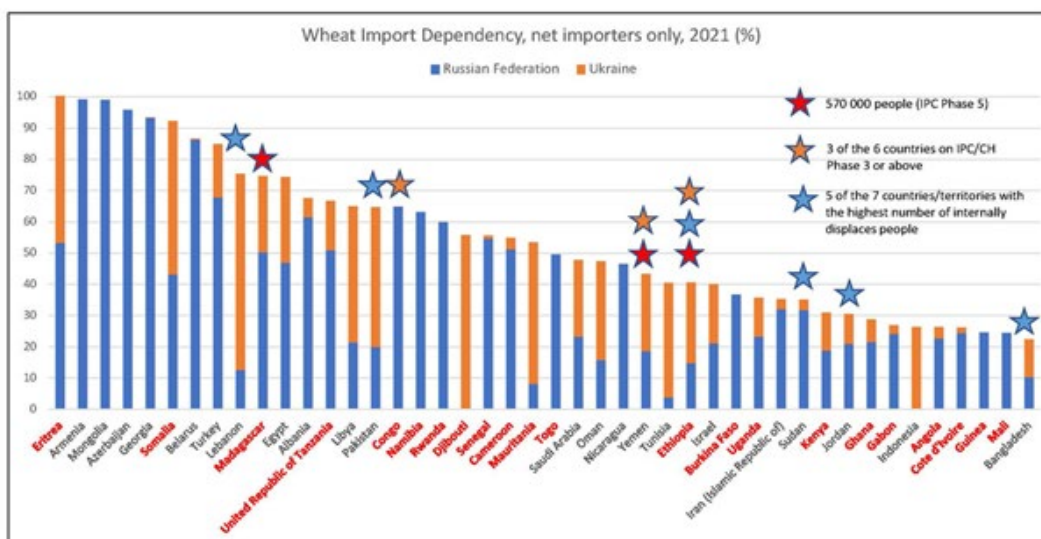
1.3 - Ukraine feeds countries most vulnerable to food shortages

Ukraine feeds 400 million people every year. Ukraine accounts for 11% of the world's wheat market, 16% of its barley, 15% of its maize, 16% of its rapeseed, 50% of its sunflower seed oil, 9% of trade in sunflower seeds and 61% of its sunflower cake.

Turkey, Egypt, Eritrea, Somalia, Madagascar, Tanzania, Congo and Namibia are some of the vulnerable countries which are highly dependent upon Ukraine for their wheat imports and food security.

In India, 77% of the domestic supply of sunflower oil came from Ukraine in 2019. In China, it was 63%.

Some countries are heavily reliant on wheat imports from Ukraine and the Russian Federation
 Countries in SSA are marked in red



Source: FAO - <https://news.un.org/en/story/2022/05/1118172>

Ukraine also assures the political stability of many countries vulnerable to food shortages, by ensuring their food security.

1.4 - Ukraine an important supplier to the EU

In 2021, Ukraine was an important supplier of the EU for vegetable, animal oils and fats (14.5% of the value of all EU imports within this product group) and imports of crops and crop products, such as wheat (500,000 tons), rapeseed cake (200,000 tons, sunflower cake (900,000 tons).

Ukraine normally supplies almost half of the cereals (52% of EU maize imports) and vegetable/rapeseed oils (23% and 72% of EU imports respectively) and a quarter of the poultry meat imported to Europe.

Because of the war and the limited access Ukraine to the Black Sea export route, the EU opened, in May 2022, an alternative land route called 'Solidarity Lanes'. The EU also signed a provisional agreement with Ukraine, in June, to suspend all import duties on Ukrainian goods for one year.

This agreement and land routes led to a significant increase in imports of poultry, eggs, milk powder, butter, sugars, starches, bran, maize and sunflower oil and provided an economic lifeline to Ukraine and its agricultural sector.

II. Impact of the war on agriculture in Ukraine

Most of the figures and findings below come from the FAO thorough study, published in December 2022, titled: *"Impact of the war on agriculture and rural livelihoods in Ukraine Findings of a nation-wide rural household survey"*¹. CEMA sees FAO as a most reliable source of information in this field of expertise.



¹ <https://www.fao.org/3/cc3311en/cc3311en.pdf>

CEMA is also a partner of FAO through a multiannual cooperation Memorandum of Understanding, renewed in June 2022.



CEMA delegation to the FAO (June 2022) on the occasion of the renewal of the CEMA-FAO MOU

2.1 – Population displacement

In February 2023, UNHCR (The UN refugee agency) estimated: *“More than 13 million people remain uprooted from their homes [in Ukraine], including nearly 8 million refugees across Europe and more than 5 million internally displaced people”*².

This represents about a third of Ukraine’s population which has been displaced by the war. Regarding the rural population, there are two opposing trends. Some of the displaced population has taken refuge in the countryside, with their families, to ensure their subsistence, while others have left rural areas for obvious security reasons, or because their farms have been damaged and the surrounding infrastructure destroyed.

As the FAO survey underlines: *“The trend is higher in areas along the front-line, with more than one in three respondents reporting to have stopped or reduced agricultural production”*³. As expected, the closer one gets to the front-line the greater the destruction.

² <https://www.unhcr.org/news/unhcr-one-year-after-russian-invasion-insecurity-clouds-return-intentions-displaced-ukrainians>

³ <https://www.fao.org/3/cc3311en/cc3311en.pdf>

Many farms and their equipment have been wiped-off by artillery shelling:



Photo credit: Institute for War & Peace reporting (May 22): <https://iwpr.net/global-voices/ukraine-how-russia-emptying-worlds-breadbasket>



Destruction of machinery in the area of Sumy. Photo courtesy of CEMA member

Storage facilities have also been destroyed by aerial bombing, like in Rubizhne.



