

Ukraine: the world's biggest minefield

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According to the Ukrainian government, around 174,000 km² of the country's territory potentially requires demining. This is almost a third of Ukraine's total area. Although this estimate seems to be exaggerated, the threat of mines and unexploded ordnance in vast swathes of the country's territory, mainly in its eastern and southern part, is a real problem. According to official reports, since the launch of the full-scale war with Russia, 261 individuals have died due to mines and other explosives. According to the Ukrainian leadership, almost six million Ukrainians live in territories at risk of mine-related incidents. Russian troops have deliberately deployed mines on Ukrainian farmland, and both the Russian and Ukrainian military have scattered them in the littoral waters. This prevents agricultural work and hinders the export of Ukrainian goods which, in turn, aggravates the crisis affecting the Ukrainian economy.

According to World Bank estimates, the total cost of Ukraine's demining effort stands at almost \$38 bn. Due to the magnitude of this challenge, Kyiv is unable to fund it on its own. Therefore, it has stepped up endeavours to obtain equipment, personnel and financial support from foreign partners.

The 'traces' left by Russian troops

Since the beginning of the invasion, Russia has been using various types of explosive devices on a large scale. According to Human Rights Watch experts, these include at least several types of landmines (anti-personnel, anti-vehicle and anti-tank mines) and so-called improvised explosive devices which are activated remotely, mechanically or by pressure. It is not uncommon for the Russians to also hide booby-traps in residential buildings, household appliances, toys, attached to dead bodies and even live animals. According to estimates by the State Emergency Service of Ukraine, from the beginning of the full-scale war until 23 October 2023 261 individuals have been killed and 559 wounded by mines and other explosive devices. The number of victims includes 68 children, out of which 14 have died.

In addition to mines, another problem involves various types of unexploded ordnance, including the remnants of inactivated shells and rockets. Since the beginning of the conflict, both sides, with varying intensity, have been firing from several to tens of thousands of artillery shells daily. According to



estimates by the General Staff of the Ukrainian Armed Forces, up to around 20% of these miss their target and fail to explode, which poses a long-term threat for local residents.¹

However, cluster munitions, which the Russian military has been using since the launch of the full-scale invasion, are significantly more dangerous. According to estimates, the proportion of unexploded ordnance of this type may be as high as 40%. The Ukrainian side, for its part, has officially been using this type of ammunition since July 2023, when it received it from the US and other countries.² US manufacturers have declared that just 2.35% of their cluster munitions fail to explode (however, no official statistics are available to confirm this claim). In 2022 alone, 916 individuals were killed by this type of weapon, including 890 who have died in an immediate attack using cluster munitions and 26 due to their contact with unexploded cluster shells. This indicates that as regards the number of victims of cluster munitions, Ukraine has outstripped Syria, which in 2012–21 had been ranked highest in this category.

In areas of intense fighting along the almost 1,200 km long front line, which stretches from Kherson oblast in the south of the country to Kyiv oblast in the north, the

number of mines and unexploded ordnance is the biggest. Russian soldiers have laid a particularly large number of mines near Kyiv, in the vicinity of Chernihiv, Sumy and north of Kharkiv, from where the Ukrainian army pushed out the occupiers last autumn. During the Ukrainian counter-offensive, in an attempt to explain the slow progress in recapturing the seized territories, the authorities in Kyiv cited the “insane number” of mines deployed by the Russians, which was up to five per square metre. The Ukrainian leadership argues that a total of around 30% of the state’s territory, that is around 174,000 km², “may have been” mined, which ranks Ukraine first globally in terms of the size of the mined area (followed by Afghanistan and Syria). Most likely, these estimates are significantly exaggerated. To be considered reliable, they would need to take into account the entire area of the occupied territories (including Crimea) alongside the areas which have been liberated.³ However, the exact figures are unavailable due to the lack of access to the Russian-occupied areas which account for around 18% of the territory of the Ukrainian state, and to the ongoing military activity in which both parties to the conflict continue to deploy mines. Similarly, the size of the mine barrages set up by the Ukrainian army along the border with Belarus is also unclear. Therefore, what is certain is that the eastern and southern parts of Ukraine have now become one of the world’s most dangerous areas as regards the threat posed by mines and unexploded ordnance.

” According to the government in Kyiv, the size of the area which potentially requires demining is 174,000 km². However, this figure is most likely several times lower.

Defunct legal acts

In Ukraine, anti-personnel mines had been a frequently applied means of warfare long before Russia’s full-scale invasion. An estimated 16,000 km² of land have been mined during the war in the Donbas which has been ongoing since 2014, including 7,000 km² located in Kyiv-controlled areas.⁴ In 2021,

¹ It seems that this proportion is exaggerated – 20% may only be true for the most faulty batches of obsolete Russian ammunition.

