



# AGRICULTURAL WAR DAMAGES REVIEW UKRAINE Rapid Damage Assessment

8th of June, 2022

## INTRODUCTION: \$4.3 BILLION IN AGRICULTURAL WAR DAMAGES

RF's full scale war on Ukraine leaves three months behind and its toll is already immense. More than 8 million Ukrainians are estimated to have been internally displaced, in addition to 6 mln who have left the country. Ukrainian economy is projected to contract by 45% and dozens of millions across the world are threatened with hunger because of the disrupted exports of grains from Ukraine and continued damage of its agri-food sector.

We launch the regular Agricultural War Damage Review to inform the wide audience and policy makers on the compensation and rehabilitation needs. We base our estimates on the rapid damage assessment methodology compliant with the World Bank and FAO<sup>1</sup>. Upcoming is the commentary Agricultural War Losses Review.

War damages are calculated as the monetary value of physical assets that are destroyed (and stolen) or partially damaged (but still suitable for repairing/recovery) due to military actions and occupation. The vital difference between the damages and losses is that damages reflect the destruction of tangible assets and inventories, while the losses accrue the foregone revenue from the unsown fields, lower yields, and higher production costs.

**TABLE 1. DAMAGES VALUE BY CATEGORY**

Category	Total Value (million \$)
Farmland & Unharvested Winter Crops	2,135
Machinery	926.1
Storage Facilities	272.4
Livestock	136.4
Perennial Crops	89.1
Inputs (e.g., fertilizers, fuel)	119.6
Stored Products	613.0
<b>Total</b>	<b>4292.3</b>

<sup>1</sup> 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>

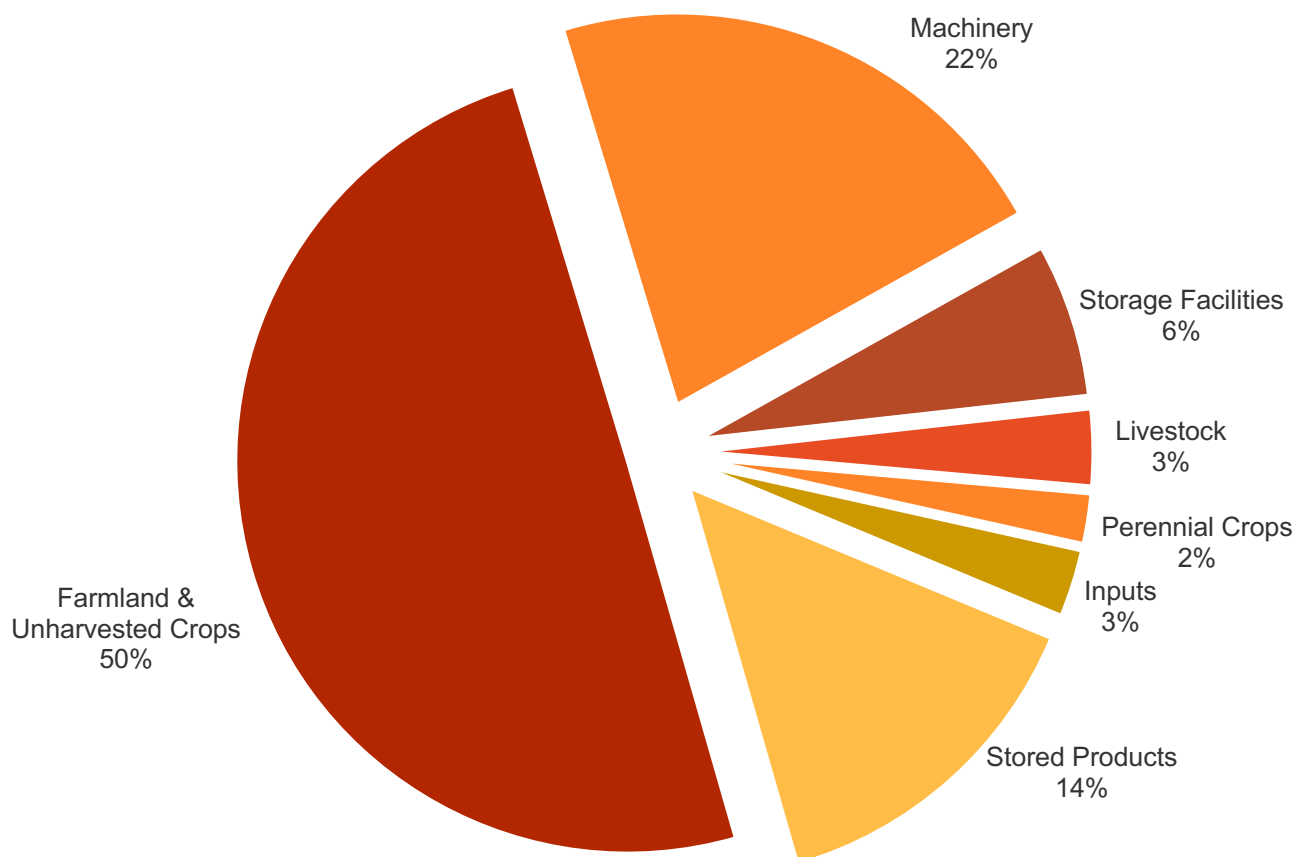
Conforti, P., G. Markova, and D. Tochkov. "FAO's methodology for damage and loss assessment in agriculture." *FAO Statistics Working Paper Series* (FAO) eng no. 19-17 (2020). <https://www.fao.org/3/ca6990en/CA6990EN.pdf>