Photo credit: Ukrinfo and CNN.

The grain storage silo above was built in 2019 at a cost of 4.8 million EUR. When it was bombed it contained 17,000 tons of wheat and 8,500 tons of sunflower seeds, worth altogether 12 million EUR.

This level of destruction could result people leaving rural areas permanently. While UNHCR indicates that most of internally displaced Ukrainians (79%) want to return home one day, it is a tautology to say that this return will only be possible if there is a home left and in the more specific case of a farm holding if there are enough assets left to make it workable.

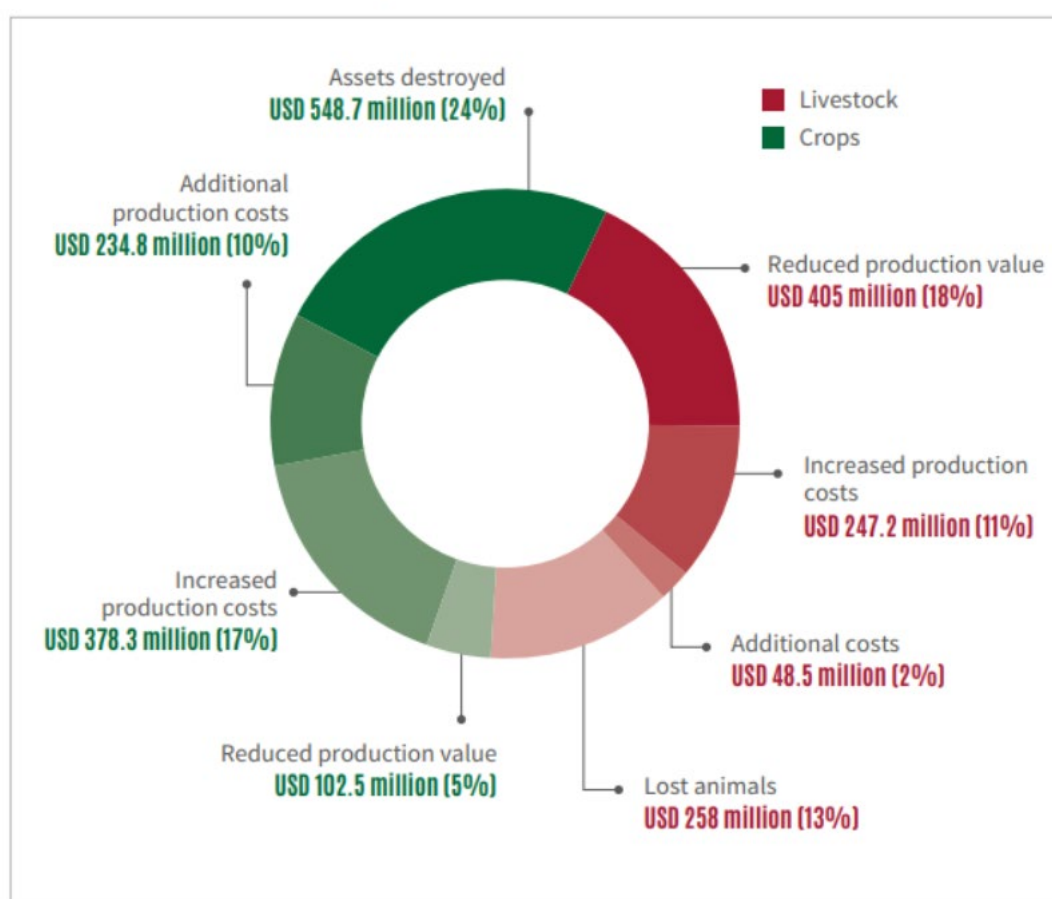
2.2 - The war impact on Ukraine's agricultural productions

The war has a horrendous impact on the Ukrainian agricultural production.

According to the assessment made by FAO, in July 2022, after eight months of full-scale war on Ukraine, the conflict has already resulted in total damage of USD 2.2 billion for the agriculture sector. It is characterized by the disruption of value and supply chains and more unpredictability of prices.

About a fourth of the rural population reduced or even stopped agricultural production due to war. The table below shows the kind of production most impacted.

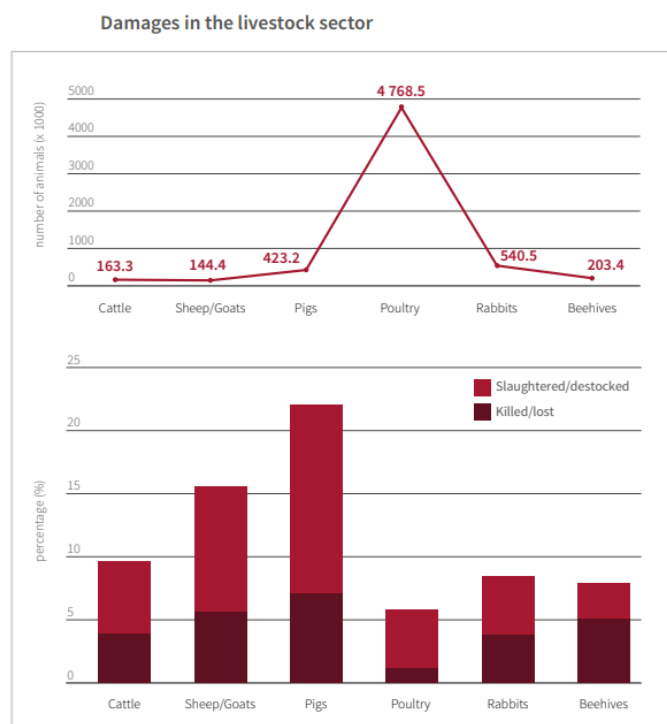
Agricultural damages and losses



Source FAO: *Impact of the war on agriculture and rural livelihoods in Ukraine Findings of a nation-wide rural household survey*, p.9⁴.

