



Walking on Fire: Demining in Ukraine

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Executive Summary

1. About 30% of Ukraine's territory (174 000 sq.km) has been exposed to intense combat operations. This area requires survey and clearance from the vast amounts of explosive ordnance left by the invaders. Ukraine is consequently the largest mined territory in the world surpassing such former frontrunners as Afghanistan and Syria. The area requiring clearance is still very difficult to assess or indeed access as fighting is still ongoing: around 18% of Ukraine's territory remains under occupation. To date, the Kharkiv and Kherson oblasts remain the most contaminated regions of all the liberated territories, as Russian forces had been present there for a longer period of time. The nature of the demining challenge is different to the pre-Feb 2022 situation: first, fighting has been heavier and longer in duration; second, a far greater range of explosive ordnance has been deployed, and, finally, the area of potentially contaminated territory is 10 times greater.
2. Russian troops are infamously creative in leaving mine-traps: they plant victim-activated devices on animals, dead-bodies, as well as double and even triple booby-traps on roads, fields and forests. It has been reported that the Russians have also deliberately targeted farming areas and agricultural land for contamination in order to deny its use for future economic activity in Ukraine.
3. The pace of demining work is very slow. Since February 2015 16 000 sq.km in Donetsk and Lugansk regions required clearance, of which 7000 sq.km on Ukrainian-controlled territories. Actual size of territories cleared in 2015-2021 was 414,56 sq km (which is only 5,9% of the potentially contaminated territories in controlled areas and 2,5% of the potentially contaminated territories in both controlled and non-controlled areas). All the operators combined cleared on average 64 sq km per year, with most of the work being done by the special services of the Ministry of Defense of Ukraine and the Ministry of Interior. International non-governmental operators combined (the HALO Trust, DDG and FSD) had been doing on average 1,89 sq km per year.
4. Having engaged in demining in the eastern territories since 2014, Ukraine has obtained the necessary expertise and skills for that work. It has also enabled the setting up of an initial coordination system among Ukrainian authorities and mine-clearance experts. However, a proper structure and strategy for demining has not yet been developed. Currently Ukraine has an embryonic development (as compared to its needs) of all mine-action pillars. There is an acute requirement for assistance from Ukraine's partners, especially in the following areas: (1) clearance (including survey and land release); (2) mine risk reduction; (3) victims' assistance; (4) advocacy; (5) stockpile reduction.
5. Most people do not understand the difference between combat, operational and humanitarian demining. They have little idea of the laborious nature of the work and costs that lie ahead to clear a given area and make it safe to use. Combat and operational demining is conducted by special military units (engineers, also called 'sappers'), police and emergency services. This is relatively fast as they concentrate only on selective demining of high-priority areas – houses and residential buildings, main roads and access routes to places of common use and infrastructure. Humanitarian demining comprises the largest part of mine clearance. This implies a complex, non-selective

systemic survey of entirety of a potentially contaminated territory, mostly on land, but also in and around lakes and rivers. Once the clearance work is completed it is inspected by a competent state authority and is officially certified as a “land safe to use”.

6. With a war-torn economy, and confronted by so many challenges, Ukraine is very much reliant on international assistance from donors in every aspect of life. In demining international assistance is essential. The country will find it extremely difficult to allocate USD 3.7 bn annually for demining from its own resources. For 2023 alone, the World Bank has estimated needs of more than USD 397 million, for which Ukraine has already attracted only USD 16 million of international technical assistance and secured preliminary agreements on another USD 73 million.
7. There are around 500 different demining teams or up to 5000 military engineers/deminers operating in Ukraine. This number of operators would take around 20 years to clear 4700 sq.km. Provided all of the territory of 174 000 sq.km of Ukrainian territory which has seen combat is contaminated, under the given human resource capacity it would take 757 years to clear all of the affected areas of the country.
8. Private operators are limited in their capacity to hire, train and equip new staff without significant financial investment. International and local NGOs, whose non-profit demining work is financed by international donors/partner countries, are seemingly in a better position and hence are more visible and better equipped for their activity. While there seems to be no difficulties in recruiting people for this work, retention is an issue as many of Ukrainians (especially, males) are subject to conscription/mobilization and are regularly called up to the UAF.
9. It is hard to determine the exact quantity and type of demining equipment currently available for Ukraine to undertake the necessary work. Ukrainian decision-makers stress that the existing stock remains very scarce and is even not enough to equip existing deminers.
10. At an average rate of USD4 per square meter, an area of 10 000 hectares (100 sq.km) would cost USD400K to clear. This is clearly unaffordable for farmers or indeed urban households. Given the shortage of deminers in Ukraine, farmers could find themselves waiting for an indefinite period of time until their requests are considered or met. Accordingly they resort to accepting offers from uncertified so called “dark deminers”, who promise to survey land at a more modest rate, using primitive equipment and without supplying any kind of reliable certification that ‘land is cleaned and safe to use’. The problem of ‘dark deminers’ has become ever-more acute with the sowing of seeds in Spring 2023. The Ukrainian government admits the existence of the problem, but has been less forthcoming with solutions.
11. Ukraine’s Law on Anti-Mine Action makes the Cabinet of Ministers of Ukraine responsible for the implementation and regulation of demining in Ukraine. However, the law assigns no responsibility for the development of a National Strategy. To date (April 2023) the Government of Ukraine has neither mid-, nor long-term national plans. It managed to develop and adopt a plan in April 2022, which is written in vague language, covering the main mine-action activities as defined by UNMAS. However, the government intends to develop a new national policy on demining in 2023. A new Plan of Action on De-Mining of Agricultural Lands seemed to be a first step in this direction.