## OVERALL APPROACH

War damages are yet uncertain, for the war is not yet over. Therefore, in this report we rely on indirect methods by defining the overall areas directly affected by the war, establishing a baseline of the resources located on these territories before the RF's invasion, and applying category-specific damage coefficients for each type of the damaged assets.

We distinguish territories by the supposed severity of the damage. The first category includes the territories previously occupied but then liberated – Kyiv, Sumy, Chernihiv, and Mykolaiv regions. And the second category includes the territories which are subject of active fighting, and (or) the territories occupied by the RF's army – Kharkiv, Donetsk, Luhansk, Kherson, and Zaporizhzhya regions. More detailed description of the methodology is available at the Center for Food and Land Use Research webpage

**FIGURE 1. DAMAGES STRUCTURE BY CATEGORY**





## **FARMLAND & UNHARVESTED CROPS**

### **\$2,135 MILLION DAMAGE**

---

Agricultural land has been affected by the two significant types of damage – mining pollution and direct physical damage. Farmland in both front-line and occupied (or previously occupied) areas has a high risk of mine pollution. Apart from the minefields, areas which have been subjected to active hostilities are also polluted with unexploded ordnance. This imposes a mortal threat to Ukrainian farmers during the field works. As a result, all farmlands located in the active warzone or occupied by RF require thorough inspection, and some of these territories require demining to make the land suitable for farming. An estimated \$436 million are needed to inspect lands with a high risk of mining pollution and demine the affected areas.

The second type of damage is physical damage to the fertile soil layer, e.g. the craters from artillery shellings and missile strikes, damage caused by the tracks of tanks and other military vehicles. Such damage is expected in the areas with active military hostilities. The subsequent land restoration requires recultivation and surface smoothening. The cost of recultivation of such lands is estimated at \$39.6 million.

The Southern regions, currently under the RF's occupation and heavy fighting, are also regions with the most developed irrigation infrastructure. Approximately 19% of all irrigated farmlands of Ukraine are located in the temporarily occupied Kherson region, and another 10% are in the partially occupied Zaporizhya region. The estimated replacement and repair costs for the damaged irrigation infrastructure are \$225 million.

Apart from the direct damage to the lands, the occupation, military actions, and mining pollution limit farmers' access to the fields and opportunities to collect the harvest. It will result in unharvested winter crops across many of the war-affected areas. Approximately 2.4 million hectares of winter crops could be unharvested, resulting in \$1.435 billion in damages.