The loss of livestock has been very significant. Many animals have been killed by direct exposure to the fighting. It is noticeably true for beehives, pigs and sheep. A more significant loss has been recorded on account of uncertainty driven by distress slaughtering and destocking due to the skyrocketing prices of the animal feed, war stress and other uncertainties.

⁴ <https://www.fao.org/3/cc3311en/cc3311en.pdf>



Source: FAO, 2022. Ukraine: Impact assessment results (September–October 2022). [Internal document]. Rome.

The estimated figures shared by the FAO focuses on rural households. However, according to the Institute of Agricultural Economics of the National Academy of Agricultural Sciences of Ukraine the direct losses were much higher.

DAMAGES VALUE BY CATEGORY

Category	Total Value (million \$)
Machinery	2,885.4
Storage Facilities	1,062.5
Livestock	362.5
Perennial Crops	348.7
Inputs (e.g., fertilizers, fuel)	95.4
Stored Products	1,872.0
Total	6,626.8

Source: <https://kse.ua/agricultural-war-damages-review/>

The financial losses, including lost future revenues (not including asset damages) estimated by the World Bank and the Kyiv School of Economics are around USD 9.3-9.8 bn. For comparison, the entire profit value of Ukrainian farms in 2020 and 2021 combined was around USD 10 bn.

All these losses adversely impact exports and the ability of farmers to transport what they produce away from their farms to export facilities. The result is farm incomes decrease because local commodity prices are depressed due to a surplus of locally available commodities. This in turn reduces household incomes, which has a negative impact on the entire rural economy.

On a national level, access to fuel, electricity became an issue for all Ukrainian farmers as the Russian military targeted critical energy infrastructures and storages facilities.



Credit: Tank Storage Magazine⁵

According to Reuters, Ukrainian farmers use more than 10% of Ukraine's annual fuel demand⁶. Additionally, Ukraine relied on Russia, Belarus for most of its fuel imports. In 2021, more than 60% of its diesel came from Russia and Belarus.

In 2022, Ukraine has been forced to use the solidarity lanes put into place by the EU to bring in fuel via land from neighbouring countries such as Poland and Romania. However, these alternative ways proved to be more expensive than the usual peacetime routes.

Similarly, access to fertilizers, spare parts, financing, and insurances became extremely difficult to Ukrainian farmers.

2.3 - The lost harvests and occupied territory

Damages associated with occupied territories and non-harvested fields, should be added to the damages mentioned above.

The NASA Earth observatory estimates that 22% of Ukraine's farmland is under control of the Russian army forces. In 2022, the total wheat harvest for Ukraine (occupied and non-occupied) was estimated 27 million tons. Meanwhile:

⁵ <https://www.tankstoragemag.com/2022/09/07/russian-forces-strike-oil-depot-in-kryvyi-rih-ukraine/>

⁶ <https://www.reuters.com/markets/commodities/ukraines-embattled-farmers-running-empty-world-faces-food-crisis-2022-05-25/>

“The analysis showed that 5.8 million tons of wheat was harvested from areas that were not under Ukrainian control. That represents a loss of at least \$1 billion.”⁷

Other Satellite data from NASA shows that Russia's occupation of eastern and southern Ukraine gives it control of the land that produces 28% of the country's winter crops, mainly wheat, canola, barley, and rye, and 18% of summer crops, mostly maize and sunflower.⁸

Furthermore, a significant portion of the farmland, close to front line, has been unharvested. The satellite map provided by NASA illustrates this very well.

A satellite view of unharvested crops in Ukraine - 2022



Source : <https://earthobservatory.nasa.gov/images/150590/larger-wheat-harvest-in-ukraine-than-expected>

While it is difficult to exhaustively evaluate the losses due to unharvested crops, we can guess that it is in the range of several million tons of various grains. In comparison, in 2021, Ukraine harvested 33 million tons of wheat. In 2022, the latest forecasts indicate 21 million for the farmland still under Ukraine's control, a reduction of 36%.

⁷ <https://earthobservatory.nasa.gov/images/150590/larger-wheat-harvest-in-ukraine-than-expected>

⁸ <https://landsat.visibleearth.nasa.gov/view.php?id=150025>

III. Lines of action for rebuilding Ukraine's agriculture

CEMA is aware that agriculture is a fully interconnected eco-system. Therefore, it is not easy to identify what would be the best operations' sequence for rebuilding Ukraine's agriculture. This needs to be addressed by appropriate planning and coordination among the stakeholders and future donors.

As far as possible, we will try to present the actions that CEMA believes are essential for the rebuilding of Ukraine's agriculture in a logical and chronological order. This order is largely defined by experience accumulated during conflicts and comparable humanitarian crises.

3.1 - Stabilizing the rural population

Outside of the areas close to the front line, the current EU and International supports should focus on stabilizing the rural population. This implies that this population also gets access to the supply of their basic needs i.e.: drinking water, food, clothing and energy. In this view, CEMA supports the *Generators of Hope* initiative taken by the European Parliament⁹.