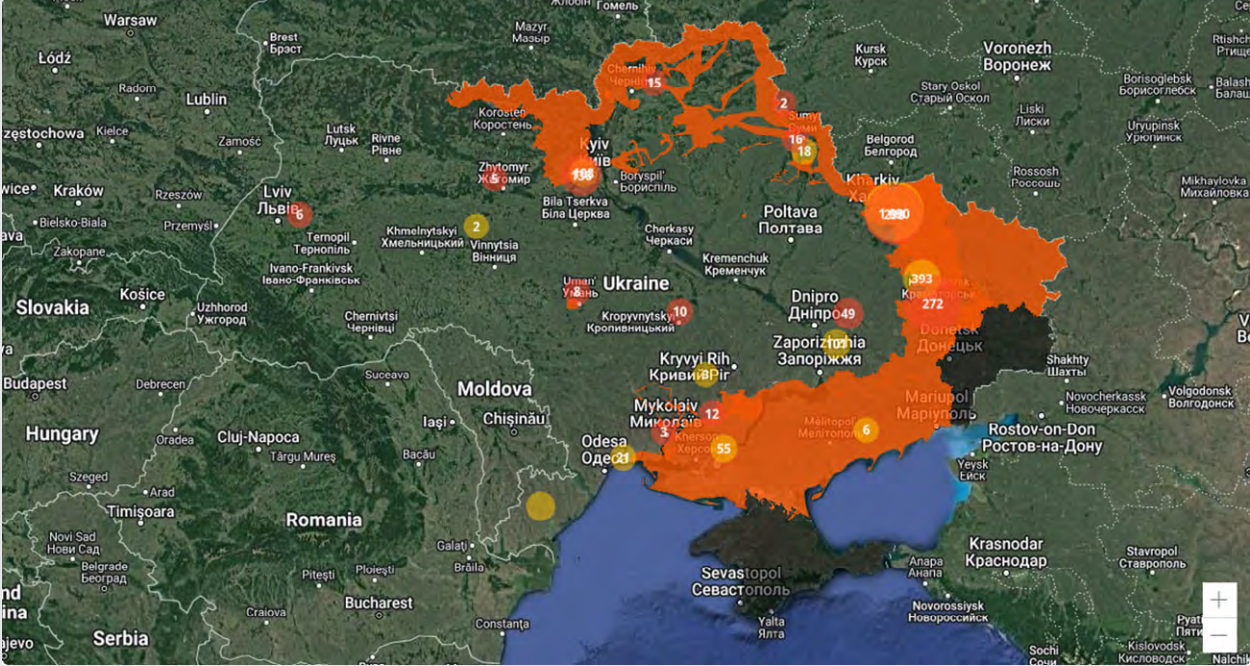
- 12.** The division of responsibilities of the various institutions responsible for demining is unclear as is the answer to the question ‘who retains overall responsibility?’ The demining environment is therefore highly competitive and potentially open to institutional conflict. The future ‘Ukrainian Center for Humanitarian Demining’, announced by the Prime Minister Denys Shmygal in February 2023, does not have a clear place in the hierarchy of relevant institutions in Ukraine. Further there is the potential for conflict with the MoD chairing the National Demining Authority.
- 13.** Ukrainian authorities have however been successful in setting up a working information system concerning mine-awareness (complete with a disaggregated interactive map of mines). Ukraine has been relatively successful in its mine-hazard awareness social campaigns, using its famous deminer-dog Patron as a mascot and symbol. However, Ukraine is still struggling to develop a coherent government policy and communication campaign on mine-education. Various mine-awareness and mine-education campaigns conducted by many certified operators in Ukraine do not meet the needs of the situation, and accidents still occur every day.
- 14.** The government of Ukraine is currently considering a number of options as to how to cope with scaled tasks and develop the necessary capabilities, especially on: (1) new technologies with the use of IT; (2) incorporating the private sector particularly with respect to supporting startups; (3) enhancing capacities for the production of demining equipment in Ukraine.



Complex, Costly, Impossibly Challenging? – Demining in Ukraine

In his address to G19 leaders in November 2022, President Volodymyr Zelensky presented Ukraine’s vision of the path to peace (his famous 10-point Peace Formula). Among other important things Zelensky noted the necessity for the immediate protection of the environment and called on leaders to unite to end Russian ecocide in Ukraine. Demining was mentioned as a vital task, as almost 30% of Ukraine’s territory (the size of two Austrias) that have been exposed to the war requires survey and potential further clearance from explosive ordnance and the other detritus of war.

The Ukrainian Ministry of Foreign Affairs reports that with 174 000 sq.km of potentially contaminated territories, Ukraine has become in 2023 the largest mined territory in the world surpassing former frontrunners as Afghanistan and Syria. The **Mine Action Review 2022**, assessed Afghanistan, Cambodia, and Iraq to be the most massively contaminated¹ countries, while Angola, Bosnia and Herzegovina (BiH), Thailand, Turkey, and Yemen were noted as being heavily contaminated². Ukraine, with 174 000 sq.km of potentially contaminated territory looks little short of terrifying in terms of the scope of work that lies ahead³.



Picture above: Ukrainian territories, which could potentially be contaminated by explosive objects

Source: State Emergency Service of Ukraine, <https://mine.dsns.gov.ua/>

1 Defined as covering more than 100 sq km of land
 2 Covering more than 20 sq km –100 sq km
 3 Note that Mine Action Review assessed only contamination of the land with anti-personnel mines.

I. Situational Awareness

The Situation Pre-February 2022

The war that Russia launched against Ukraine started long before the full-scale invasion in February 2022. Since 2014 parts of Donetsk and Lugansk regions, as well as Crimea have been occupied. Until February 2022, some demining was conducted on those parts of the territory that had been liberated by the Ukrainian Armed Forces. Even then de-miners were faced with a very demanding decontamination challenge. Clearance was required for 16 000 sq.km in the Donetsk and Lugansk regions, with around 7000 sq.km of it on Ukrainian-controlled territories. The UN ranked the East of the country to be one of the most mine-contaminated regions in the world and ranked Ukraine fifth in the world for civilian casualties caused by mines and among the top three for anti-vehicle mine incidents.