² In June 2023, chairman of the Joint Chiefs of Staff General Mark Milley admitted that other countries, including Turkey and Estonia, were supplying cluster munitions to Ukraine.

³ From the beginning of the conflict, representatives of the Ukrainian authorities have quoted various estimates regarding the size of the mined area: in April 2022 they argued that this figure was 300,000 km², in December 2022 250,000 km², in June 2023 200,000 km², most recently 174,000 km². According to World Bank estimates, the size of the potentially mined area is 187,000 km², although a mere 9,180 km² of this area is viewed as territory which requires mine clearing using technical means.

⁴ In this context, it should be noted that, due to Russian snipers operating in this area, mine clearing activities could only be carried out at a distance of 10–15 km from the so-called demarcation line.

the United Nations in Ukraine reported that the eastern part of the country ranked fifth globally as regards the number of casualties due to landmines and explosive remnants of war.⁵

Although both sides of the conflict are bound by international treaties which ban the use of anti-personnel mines, after 24 February 2022

» **According to World Bank estimates, the losses incurred by Ukrainian farmers who were unable to carry out field work stand at \$31.5 bn.**

these have been deployed on a large scale. Ukraine is bound by the Ottawa Treaty which prohibits the use, stockpiling, production and transfer of anti-personnel mines (Kyiv signed this document in 1999 and ratified it in 2005). As regards Russia, although it has failed to sign this treaty, it is bound by Protocol II on Prohibitions or Restrictions on the Use of Mines, Booby-Traps and Other Devices as amended on 3 May 1996. It has been a party to this protocol since March 2005.

Since March 2022 Russia has come under repeated criticism from Western states and international organisation due to its documented use of anti-personnel mines.⁶ Ukraine, for its part, has failed to destroy more than 3 mn anti-personnel mines in line with its commitments arising from the Ottawa Treaty (it was expected to do so by 2010). Russian propaganda media has aired several reports regarding Ukrainian soldiers using anti-personnel mines and similar accusations have been voiced by representatives of human rights organisations.⁷ However, for the time being no reliable and convincing information on this issue is available.⁸

Mines instead of grain

For the Ukrainian economy, the problem of mined farmland is particularly acute. Before the war, the area of Ukraine's cultivated land stood at around 28 mn hectares. It shrank to 23.4 mn hectares as a result of the hostilities in 2022 alone.⁹ At present, according to the World Bank, the losses suffered by Ukrainian farmers who are unable to do their field work (due to shelling and landmines) are likely equal to \$31.5 bn.¹⁰ According to the Ukrainian authorities, most farmland areas 'contaminated' by mines are located in Kherson, Mykolaiv and Kharkiv oblasts.¹¹ Due to the insufficient pace of mine clearing activities, the prospects for the resumption of agricultural production are not optimistic. In 2022, in the Kyiv, Sumy and Chernihiv oblasts, sappers have only cleared around 50,000 hectares of land of mines. In September 2023, Deputy Prime Minister Yulia Svyrydenko announced that since the beginning of the year more than 200,000 hectares of arable land had been surveyed and another 120,000 hectares had been cleared of mines, which enabled the farmers to resume their farming activity there. However, according to the State Emergency Service of Ukraine, around 470,000 hectares of arable land in nine oblasts of Ukraine still require urgent mine clearing activities.

Other problems result from the fact that the maritime routes which were used to export Ukrainian agricultural produce have also been mined.¹² According to Ukrainian estimates, at the beginning of the full-scale invasion Russians deployed 450 naval mines in the Ukrainian exclusive economic zone and in Ukrainian territorial waters in the Black Sea. In addition, it is believed that along

⁵ 'Landmines Still Pose a Threat to Two Million Ukrainians', United Nations Ukraine, 5 April 2021, ukraine.un.org.

⁶ 'Ukraine: Russia Uses Banned Antipersonnel Landmines', Human Rights Watch, 29 March 2022, hrw.org.

⁷ 'Ukraine: Banned Landmines Harm Civilians', Human Rights Watch, 31 January 2023, hrw.org.

⁸ *Landmine Monitor 2022*, Landmine and Cluster Munition Monitor, November 2022, the-monitor.org.

⁹ S. Matuszak, T. Iwański, K. Popławski, A. Wilk, *The second front. Ukraine's economic conditions after a year and a half of war*, OSW, Warsaw 2023, osw.waw.pl.