It is critical that Ukrainian farmers can stay on their land and continue to run their farms at a minimum level. The experience of previous humanitarian crises show that it is more difficult to bring back people who have left their place of residence than to maintain them there.

As the Center for Strategic and International Studies rightly addresses, there is a need to stabilize the rural labour force in the context of a country at war:

"Up to 20 percent of whom have left farms to participate in territorial defense. As the size of the agricultural labor force has changed, so have the needs of Ukraine's farmers because of the challenges laid out here. For example, because Ukraine's agricultural exports flowed primarily through Black Sea ports before the war, its expertise in road and rail transportation is limited. Technicians operating new transportation infrastructure may require new trainings and certifications. Some farmers may likewise require new training to operate machinery required for new modes of storage. Others may require financing and training to bolster their capacity for precise application of fertilizers".¹⁰

Some of these findings also apply to agricultural machinery dealers who have lost part of their skilled workforce and do not easily receive the parts needed to maintain their customers' equipment. Requalifying employees who have recently retired or people who cannot be drafted are among options to consider. Likewise, requalification of refugees (especially women) who fled from the areas under military attack and found their new homes in unoccupied rural destinations, might be a short-term solution for fighting rising unemployment.

⁹ <https://ukraine.europarl.europa.eu/en/support-for-ukraine/generators-of-hope>

¹⁰ <https://www.csis.org/analysis/rebuilding-ukraines-agriculture-sector-emerging-priorities>

This may also be a mid-to long-term solution to attract people for vibrant rural areas (not necessarily to be employed directly at farms but creating additional value in renewable energy, processing, tourism, recreational sector, and other local initiatives).

3.2 - Access to Finance for all farms

On March 30th, 2023, the World Bank announced the restructuring of its own *Program-for-Results on [Accelerating Private Investment in Agriculture](#) to Ukraine*, supporting the recovery of agricultural production affected by Russia's invasion of Ukraine.

The World Bank will make available \$132 million for government programs that improve access to finance through the credit program “5-7-9” and partial credit guarantees for small farms. Money will be targeted towards diversify agricultural production by supporting horticulture, and improve water deficit management and climate change adaptation. Funds will be made available for small farmers to access finance.¹¹ This will certainly help cover the immediate financial needs of smaller farm holdings. Meanwhile as the World Bank points out in its most recently released working document *UKRAINE Rapid Damage and Needs Assessment February 2022 – February 2023*:

“As of February 24, 2023, the war has resulted in total damage of US \$8.72 billion for the agriculture sector, while the aggregate losses total US \$31.50 billion. The damage includes partial or full destruction of machinery and equipment, storage facilities, livestock, fisheries and aquaculture, and perennial crops, as well as stolen inputs and outputs. The damage to machinery and equipment was the largest source of total damage (53 percent), followed by stolen inputs and outputs (23 percent) and damaged storage facilities (15 percent).”¹²

These figures give us several particularly meaningful indications for our sector of activity. The first is that most of the war damage in agriculture relates to agricultural equipment (53%). It is an amount estimated between 5 and 20 billion dollars, depending on the sources. The second indication is that the damage impacts all types of farms.

Beyond the urgent need to stabilize the rural population, access to finance should, be made available to all farms since the larger farms are those contributing the most to Ukraine's exports and the nation's wealth.

According to information available to CEMA members, the credit crisis is affecting the entire Ukrainian agriculture and is now extending to farms that had good cash reserves at the beginning of the war. Ukrainian farmers face a cash crunch because they plant less and consequently earn less.

¹¹ <https://www.worldbank.org/en/news/press-release/2023/03/30/agricultural-production-in-ukraine-to-recover-with-world-bank-support>

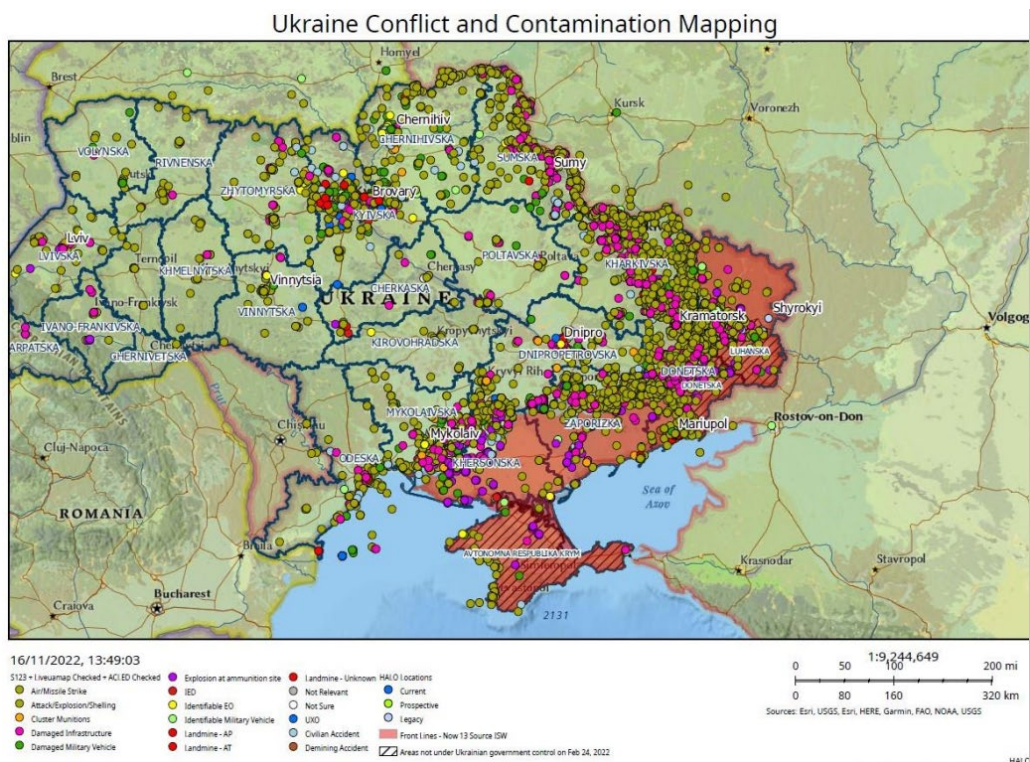
¹² <https://documents1.worldbank.org/curated/en/099184503212328877/pdf/P1801740d1177f03c0ab180057556615497.pdf>