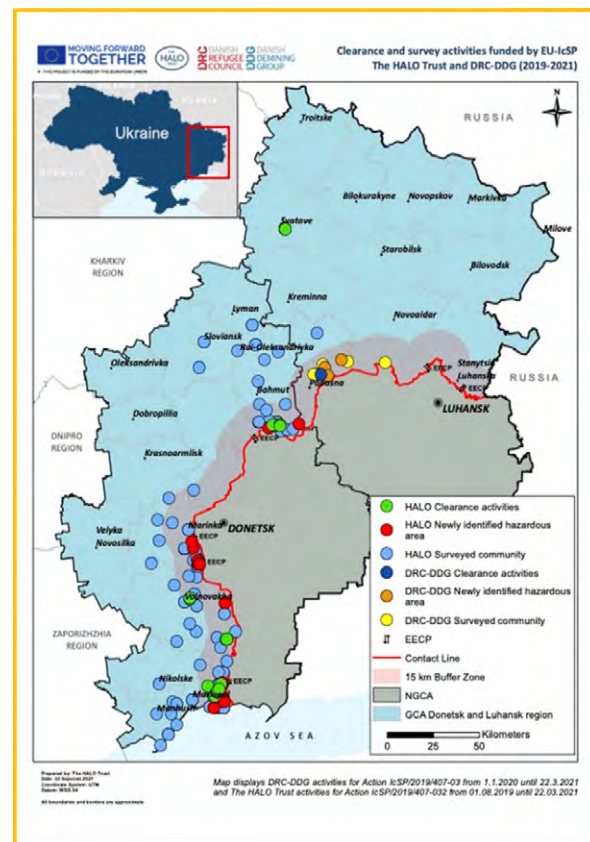
Having engaged in demining in the eastern territories since 2014 Ukraine has obtained the necessary expertise and skills for that work. It has also developed the expertise to set up an initial coordination system among Ukrainian authorities and operators. However a proper structure and strategy for demining had not been developed by that time.

As it can be seen from the map to the left, de-miners were able to work only on areas 10-15 km from the contact line. The ‘Grey zone’ nearer the front was not possible to demine as snipers of the Russian proxy forces operated in the area. Moreover, Russian Armed Forces and their proxy groups had been using artillery systems to spread anti-personnel mines, leaving mine dispersion patterns that were chaotic and difficult to map.

*Sustainable Development Goals: Ukraine 2021 Monitoring Report*⁴ suggests that the actual size of territories cleared in 2015-2020 was 38 573 hectares

(or 385,73 sq km). All the operators combined cleared on average 64 sq km per year. With Annual Mine Action Review 2021 data on territories, cleared from anti-personnel mines and cluster munition remnants (altogether 1,83 sq km), and MOD data of 27 sq km cleared by MOD and MI/SESU in 2021⁵, this brings the overall size of the territories cleared in 7 years to 414,56 sq km (which is only 5,9% of the potentially contaminated territories in controlled areas and 2,5% of the potentially contaminated territories in both controlled and non-controlled areas⁶).

Of course, the worst thing about the pre-Feb 2022 demining was that all those efforts comprising over 7 years of work have been wasted as this territory has been re-contaminated after the advance of Russian armed forces in the area since February 2022.



4 Prepared by the State Statistics Service of Ukraine (SSSU) with the support of UNICEF in Ukraine and UN RCO.

5 Not specified whether it is operative or humanitarian demining

6 The actual data could vary, as there is no publicly available correct data of actual territories searched and defined as non-contaminated, territories that still need to be surveyed and those entirely searched and demined



Actual Status of the Problem: The Situation Post-February 2022

Having become one of the most contaminated countries in the world, Ukraine faces enormous challenges in clearing its territory from mines and unexploded ordnance (UXO). The actual size of the territory, which requires clearing is still very difficult to access as fighting is still ongoing. Around 18% of Ukraine's territory remains under occupation at the time of writing (April 2023). To date the Kharkiv and Kherson regions remain the most contaminated regions of all the liberated territories, as Russian forces had been present there for a longer period of time.

Also, the nature of challenges in demining is different to the pre-Feb 2022 situation for the following reasons:-(1) much heavier and longer fighting; (2) the range and dispersal of the explosive ordnance is much greater⁷; (3) the size of potentially contaminated territories is 10 times larger.

Deliberate Mining as a Component of Ecocide in Ukraine

President Zelensky promised that the indiscriminate use of explosive ordnance will be among the charges put forward against Russia in international tribunals. Even after they have been forced out of the areas they occupied, Russians are infamously creative in laying booby-traps: they plant victim-activated devices on animals, dead-bodies, double and even triple mine-traps on the roads, fields and forests.

It has been observed that the Russians have also deliberately targeted farming areas and agricultural land for contamination to render it impossible to use for economic activity. As a result of Russia's invasion, nearly five million hectares (50,000 square km) of agricultural land are currently unsuitable for use in Ukraine due to mines, contamination with explosive ordnance or armed hostilities. Some estimate that land area of grain crops could be reduced by 45% after two years of war.

⁷ GICHD Ukraine Ordnance Guide (1 and 2 edition) have identified over 185 different types of the explosive ordnance confirmed as seen in Ukraine.



Використання російськими військами засобів дистанційного мінування



Picture above: Devices with distance mining.

Source: Ministry of Defence of Ukraine



Застосування російськими військовими саморобних вибухових пристроїв та мін-пасток



Picture above: Russian-made improvised explosive devices and booby-traps (1).

Source: Ministry of Defence of Ukraine



Використання російськими військами засобів дистанційного мінування



Picture above: Russian-made improvised explosive devices and booby-traps (2).