## **MACHINERY \$926 MILLION DAMAGE**

---

The agricultural machinery and equipment are also being damaged by shellings, airstrikes, and battles taking place in close proximity. Tractors and trucks have higher risk of being damaged, than other types of farm equipment. They can be used not only for farming activities but also for war-related purposes, such as, for examples, trenches digging, transportation and logistics. This increases the probability of farms being located in the active warzone and makes them targets for expropriation. In the areas controlled by the RF's army, more expensive agricultural machinery is also at risk of being stolen. The estimated cost of replacing and repairing the damaged machinery is \$926.1 million. In our calculations we follow the principle of "build back better," and assume the replacement with new machinery in cases where the current machinery is completely destroyed.

## **STORAGE FACILITIES \$272 MILLION DAMAGE**

---


RF is reportedly precisely targeting elevators and other storage facilities, because these damages weaken Ukrainian agricultural capacity. Given that storage facilities are frequently located in the open area and provide an excellent sight of the surroundings – they as well suffer from direct military assaults to limit the enemy's situational awareness.

Storage facilities include traditional barns, concrete, and metal silos. Whereas barns and concrete silos are relatively inexpensive to repair, with an average cost of \$50-130 per ton of storage, reconstruction of damaged modern metal silos can cost up to 250 \$/ton. The complexity of their structure makes it impossible to repair even minor damage without dismantling the entire silo. An estimated 3.9 million tonnes of storage capacities could be at least partially damaged because of the war. Their estimated repair and replacement cost is \$272.2 million.

## **LIVESTOCK \$136 MILLION DAMAGE**

---

Farm animals are dying directly because of the hostilities and because of the farmers' inability to



either access the farm or get animal feed and provide animals with needed veterinary support and care. The estimated number of animals that died because of the RF's aggression is 42 thousand heads of sheep and goats, 92 thousand heads of cattle, 258 thousand pigs, and over 5,700 thousand heads of poultry. The combined estimated value of such damages exceeds \$136 million.

### **PERENNIAL CROPS \$89 MILLION DAMAGE**

---

More than 7.8 thousand hectares of perennial crops located in the affected areas are estimated to be either partially or totally destroyed. These damages are estimated at \$89.1 million (cost of replanting the gardens).

### **INPUTS \$120 MILLION DAMAGE**

---

Agricultural inputs are being damaged and stolen. Fertilizers and crop protection products are assumed not to be an element of high interest to the RF military and are mostly being lost due to physical damage.

Fuel, however, is one of the primary subjects for looting. The expected rate of fuel stock being lost on the territories controlled by the RF's army is 100%. There is evidence on severely insufficient fuel supplies of the invaders. Consequently, demand for fuel for the RF'S military vehicles leads, with high probability, to looting of all fuel stocks that RF army could get its hands on.

### **STORED PRODUCTS \$613 MILLION DAMAGE**

---

The stored grains, oilseeds, and other agricultural outputs are the categories expected to be lost mainly due to stealing rather than being physically damaged. There is evidence of the RF's state-run stealing of agricultural products that is organized by the RF's military and civil officials. It is expected that the longer the territory is being occupied, the more stocks will be stolen and brought to RF. Thus, Donetsk, Luhansk, Zaporizhzhia, and Kherson regions are most affected. The estimated total value of stolen grains and oil seeds is over \$613 million.

The respective authors are responsible for the content of their publications.  
Views expressed in the publication do not necessarily reflect the position of all involved parties.

#### **Authors:**

Roman Neyter, Hryhorii Stolnikovych, and Oleg Nivievskyi

KSE Center for Food and Land Use Research

agrifood@kse.org.ua  
kse.ua

#### **Acknowledgements:**

This work is supported by the Food and Agriculture Organization of the United Nations and by the World Bank.

The authors are thankful to Nataliia Shpygotska for her invaluable inputs at the initial stage of the estimations.