According to the Ukrainian Agrarian Council, the biggest farmers association, it is expected that *plantings of corn, a fertilizer-intensive crop, to plummet 20% from last year, which itself saw a 27% decrease in harvested area.*¹³ This is also due to mined fields.

3.3 - The particular case of farms in hostility areas

Farms which have been or are still in hostility areas face the major challenge of landmines which cover their farms and fields. To date, estimates of mined rural areas varied from one to twenty times. Some Ukrainian officials estimate that all land in areas of hostility is mined, totalling 10 million hectares. Some other analysts estimate that ‘only’ 500,000 hectares of the farmland would be mined.¹⁴ The Ukrainian ministry of agriculture is aiming to clear up to 800,000 hectares of farmland this year in time for planting.

According to HALO trust, the world largest organization for mine-clearance: “*The scale of contamination is huge, and it’s spread across the country.*”¹⁵ The map below shows the level of contamination by landmines in Ukraine.



Source: HALO Trust

¹³ <https://www.reuters.com/world/europe/facing-minefields-cash-crunch-ukraine-farmers-sow-smaller-crop-2023-03-08/>

¹⁴ <https://www.reuters.com/world/europe/facing-minefields-cash-crunch-ukraine-farmers-sow-smaller-crop-2023-03-08/>

¹⁵ <https://edition.cnn.com/2023/03/27/europe/farmers-land-mines-clearance-ukraine-russia-invasion-intl-hnk/index.html>

Whatever the level of contamination is, CEMA sees the need for well-coordinated international efforts, starting with training farmers to identify land mines and associated risks. CEMA also encourages its members to engage through their foundations with HALO or similar landmine-clearance NGOs to provide landmine clearing support.



A John Deere armored and demining tractor, provided to Hallo. John Deere is a member of CEMA.

A safe land is a precondition to food security. Mine-clearing should be performed by certified organizations and not by unqualified individuals who currently offer their services to desperate Ukrainian farmers and charge them \$3000 per ha for cleaning their fields¹⁶.

Another characteristic of the farm holdings located in hostility areas is that they often face total destruction, as many reports show.



Credit: <https://www.nytimes.com/2022/04/10/world/europe/ukraine-farmers-food.html>

¹⁶ <https://www.reuters.com/world/europe/facing-minefields-cash-crunch-ukraine-farmers-sow-smaller-crop-2023-03-08/>



Credit: <https://english.elpais.com/international/2022-11-29/ukraines-farm-of-horrors-2000-dead-cows-and-fields-of-anti-tank-mines.html>

The same applies to storage capacities. In the CSIS report, already quoted, we can read:

*“According to the government of Ukraine, Ukraine’s prewar agricultural storage capacity was 75 million metric tons. The facilities for storage of over half of this capacity have been damaged or destroyed, are in Russian-occupied territories, or remain filled with last year’s harvest awaiting export. Considering the estimated size of the 2022–2023 harvest, the Food and Agriculture Organization (FAO) predicts a storage deficit of 16 million metric tons and has launched a grain storage support strategy to address this deficit”.*¹⁷

In CEMA’s view the damages caused by war is no different from damages caused by natural disasters. EU-US and international solidarity for restoring Ukrainian farms to working order should be mobilised rapidly. When hostilities have ceased, simplified procedures should be established, perhaps with the help of EU insurance companies’ experts, to compensate farmers who have been victims of such destructions. This will accelerate the reconstruction of impacted farm holdings.

3.4 - Critical transport infrastructure for agriculture

Before the war, Ukraine exported up to 98% of its outbound agricultural products via the Black Sea. Ukraine’s agricultural exports averaged 4 million metric tons per month, with summer and autumn highs exceeding 6 million metric tons. Under the UN-brokered grain deal, Ukraine kept some access to the Black Sea, but exports went down to 2 million metric tons per month. Ukraine also exported grain by rail and truck via the port of Constanza, which has poor infrastructures and therefore limited capacities.

¹⁷ <https://www.csis.org/analysis/rebuilding-ukraines-agriculture-sector-emerging-priorities>



Credit: CBS NEWS, railway bridge, damaged during the night of July 6-7, near the village of Novobakmutivka, 30 km north of Donetsk¹⁸

Restoring transport infrastructure in Ukraine will be a vast project. Not only will there be a need to rebuild existing bridges and railway tracks, but also to make compatible with the EU rail cars standards and gauges. As the EU Commission also noted:

“Equally important is increasing Ukraine’s capacity of EU-standard grain hoppers. Ukrainian-sized grain hoppers are too large for European railway platforms, presenting problems outside Ukraine. Potential approaches to these barriers include providing subsidies to Ukraine to produce or procure European-sized grain hoppers, directing European grain hoppers to the Ukrainian border once they have fulfilled existing contracts, and retrofitting rail cars designed for other purposes with special liners to allow for grain transport”.¹⁹

Other transportation infrastructure has been targeted since the beginning of the war. Logistic hubs and trucks transportation platforms have also been destroyed.