Source: Ministry of Defence of Ukraine

Mines and other UXO are intensely poisonous for the environment: they damage soil as fragmented explosives release heavy metals like chrome, zinc, iron, copper, mercury; later these enter groundwaters and contaminate the Dniester, Dnipro and Seversky Donets rivers, thus seriously affecting water safety. Animal-activated mines cause forest fires with massive migration of wild life a devastated biodiversity. Almost **44%** of nature preservations and natural parks of Ukraine (around 900) are under occupation now or on the territory of active fighting. 30 000 sq.km of forestry has been **affected** by the war and will be subject to clearance inspection as well.

The requirements for clearance of anchored and floating sea mines in the Black Sea, as well as on the river banks of the Dnipro, Dniester and Seversky Donets rivers are yet to be assessed, but without such assessment and subsequent clearance, there will be no return to normal navigation and the safe use of harbors and commercial seaports will be very heavily circumscribed, if not impossible.

The Basics of Mine Action

It is important to highlight that most of the people do not understand the difference between combat, operational and humanitarian demining and hence have little idea of the extent of the laborious work and costs that lie ahead in order to clear an area and make it safe to use.

Combat and operational demining is conducted by special military units (military engineers, also called 'sappers'), police and emergency services and is relatively fast as they concentrate only on selective demining of first priority areas (so called emergency clearance of visible UXO or 'spot tasks') – houses and residential buildings, main roads and road access to places of common use and infrastructure objects. This normally happens immediately after a territory is liberated. The Ukrainian State Emergency Service steps into the liberated territories after the special units of the Ministry of Defence has completed its selective demining and undertakes initial inspections. In most cases when there are reports about the swift clearance of an area, it means that operational demining has been conducted. These figures could be misleading as they by no means guarantee the safety of the land.

Humanitarian demining is the largest component of mine clearance and involves a complex non-selective systemic survey of the entire potentially contaminated territory, both lands and aquatic settings. Humanitarian demining is conducted by emergency services and authorized demining operators (both commercial and non-profit); the clearance work then is inspected by a competent state authority and is officially certified as land that is “safe to use”. In order to make Ukraine’s territory safe for reconstruction a comprehensive humanitarian demining (comprising of non-technical survey (NTS)⁸, technical survey (TS)⁹, and actual clearance¹⁰) should be conducted on all the war-affected territories. As will be shown below, the process of humanitarian demining is extremely laborious and time-consuming, but only this will guarantee that an entire area has been thoroughly searched and cleared from explosives and is safe to use.

The whole process of mine-action, as universally defined by **UNMAS**, goes much wider than actual demining works. It is more complex and consists of **5 main pillars**: (1) clearance (including survey and land release); (2) mine risk reduction; (3) victims’ assistance; (4) advocacy; (5) stockpile reduction. These five constitute a comprehensive strategy at a governmental level where all stakeholders (state authorities, international and national actors (international institutions/organizations, commercial and non-profit operators)) cooperate in an organized manner. Currently Ukraine has an embryonic (as compared to its needs) development of all the mine-action pillars, and this is where the country urgently needs extensive assistance from its partners.



8 NTS is the starting point for identifying, accessing, collecting data on, reporting, and using information to define where mines/explosive remnants of war (ERW) are to be found, as well as where they are not. It also aids in identifying Suspected Hazardous Areas (SHA) and Confirmed Hazardous Areas (CHA) where further investigation and/or clearance need to take place.

9 TS techniques and methods involve a physical intervention and, use survey or clearance assets to enter a hazardous area to: (i) confirm the presence, or absence, of mines/ERW and identify the type of hazards present; (ii) better define the boundaries of the SHA or CHA that requires clearance; and (iii) collect information to support land release decision-making. TS can be broadly characterized as either targeted or systematic depending upon the information gathered about hazard and threat. TS assets must provide a high probability (near certainty) that the presence of expected hazard items will be indicated by the equipment and methodology in use and that TS personnel are safe to conduct the activity.

10 The most familiar and visible part of mine action is the clearance of mines and ERW. It is also the most expensive. Clearance refers to an intrusive information-gathering and threat removal process that fully defines a hazardous area while removing explosive hazards.

II. Needs Assessment

Demand and Supply of Resource Capacity: the Financial Dimension

In its *Rapid Damage and Needs Assessment Report on Ukraine* the World Bank assessed that comprehensive humanitarian demining works will cost USD 37.4 billion over the next 10 years.

For 2023 alone, the World Bank has estimated a requirement for more than USD 397 million. Ukraine has already attracted USD 16 million of international

technical assistance and secured preliminary agreements for another USD 73 million. In order to achieve the relevant target indicators Ukraine needs to attract another USD 310 million this year (2023). A breakdown of costs on demining comprises equipment purchase (personal kits and unmanned machines), the training of deminers, salaries for an expanded staff, as well as the operational work in force in Ukraine.

Recovery and Reconstruction Needs (US\$ million) as of February 24, 2023

Category	Types of activities/ investments	Short term (2023–2026)	Medium to long term (2027–2033)	Total (2023–2033)
Service delivery restoration needs	Non-technical survey	80.1	120.1	200.2
	Technical survey	1,475.0	8,358.2	9,833.2
	Mine clearance	4,132.8	23,419.2	27,552.0
Total		5,687.9	31,897.5	37,385.4

Source: World Bank Assessment team. Note: Equipment to be procured in the amount of US\$372 million for the short and US\$400 million for the long-term needs (total of US\$772 million) is considered as a prerequisite for mine clearance and therefore already included as part of the unit costs for NTS/TS and demining.

Recovery and reconstruction needs (US\$ million) as of February 24, 2023

Category	Priority activity/investment	Estimated cost
Service delivery restoration needs	Non-technical survey	34.3
	Technical survey	181.4
	Mine clearance	181.4
Total		397.1

Source: World Bank Assessment team.