¹⁰ *Ukraine. Rapid Damage and Needs Assessment. February 2022 – February 2023*, World Bank, March 2023, worldbank.org.

¹¹ 'Дмитро Соломчук: Для швидкого й повного розмінування сільськогосподарських земель України потрібно кілька сотень спеціальних машин', Офіційний вебпортал парламенту України, 27 April 2023, rada.gov.ua.

¹² Prior to the Russian invasion, the sale of agricultural produce and foodstuffs was the main category of Ukraine's exports. In 2021, its value stood at \$27.7 bn, so almost 41% of all exports, and accounted for around 14% of Ukraine's GDP. Maritime transport used to be the principal method for exporting goods and accounted for around two thirds of Ukraine's exports prior to the Russian invasion.

the Black Sea transport route running from Odesa to the Bosphorus Strait, Russia has also deployed 400 to 600 mines¹³ which continue to float and hamper the navigation of commercial vessels heading for Ukrainian harbours.¹⁴ In spring 2022, the Ukrainian Armed Forces mined the coast off Odesa to prevent the Russians from carrying out a landing operation. In addition, it is unclear how many mines, unexploded ordnance and other explosive devices have made it into the Black Sea as a result of the flooding caused by the blowing up of the Nova Kakhovka dam. It is believed that this number is significant because immediately ahead of the dam's destruction, Russian soldiers had mined areas on the left bank of the Dnipro in Kherson oblast, fearing a Ukrainian offensive.

Mine clearing will last many years

The lack of professional equipment and personnel has been the key obstacle to carrying out a mine clearing effort. At present, Ukraine has 3,000 individuals who have the necessary skills and 19 companies which provide professional services of this type (this includes international organisations such as the British-American HALO Trust, the Swiss FSD, the Danish DRC and the Norwegian NPA organisations). The State Emergency Service of Ukraine and the police have 17 mine clearing vehicles at their disposal, while the present demand from the mine clearing teams is estimated at at least 70 of these vehicles. According to calculations by the authors of the Globsec report, considering Ukraine's present equipment and personnel, the removal of mines and unexploded ordnance from an area of 4,700 km² will last 20 years.¹⁵ Deputy Prime Minister Svyrydenko has presented more optimistic forecasts, as according to her the time needed for clearing all of Ukraine's mined areas is 70 years.

The high cost of the mine clearing operations is another major obstacle. The World Bank has estimated this cost at \$397 mn in 2023 alone.

” The cost of mine clearing activities is in excess of the Ukrainian state's equipment, personnel and financial capabilities.

Experts argue that in order to thoroughly clear the land of all mines and unexploded ordnance the cost will be almost \$30,000 per hectare. As Ukrainian farm owners are unable to bear this cost, they often decide to hire amateur teams which operate on the black market for mine clearing services, which has been on the rise. According to Ukrainian journalists, the cost of hiring amateur sappers, who offer no guarantee for their work's effectiveness, is between 5,000 and 15,000 hryvnias (around \$140–420) per one hectare of land.¹⁶

In an attempt to significantly reduce the cost of mine clearing activities, the authorities in Kyiv have announced their intention to liberalise the market for these services and to publish the relevant tenders in the public procurement IT system known as Prozorro. In the first pilot tender for the demining of 3 hectares of forest in Zhytomyr oblast, the price quote for comprehensive mine clearing work presented by the successful tender was 550,400 hryvnias, at 183,000 hryvnias (around \$5,000) per hectare of land.¹⁷ However, another problem involves the highly time-consuming and bureaucratic procedure for issuing licences to carry out mine clearing tasks, which lasts from 6 to 12 months (at the end of September 2023, 29 companies were waiting to receive their relevant permits). As part of additional support measures, in 2024 the government plans to establish a special fund worth 2 bn hryvnias to provide subsidies to cover 50% of the cost of the mine clearing work commissioned by agricultural producers.

¹³ 'Небезпечне Чорне море. Розмінувати будуть усі країни басейну', Центр оборонних стратегій, 29 April 2023, defence.org.ua.

¹⁴ US intelligence has confirmed that Russian navy did lay mines in the Black Sea. See J. Borger, 'Russian navy ordered to lay mines at Ukraine's Black Sea ports, says US', The Guardian, 23 June 2022, theguardian.com.

¹⁵ I. Osmolovska, *Walking on Fire: Demining in Ukraine*, GLOBSEC, July 2023, globsec.org.

¹⁶ А. Заїка, 'Розмінування полів. Чому аграрії самі шукають міни', ЛІГАБізнесІнформ, 12 July 2023, biz.liga.net.