Credit: Bloomberg, April 22, 2022²⁰

¹⁸ <https://www.cbsnews.com/pictures/fighting-from-the-barricades-in-eastern-ukraine/12/>

¹⁹ https://ec.europa.eu/commission/presscorner/detail/en/ip_22_3002

²⁰ <https://www.bloomberg.com/news/articles/2022-04-19/ukrainian-troops-risk-being-encircled-in-new-russian-offensive?leadSource=uverify%20wall>

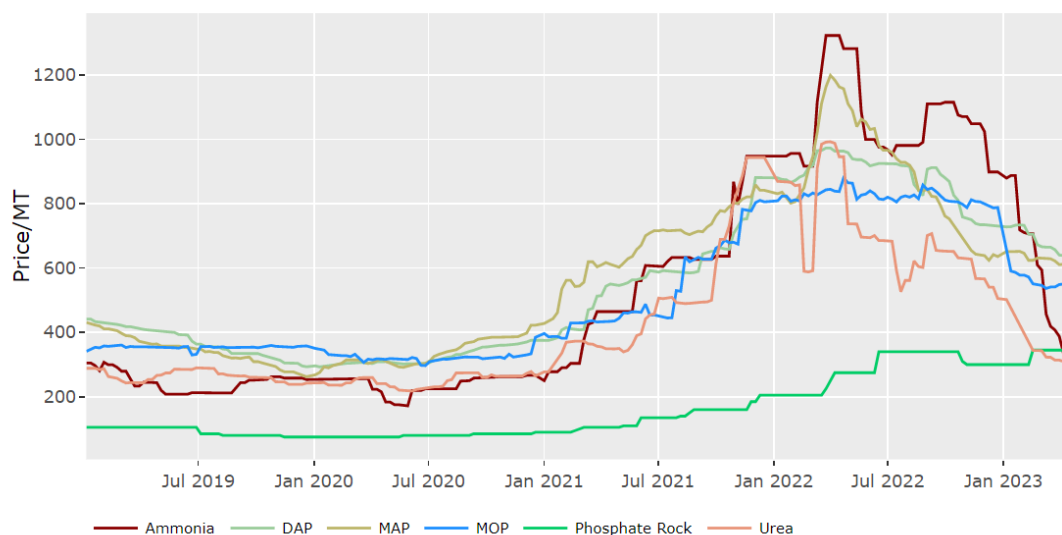
Due to these attacks on infrastructures and transport hub, the cost of insurance, fuel and operating costs drastically increased. For instance, the cost of rail transportation has been multiplied by 6, from approximately \$35 per metric ton before the war to up to \$230 per metric ton today.

In summary, restoring Ukraine’s agricultural transportation infrastructure will require addressing multiple challenges like repairing damaged road, bridges, rebuilding the railway infrastructure and make it compatible with EU gauges, building new grain hoppers also compatible with EU standards. However, it is estimated that it will be extremely difficult to restore Ukraine’s grain transport full capacity without securing its trade through the Black Sea. Consequently, priority must be given to maritime roads and transport after the war.

3.5 - Access to fertilizers

According to the EU Commission Food Security Portal, before the full-scale war Ukraine’s imports of fertilizers accounted for 58% of the total domestic use, 83% of which came from Belarus and Russia the world’s largest sources of mineral fertilizers. In other words, nutrients imports amounted to 12 Mio tons in average for 2022 and domestic agricultural use of nutrients amounted to 21 Mio tons²¹. The war in Ukraine triggered a spike in fertilizers’ prices globally and created all kind of obstacles for Ukraine’s farmers to import nutrients.

Fertilizers Market Dashboard (July 2019 – April 2023)



Source: Food Security Portal EU Commission, prices in dollars/Metric ton.

²¹ <https://www.foodsecurityportal.org/node/1947>

As we can see from the graph above, between February 2021 (Index 100) and April 2022 (Index 292) fertilizers price almost tripled. Now fertilizers prices also went down (Index 158, April 1st) but they are still 58% higher than in February 2021. This is partially due to export restrictions.

According to Charlotte Hebebrand and David Laborde:

*“Such restrictions impact 20% of global trade and threaten more than 50% of fertilizer supply for 24 countries. Removing existing export restrictions, and foregoing new ones, is an important priority now. Export bans, stringent inspections and licensing processes, and sanctions that limit availability contribute to supply disruptions and push market prices higher. Governments should also designate fertilizers as essential goods to ensure that they can continue to be traded and prioritized in logistical channel”.*²²

This is an observation that CEMA shares and supports. Open trade demonstrated its full efficiency to push prices down and alleviate scarcity issues.

3.6 – The fruitful experience of the SAPARD programme

The Special Accession Programme for Agricultural and Rural Development (SAPARD) has been a key financial instrument to support the beneficiary Central and Eastern Europe candidate countries to the EU in dealing with the structural adjustment in their agricultural sectors and rural areas. Using the SAPARD programme experience as a source of inspiration for designing the future EU integrated recovery and reconstruction programme for Ukraine would be meaningful since the country faces several common issues with the past candidates of Central and Eastern Europe. Indeed, Ukraine needs to:

- Invest in agricultural holdings: modernization and expansion of local production, processing, and of respective facilities; equipping farms with licenses for precision farming and modern agricultural technologies to strengthen agricultural performance,
- Develop or rebuild rural infrastructure,
- Diversify its rural economy,
- Modernize its food processing sector,
- Create the necessary institutional framework which will enable the country to comply with the agricultural chapters of the *acquis communautaire*.