The Crucial Importance of Donor Assistance in Demining

Being confronted with so many challenges for the immediate needs of the war-torn country and its economy, Ukraine is very much reliant on international assistance from the donors in every aspect of life. Its budget needs of up to 50% are supported by international financial institutions and partner countries; reconstruction is also seen as a process which is unlikely to develop without external support. Naturally, demining is another field where international assistance is essential. A country, which has already asked partners for USD 38 bln to cover 20% of its overall budget deficit in 2023, will be highly unlikely to be able to allocate USD 3.7bln annually for demining alone from its own resources.

There has been an enthusiastic response from the international community to help Ukraine with its demining needs, however a lack of coherent publicly available data about commitments made by institutions and individual countries makes assessment difficult.

In 2022 the **EU** allocated EUR 18 mln¹¹ for mine action in Ukraine through its Foreign Policy Instrument and another EUR 25 mln¹² for 2023. The **U.S.** Department of State has allocated USD 91.5 million in 2022 towards humanitarian demining efforts in Ukraine, thus, making Ukraine the **top recipient** of that type of aid¹³. **Canada committed** to USD 11.04 million for equipment needed by Ukraine for humanitarian clearing of landmines. A component of Japan's USD 400 mln assistance package has been dedicated to demining and debris clearance, however the exact amount had not been specified. **Croatia** has **pledged** to spend €3 million on specialized mechanical demining vehicles and other equipment; **Denmark announced** a contribution of US \$1.6 million, while **France committed** to help in direct

mine clearance (specialists and equipment) and training of Ukrainian deminers. The **UK delivered** GBP 2 mln for demining in 2022.

In its provision for further support in demining, the EU set up the following five priorities : (1) to maximize EU funding; (2) to improve donor coordination; (3) to ensure value added of EU support; (4) equipment, (5) training support to governance.

Demand and Supply in Resource Capacity: Human Capital Dimension

According to the Ministry of Foreign Affairs of Ukraine, there are around 500 different demining teams¹⁴ or up to 5000 sappers/deminers operating in Ukraine, including MOD, SESU, private operators, international NGOs and teams sent by partner countries¹⁵. This workforce would require around 20 years to clean a territory of 4700 sq.km. Provided all of the territory of 174 000 sq.km at risk in Ukraine is contaminated, under the given human resource capacity it would require 737 years to clean the country.

11 Scaled-up clearance through NGOs (EUR 10.5 million); Procurement of mine action equipment for state mine action operators (EUR 6 million); Support for OSCE mine action support programme to improve standards and governance (EUR 1.2 million)

12 Up to EUR 20 million for procurement of EOD equipment for state operators; Up to EUR 5 million to support improved mine action governance at the national level through the provision of expert support (Reform Support Teams)

13 This funds efforts to train and equip Ukrainians to conduct demining operations and to deploy contractor and NGO demining teams.

14 One team is in average 10-12 people.

15 This is an aggregate number which includes both military engineers (combat and operational demining conducted by military, security and emergency forces) and deminers (humanitarian demining).

Fact Box

- One deminer can clear up to 15-25 sq meters per day of land clearance depending on the level of contamination.
- A Deminer works no longer than 8 hours per day; rains and winter period (frozen soil) stop active demining works.
- In Kosovo deminers' work is limited to 200 days per year. In Ukraine with more severe climate number of working days of a deminer could be even less.
- In Georgia with less intense 8-day war, demining work started in 2008 and ended in 2019.

Current Resource Availability of Sappers/Deminers

Institution	By end 2022	By end 2023 (est)
State Institutions		
MOD	n/a	n/a
Special Transport Service	120	3000
SESU	Around 1000	1500
Police	350	450
National Guard	291 people (34 groups)	291 people (34 groups)
National non-governmental Operators		
GK Group	12+8 trainers	12+8 trainers
Demining Solutions	10	50
UkrOboronService	30	100
International Demining Group	n/a	n/a
Ukrainian Deminers Association	61	61+?
International Operators		
HALO Trust	600+35 instructors	1200
FSD	Up to 100	Up to 150-200
DRC (Denmark)	60	60+?
NORWEGIAN PEOPLE'S AID	n/a	n/a
Mine Advisory Group (MAG) (UK)	n/a	n/a
Safeland Defense Systems and Logistics (Turkey)	n/a	n/a
Danish Church Aid	n/a	n/a
Ardan Risk Management (USA)	n/a	n/a
Teams supplied/trained by partner countries		
EUMAM-demining (Lithuania, Sweden, Norway, Iceland)	n/a	48 instructors*100deminers=4800
Japan-Cambodia	n/a	8 (trained)
MAT Kosovo	80 (trained)	n/a
Canada	300 (trained)	n/a
Poland	n/a	90 supplied
Tetra Tech (USA)	n/a	40 specialists 70 to be trained locals
Total	3057	11940

Source: GLOBSEC Kyiv Office assessment based on openly available data

Data assessment of actual availability of sappers/deminers is imperfect because some of information is not in public access. The idea of presenting the known figures is to provide with a rough understanding of human resources available and their potential growth to narrow the gap in needs. It should be noted that most of state institutions' resources are engaged with combat-related tasks and predominantly do operative demining. That actually decreases resources available for humanitarian demining. Some of operators privately assess that actual number of deminers to the date is less than 2000 people. Provided EUMAM in demining is fully operational in 2023, it will increase resource capacity of Ukraine fourfold.

Recruiting and Training Deminers

International and national operators in Ukraine estimate that to train and equip one deminer may cost up to USD 6 000. Low purchasing power on the market makes the process costly for private operators and they are naturally limited in their capacity to hire, train and equip new staff. International and local NGOs, whose non-profit demining work is financed by international donors/partner countries, are seemingly in a better position and hence are more visible and resource-sufficient in their activity.