¹⁷ *Idem*, 'Підризна діяльність. Хто витягне вибухівку з полів', ЛІГАБізнесІнформ, 4 October 2023, biz.liga.net.

A bureaucratic minefield

According to the provisions of the Mine Action Law enacted back in December 2018 (which has been amended several times, most recently in April 2023), the inter-ministerial National Mine Action Authority supervised by the Minister of Defence is responsible for coordinating the mine clearing activities. Its tasks include coordinating cooperation with the central and local level authorities as well as other organisations and companies carrying out mine clearing tasks, monitoring the mine clearing activities, and supervising the implementation of national mine action programmes and strategies.

However, this body is not the only institution responsible for carrying out mine clearing tasks. Three other similar institutions operate in the public administration struc-

tures. These are: the Centre for Demining Action established in July 2021 (it also operates at the Ministry of Defence), the Interregional Centre for Humanitarian Demining and Rapid Response established in May 2020, which is supervised by the State Emergency Service of Ukraine at the Ministry of Internal Affairs (these two bodies are responsible for issuing licences to operators carrying out demining activities, inspections of the demined areas and assessments of the quality of mine clearing work etc.), and the Socio-Humanitarian Mine Action Response Centre established in November 2021 at the Ministry for the Reintegration of the Temporarily Occupied Territories of Ukraine. Due to several instances of misunderstanding and rivalry (in particular between the bodies supervised by the Ministry of Defence and the Ministry of Internal Affairs), in February 2023 the government decided to establish another entity, that is the Humanitarian Demining Centre, in order to enhance the coordination of activities carried out by all of the involved parties. Although it was conceived as a platform for exchanging information between specific ministries, its tasks overlap with the competence of the National Mine Action Authority.

” **The chaotic and unclear division of competences among the institutions responsible for demining is not conducive to efficiently clearing the land of mines and unexploded ordnance.**

The multitude of institutions responsible for mine clearing has failed to improve the organisation of how the state institutions operate in this area. Despite repeated announcements, no comprehensive national strategy has been devised which would set priority directions and define the competences of specific bodies. One important element of this strategy should involve prioritising the preparation of estimates of the actual size of the mined areas. According to the Ukrainian government, the strategy will be unveiled by the end of this year, and a detailed schedule of the mine clearing effort will be released by March 2024.

International assistance is urgently needed

In many aspects, demining the territory of the Ukrainian state has been the biggest challenge since the Second World War. During the war with Russia, which has now lasted for more than 600 days, more than 650,000 mines and explosive devices have been found and neutralised. It should be expected that many more will be discovered, provided that a comprehensive survey of the liberated territories is feasible. The cost of these activities is beyond of Ukraine's equipment, personnel and financial capabilities.

In order to obtain the necessary support, Kyiv reached out to the Western world as a whole and organised the first international demining conference, the Demine Ukraine Forum, which was held on 27 September, and the International Donor Conference on Humanitarian Demining Ukraine held in Zagreb on 11 October. During the latter event, 34 participating countries declared their intention to provide a total of €500 mn to Ukraine (Switzerland has pledged to provide €100 mn, Norway €20 mn, Sweden €12.5 mn), which will make it possible to conduct an initial demining of the Kyiv-controlled territories. In addition, by the end of 2023 Ukraine will receive ten specialist machines from the

Croatian DOK-ING company and the Global Clearance Solutions company each, as well as 200 vehicles used in carrying out sapper work and other equipment. This is possible due to the assistance offered by Japan, Canada, South Korea, Switzerland, Lithuania, the Howard G. Buffett Foundation and the United Nations Development Programme (UNDP).

In mid-October, the governments of Bulgaria, Romania and Turkey agreed to carry out a joint demining operation in the western Black Sea basin. This effort will involve removing mines from an alternative transport route which runs from Ukrainian Black Sea ports via Romanian and Bulgarian territorial waters. When in mid-July Russia reinstated its blockade of the Black Sea grain corridor, this route was among several used to export Ukrainian foodstuffs.

The successful demining of the territory of the Ukrainian state is a prerequisite for the launch of the country's reconstruction effort. This is because the threat posed by dangerous explosives remaining on Ukrainian soil significantly increases the cost of insurance against investment risks and, in turn, discourages potential partners who may otherwise be interested in taking part in this process. To remedy this situation, Deputy Prime Minister Svyrydenko announced the launch of cooperation with the European Union on a comprehensive demining policy for the recaptured territories. As part of this cooperation, the primary tasks will include hiring international specialists to carry out these activities, purchasing special equipment, and clearing arable land of mines. Due to the international support Ukraine has received, the prospects for tackling this difficult challenge are good.