The future EU integrated recovery and reconstruction programme for Ukraine could also include specific skill training needs and provide the know-how and tools to facilitate more efficient, crop, site-specific, and integrated nutrient management, which can help to reduce supply pressures while also improving efficiency and minimizing nutrient losses to the environment. Priority could be given to educate farmers to implement the:

²² <https://www.ifpri.org/blog/short-term-policy-considerations-respond-russia-ukraine-crisis-disruptions-fertilizer>

*“4Rs” (applying the right nutrient source, at the right rate, at the right time, in the right place). To be effective, the 4R principles should be promoted at scale by extension services and private sector actors, as many of the world’s farmers still lack the proper tools, knowledge or incentives to undertake site-specific nutrition management (SSNM)”.*²³

For all the reasons mentioned above, CEMA is of opinion that, after the war, guidance systems, variable rate and nutrient sensing technologies are the most critical PATs to be promoted in Ukraine so that they can be accessible to all farms.

Precision manure sprayer equipped with nutrient sensing technology



Source: courtesy of CEMA Member

SAPARD also played an important role in modernizing the agricultural equipment fleet of former Central and Eastern European candidates. The same approach should be adopted by the future EU integrated recovery and reconstruction programme for Ukraine.

The last 20 years have seen a significant increase in yield per hectare for all the main crops, but it is still rather low. This is mainly due to an inadequate level of mechanisation compared to the real needs and potential of the primary sector. Today, Ukraine has 130,000 tractors and 28,000 combine harvesters, in addition to 65,000 trailers and 70,000 sowing and transplanting machines.

The fact that this equipment is insufficient is also reflected in the sharp decline in the number of tractors from 2000 to 2019. During this period, tractors lost was 190,000 units (they were 319,000) while the number of combine harvesters has more than halved (from 65,000 to 26,500). It is estimated that the current mechanical equipment of Ukrainian farms can only meet 50% of their actual technological needs. The obsolescence of the circulating mechanical equipment is another factor of weakness for the country's agriculture: one machine in four would have to be replaced due to wear and tear:

*“Ukraine has a surface area like France and Germany, but the market for agricultural machinery in these countries is around six times larger than in Ukraine”.*²⁴ Based on

²³ Ibid.

²⁴ <https://statics.teams.cdn.office.net/evergreen-assets/safelinks/1/atp-safelinks.html>

these data, the potential of the Ukrainian market in agricultural machinery is 10 times the current level.

According to the Ukrainian Ministry of Agriculture this equates to a demand of 40,000 tractors and 5,000 combine harvesters a year, or a total value of 1.5 billion dollars a year. And most of this equipment are imported from the EU (Germany, France, Italy, Belgium).

3.7 - Moving Ukraine's agriculture to higher added-value production complementary to the EU's

In CEMA's views Ukraine's agriculture should, on the long-term, become complementary to the current EU's production but also respond to the needs of the Union, the global food markets' demand and food-security. Meanwhile, some short-term priorities should be addressed to keep Ukraine's agriculture running.

3.7.1 - Continuing to supply the UN World food programme

40% of the World Food Program's wheat supplies come from Ukraine and these supplies must continue and be secured. As we have seen, Ukraine feeds most vulnerable countries that experience food shortages (cf. 1.3). These supplies are critical for food security and political stability in about 20 different countries, mostly located in Africa.

3.7.2 Supplying Ukrainian refugees with their cultural food

At least, 8 million Ukrainian refugees are spread all over Europe. They form a new cluster of EU consumers with some special eating habits (like on buckwheat as a favorite side dish after potatoes). Private initiatives should be supported to develop new supply chains for local Ukrainian products and ingredients so that they could be purchased in supermarkets or specialized shops. In this line of thoughts, opening Ukrainian fast-food shops in the EU could also be an option to offer an outlet to Ukrainian agricultural production.

3.7.3 Export credit and investment guarantees

Among the potential short-term actions to be taken before the war on Ukraine ends, countries which have Export Credit Agencies and belong to the OECD Exports Credit Group (Australia, Canada, the European Union, Japan, Korea, New Zealand, Norway, Switzerland, Türkiye, the United Kingdom, and the United States) should take benefit of their most recent commitment (March 31st, 2023) to modernize their common Arrangement on Export Credits²⁵, to put together additional export credit and investment guarantees for their national companies being active in Ukrainian agricultural sector.

3.7.4 Plant-based proteins

There is consensus that the demand for plant-based proteins will, increase in a near future in the EU. These proteins are part of a more sustainable agriculture and wealthier diet. With this in mind, Ukraine should be supported to redirect some cash-crops towards

²⁵ [https://www.oecd.org/trade/topics/export-credits/documents/Participants%20Statement%20\(3%20April%202023\).pdf](https://www.oecd.org/trade/topics/export-credits/documents/Participants%20Statement%20(3%20April%202023).pdf)

higher-value protein plants like: beans, broccoli, chickpeas, lentils, nut butter, nuts and seeds, peas... Also, organic food could be an option for some niche products from processing, for example, GMO-free corn or soybeans.

3.7.5 Rebuilding the domestic meat and dairy markets dairy

As we have seen (Cf. 2.2) the loss of livestock has been extremely significant for Ukraine. According to FAO, losses due to reduced meat production amounted to 405 million USD in 2022. Poultry and pigs have been dramatically destocked, slaughtered or killed because of the war.