Training one deminer normally takes 4-12 weeks. Due to the war time the actual time spent on training has been reduced to 20 days now, which does not allow a newly-trained deminer to get most comprehensive skills required for a job. Moreover, some of qualifications like sapper diver and deminer of chemical improvised explosive devices are not taught in Ukraine, but these will be of high demand now.

While there seems to be no difficulties in recruiting people for this work¹⁶, there still a problem of personnel turnover, as many Ukrainians (especially, males) are subject to conscription/mobilization and are regularly called up to the UAF.

Demand and Supply in Resource Capacity: Technical Needs and Equipment

From the open data available it is difficult to identify the exact quantity and type of demining equipment available for Ukraine. Ukrainian decision-makers stress that stock remains very low and is insufficient to equip existing deminers. For instance, the Ministry of Interior has **said** that it would find it very difficult to equip another 500 deminers (on top of the existing 600) it had planned to train by the end of 2022, because they are short of personal protection kits.

There is also a substantial need in equipping Ukraine for a mechanized demining. To the date all state operators have only 8 demining machines available for humanitarian demining of the priority areas defined in the *Plan of Action on De-Mining of Agricultural Lands for 2023*. Some of them like Special Transport Service and the National Guard have none of machines at all. Before 2022 only one non-state operator The HALO Trust had in its possession **4 machines** for demining.

In general, according to UA officials, the following equipment are the priority needs for Ukrainian deminers; demand for these will only grow in time:

- **Individual protection kits;**
- **Individual tools for manual demining;**
- **Special transport for transfer of personnel;**
- **Robotic platforms for mine-detection and extraction;**
- **Demining trawls;**
- **Demining machines of different modifications;**
- **Territory monitoring tools (drones)**

¹⁶ An average salary of a deminer is about 30 000UAH (EUR750) per month, which makes the job attractive for Ukrainians (especially in rural areas and small towns of Kharkiv, Kherson, Mykolayv, Sumy and Chernigiv regions).

Development of the Market for Demining in Ukraine. The Problem of ‘Dark Demining’

Market rate for clearing 1 sq meter is USD2-USD8, depending on different factors such as the complexity of terrain (flat field, bushes, forests etc), landscape, contamination, proximity to an active front and time under occupation. With average price of USD4/sq.meter a land of 10 000 hectares (100 sq.km) would cost USD400K to clear.

Naturally, farmers and households cannot afford to pay for the clearance of their land under these market conditions. One farmer put the problem succinctly “even if I plant the whole field with hemp, I still would not be able to breakeven in years”. Also, even when a farmer submits a request for an NTS and demining works, that does not mean that his request will be met immediately. The procedure for consideration of requests is very time-consuming.

It is subject to the priority plan on demining set up by National Mine Action Authority (NMAA), regional military and civil administrations’ priority plans, and of course the availability of deminers’ teams and their capacity. Given the severe shortage of deminers in Ukraine, farmers could wait for an indefinite period of time until their requests will be met.

Therefore, farmers often resort to accepting offers from uncertified so called “dark deminers”, who promise to survey an area of land at more modest prices, using primitive equipment and without providing reliable certification that ‘land is cleaned and safe to use’. Nonetheless, many farmers find this proposal still attractive for them, however, accidents are common. The problem of ‘dark deminers’ has become ever acute given the sowing campaign in the Spring of 2023. The Ukrainian government admits the existence of the problem, but has provided ineffective solutions.



Walking on Fire: Demining in Ukraine

III. State Policy, Stakeholders and Coordination Mechanisms

State Mine Action Policy in Ukraine

From the existing **Law on Anti-Mine Action**, amended in November 2021, it is still unclear which government bodies is in charge of developing the *strategy*. According to this Law, the Cabinet of Ministers of Ukraine is responsible for implementation and state regulation of the anti-mine activity of Ukraine. However, it has not been assigned the role of developing a national strategy. The 2022 Mine Action Review **stated** that Ukraine still did not have a strategy.

The main body responsible for the elaboration of *mid-term (5-years) and long-term (over 5 years) National Plans on Anti-Mine Action* is the National Anti-Mine Action Authority (NAMAA). It is also in charge of developing *operative plans on anti-mine action*, which should be adopted annually. To date the Government of Ukraine has neither mid- nor long-term national plans. It only managed to develop and adopt a **current** operational plan in April 2022, written in a very vague language covering main mine-action activities defined by UNMAS.

On April 4, 2023 the Prime-Minister of Ukraine Mr Denys Shmygal **announced** the government's plans to develop a **new national policy on demining**, which will address the following issues:

1. Revision of national standards in demining; its compliance with internationally set standards;
2. State Program in Demining with set of priority areas/regions;
3. Formation of proper market conditions for demining activity to stimulate competition among the operators; engagement of more international operators with financial assistance of partner countries;

4. Education and communication campaigns on mine-awareness;
5. Effective introduction of innovative technologies

One step in this direction has been made already. A new **Plan of Action on De-Mining of Agricultural Lands** was approved on March 20, 2023. The Plan stipulates that about 470,000 hectares of agricultural land in nine regions¹⁷ of Ukraine will be surveyed and, if necessary, demined. Priority is given in the Plan to the contaminated territories with the highest agricultural and economic importance: Mykolayv and Cherkassy regions.

A functional Information System

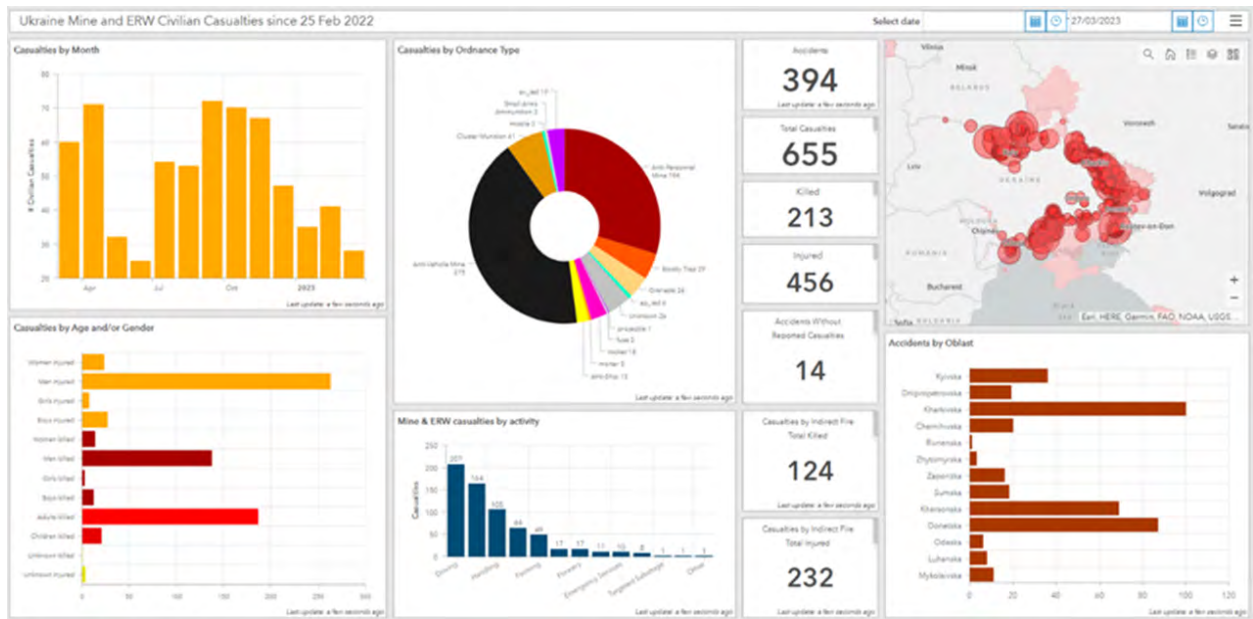
Ukrainian authorities have been successful, however, in setting up a **proper information system on mine-awareness**. With the assistance of the Mine Action Information Management (IM) cell, coordinated by the Geneva International Centre for Humanitarian Demining (GICHD), Ukrainian national authorities supported by UN agencies, international and local mine action organizations have set up an emergency coordination platform to aggregate, interpret, and share the flood of data across partners and sources, in order to map areas where threats exist and define possible actions in real time.

Risk Education

One of the most pressing issues in demining is to **educate the population about mine-hygiene**. People should develop a strong understanding of how to recognize explosive ordnance in their communities, what to do if it is found, and how to reduce risks of explosions. Addressing the problem requires a well-coordinated and well-structured government policy and communication campaign, which is not now in place in Ukraine.

¹⁷ Dnipropetrovska, Zaporizhzhya, Kyivska, Mykolayvska, Sumy, Kharkiv, Kherson, Chernigiv and Cherkassy regions.

Casualties in Ukraine caused by explosive ordnance (data since 25 February 2023)



Source: Data gathered by GLOBSEC team from open sources.

However, Ukraine has been relatively successful in a mine-hazard awareness social campaign, using as its mascot the deminer-dog Patron. Also, many certified operators in Ukraine conduct risk-awareness and risk-education campaigns within the resources available. However, this does not match the scale of the problem, and accidents still occur every day (see below).

The National Coordination Structure on Demining in Ukraine:

The division of responsibilities of the various institutions responsible for demining is unclear as is the answer to the question ‘who retains overall responsibility?’ making the environment highly competitive and potentially open to conflict.

Strategic and Policy Planning Level

- **The National Anti-Mine Action Authority (NAMAA)**, established in November 2021. This is a collective¹⁸ inter-agency body chaired by the Ministry of Defence, responsible for development of national policy, strategic

programs and plans on anti-mine action based on the set priorities, as well as coordination of all the competent authorities. It is expected that once Ukraine restores territorial integrity over its internationally recognized borders, the head of the ministry responsible for formulating and implementing State policy in civil protection and emergency response (currently the Ministry of Interior-SESU) will replace the MoD as the lead body in NAMAA.

- A new **Interagency Working Group on Humanitarian Demining (HDWG)**, chaired by the First Vice-Prime Minister-Minister of Economy, was set up on February 14, 2023. The HDWG is comprised of almost the same governmental institutions of Ukraine as the NAMAA¹⁹. The tasks of the HDWG are to define priorities and organize the work of humanitarian demining required for reconstruction and resumed economic activity, as well as to come up with respective policy proposals. The HDWG reports on its activity to the Cabinet of Ministers of Ukraine.

¹⁸ It is composed of Ministry of Defence, Ministry of Interior, Ministry of Temporarily Occupied Territories, Ministry of Education and Science, Ministry of Health Protection, Ministry of Social Affairs, Ministry of Foreign Affairs, Ministry of Agriculture, Ministry of Development of Communities and Territories, Ministry of Infrastructure, State Emergency Service of Ukraine, Security Service of Ukraine, Ministry of Economy (since Feb 2023).

¹⁹ Ministry of Temporarily Occupied Territories, Ministry of Digital Transformation, Ministry of Development of Communities and Territories, Ministry of Interior, Ministry of Foreign Affairs, Ministry of Agriculture, Ministry of Defence, SESU, State Agency of Reconstruction and Development of Infrastructure, State GeoCadastr, National Security and Defence Council of Ukraine

- Formally, the **MOD** is mostly in charge of combat and operational demining, as well as military engineers.
- **The Ministry of Interior** and the **State Emergency Service of Ukraine** (as part of the MOI) are responsible for humanitarian demining.
- Before February 2022 the **Ministry of Reintegration of the Temporarily Occupied Territories** had played one of leading roles in demining of Ukraine. However, since the full-scale Russian invasion into Ukraine in February 2022 its role has been visibly reduced and mostly limited to participation in respective coordination structures at the governmental level.
- It is expected that with the rising needs of reconstruction and resumed economic activity the role of the **Ministry of Economy and Ministry of Agriculture** in demining will be substantially increased. The same goes for the **Ministry of Digital Transformation**, which will apparently be assigned the tasks of introducing innovations and digital solutions into the demining of Ukraine.