The dairy sector has also been impacted by the war. Ukraine has experienced significant rise in prices of dairy products, especially in the energy-consuming segments. In 2022, the dairy industry in the country suffered major destruction, especially in the eastern and southern regions. As a result, milk production shrunk by 1 million tonnes to 7.66 million – the lowest level ever. Small individual farms saw a severe slump in production. In total, this segment produced 5 million tonnes of milk, 15.3% less than in 2021. During the past few months, in 2023, the Ukrainian dairy industry has been struggling against [power outages](#), as Russia's efforts impacted critical energy infrastructure since October last year.

In the coming years, Ukraine's meat and dairy sectors will, experience substantial growth opportunities as they return to pre-war levels. This phase should also be used to implement EU quality standards and improve the value-adding potential of the two sectors.

3.7.6 Becoming the biomass fuels production platform for the EU

Among the most promising productions for Ukrainian agriculture are biomass fuels. Biomethane, HVO (Hydrotreated Vegetable Oil) and advanced biodiesels should be considered strong options for Ukraine's economy to move towards more energy independency and reduce local carbon emissions. They will boost technological innovations and help the country to create new sources of revenue, playing a key role in the overall return on investment for farmers.

Vegetable oils, such as rapeseed oil, soybean oil, rapeseed oil, sunflower oil are the most common feedstocks for biodiesel production are also common crops in Ukraine. These oils could be refined on farms or in regional refinery facilities. With some adaptations they could fuel agricultural equipment and combustion engines. HVO may be produced from the same vegetable oils, animal fat and/or waste cooking oil. Its chemical properties are almost identical to conventional diesel and is better suited for winter operations than biodiesel. Biomethane may be produced locally in farm upgrading biogas generated by fugitive emissions from livestock manure or other agricultural waste. It could be used directly in farm, as gaseous fuels for agricultural vehicles, converted into heat and electricity or distributed through the national gas grid.

Biodiesel from rapeseed and pure rapeseed oil enable direct GHG savings of ca. 60% as compared to fossil diesel (when both direct and ILUC impacts considered) On average, 1 t of biofuel when replacing fossil fuel, is saving over 2 t of CO₂ emissions – even when including ILUC impacts. Energy produced within circular agriculture in form of sustainable biofuels and valuable by-product proteins can play a key role in ensuring

European food and feed supply security. On average, every kg of crop-produced biodiesel generates 2 kg of vegetable proteins, which could be used to supply the dairy and meat sectors. Finally, what is left over from the plant can also be used as organic fertilizers also reducing Ukraine's dependency on foreign imports. Biomethane has the best CO₂-balance of Well-to-Wheel of any currently known energy source, and is even considered CO₂ negative when produced from manure. It may also generate additional opportunities for farmers, as the digested biomass is an excellent fertilizer to restore soil organic matter.

3.8 - Focus on stable agricultural markets

In addition to rebuilding agriculture and infrastructure, the European Union should help the Ukrainian farmers with agricultural products in its traditional markets.

The EU can also counteract the effects of the current situation in agricultural production in Ukraine and help normalize food markets in the Middle East and Africa.

IV. Conclusion: the necessary coordination

The term Marshall Plan has become so common for any type of public intervention that it is now partly depreciated. However, if there is one situation where the establishment of a new Marshall Plan is fully justified, it is the future reconstruction of Ukraine.

The 1948 original Marshall Plan's goals (officially named the European Recovery Program, ERP) were to rebuild war-torn regions, remove [trade barriers](#), modernize [industry](#), improve European prosperity. From 1948 to 1952, The [United States](#) transferred \$13.3 billion (equivalent of \$173 billion in 2023) in economic recovery programs to Western European economies. To date, the amount of aid Ukraine will need is unknown at this time and varies from \$500 billion to \$1 trillion. However, there is consensus that it will be:

“The largest reconstruction effort since the second world war and perhaps the most expensive in history”.²⁶

Such a financial effort cannot be made by the United States or the European Union alone. It requires the mobilisation of all partners committed to Ukraine. Their number and the variety of actions they can undertake, particularly in the field of agriculture, require an international body should coordinate efforts to disperse aid and avoid duplication.

In CEMA's view the newly created Multi-agency Donor Coordination Platform could play this role and bring *“together high-level officials from Ukraine, the EU, G7 countries, as well as financial institutions such as the European Investment Bank, the European Bank*

²⁶ <https://www.theguardian.com/world/gallery/2023/apr/07/rebuilding-ukraine-reconstruction-war-in-pictures>

for Reconstruction and Development, the International Monetary Fund and the World Bank. Other donors will be able to join the Platform over time”²⁷.

CEMA is keen to engage with all stakeholders involved in the reconstruction and stands ready to contribute to the future work of rebuilding Ukraine after the full-scale war.

²⁷ https://ec.europa.eu/commission/presscorner/detail/en/read_23_383,
https://ec.europa.eu/commission/presscorner/detail/en/ip_23_2102

ABOUT CEMA

CEMA aisbl (www.cema-agri.org) is the association representing the European agricultural machinery industry. With 11 national member associations, the CEMA network represents both large multinational companies and numerous European SMEs active in this sector.

The industry comprises about 7,000 manufacturers, producing more than 450 different types of machines with an annual turnover of about €40 billion and 150,000 direct employees. CEMA companies produce a large range of machines that cover any activity in the field from seeding to harvesting, as well as equipment for livestock management.

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