Operational Level

- **The National Mine Action Centre (NMAC)**, which technically falls under the Special Transport Service of Ukraine within the Ministry of Defence, was established in July 2021. Among its functions there is quality control in demining; certification of operators and anti-mine activities; inspection of cleared territories (issuing a special certificate that 'land is cleared and safe to use').
- **The Inter-Regional Centre on Humanitarian Demining and Immediate Response (HDC)** is placed under State Emergency Service of Ukraine within the Ministry of Interior (MOI), established in May 2020. Among its functions there is quality control in demining; certification of operators and anti-mine activities; inspection of cleared territories (issuing a special certificate that 'land is cleared and safe to use').

The two centers share almost identical functions in demining, related to information management, quality control, monitoring, and certification of the operators, although their responsibility is divided territorially. It is known that a decision to create two mine action centers instead of one was taken as a compromise because of a competition between the MoD and MOI on who takes the lead on mine action.

- **The Center of Social and Humanitarian Response** under the Ministry of Reintegration of Temporarily Occupied Territories. Center **declared** to be established in November 2021 with the main purpose of helping victims and the education of the population in mine awareness. According to 2022 **Mine Action Review**, the Centre was not operational as of September 2022 and was unlikely to be operational in the foreseeable future.

In order to streamline the coordination and make it more efficient, a **joint inter-ministerial decree** by the MOD, MOI and Ministry for Temporarily Occupied Territories was issued on January 24, 2023. However, this mechanism has done little to improve the coordination among the stakeholders.

- On 11 February, the Government of Ukraine decided to establish the **Ukrainian Center for Humanitarian Demining** in order to ensure better coordination of all stakeholders. The body will act as a secretariat and analytical center and will collect and process all the information on needs for demining from the MOD, MOI, SESU, regional military administrations, partner-countries and international organizations. However, it has not been clear what place in the hierarchy of all the centers it will take and how this will be aligned with the supposedly leading role of the MoD as chair of the National Demining Authority.

Non-state International and Local Operators

All operators of demining activity in Ukraine should comply with international standards of IMAS and are subject to national certification, which is much stricter than those of IMAS. National certification costs around EUR2000 and it could take 6-12 months to get, after which an operator may legally work.

Certified operators on demining in Ukraine

	Operator	Certified for
1	Demining Solutions (Ukraine)	NTS, TS, Manual demining, Mine Clearance
2	International Demining Group ²⁰ (Swiss/Ukraine)	NTS, TS, Manual demining, Mine Clearance
3	The Ukrainian Deminers Association/UDA (Ukraine)	Risk education
4	GK Group (Ukraine)	NTS, TS, Manual demining, Mine Clearance
5	Center for Humanitarian Demining SC UkrOboronService (Ukraine)	NTS, TS, Manual demining, Mine Clearance, Liquidation of ERW
6	Danish Refugee Council's/DRC (Denmark) ²¹	NTS, TS, Manual demining, Mine Clearance
7	Swiss Foundation for Mine Action/FSD (Switzerland)	NTS, TS, Manual demining, Mine Clearance, risk education
8	The HALO Trust (US/UK)	NTS, TS, Manual demining, Mine Clearance
9	Norwegian People's Aid/NPA (Norway)	NTS, risk education
10	Humanity and Inclusion/HI)	Risk education
11	Mines Advisory Group/MAG)	Risk education, pending certification on other types

One of the main challenges for the operators is that they are not entitled to conduct disposal, destruction, and transportation of explosive items for EOD procedures. This is done solely by NMAC and HDC, which creates significant delays in the work of operators: they detect, extract explosives and have to wait for the deminers of the NMAC or HDC to come and destroy them. Also, while operators complete their work on mine clearance,

they have to wait for an inspection of the respective authorities of MOD or MI to make an assessment and issue a 'clearance certificate'. Given the severe staff-shortage of the inspection authorities, operators complain that this final stage also takes some time to complete.

However, recently the HDWG adopted new measures, aimed at simplifying regulations on issuing permits to undertake explosive works in demining and the use of explosives by anti-mine operators for the special legal regime during wartime period. HDWG have revised existing procedures for the recognition of foreign documents of qualified specialists in de-mining and their compliance with national requirements in order to speed up the process of national certification.

Emerging Actors from the Agricultural Sector

Recently one of the major agricultural -players in Ukraine JSC "Nibulon" announced its intention to get involved in demining work to clear 25 500 hectares of its land. International Bayer AG said that they have also become involved in demining by supplying Ukraine with demining machines to help farmers.

Other Actors

Other international actors engaged in mine-action in Ukraine are: the Organization for Security and Co-operation in Europe (OSCE); Geneva International Centre for Humanitarian Demining (GICHD); the Mine Action Sub-cluster chaired by the United Nations Development Programme (UNDP). Their tasks mainly concern the provision of expert advice and donor assistance in demining through their respective international/local non-profit operators.

²⁰ Also known as the Demining Team of Ukraine

²¹ Humanitarian Disarmament and Peacebuilding sector (formally known as Danish Demining Group (DDG) and hereafter referred to as DRC

International Coordination Networks

The main international actor that plays a role of a coordination platform on demining both for international and national stakeholders in Ukraine is **UNDP**. They offer bi-weekly coordination meetings where current developments and plans are discussed. However, participants say that these meetings are good for operative information sharing, but less efficient from the perspective of tackling major systemic problems. Some of them say that they wish those meetings were more efficient.

Occasionally, the **OSCE** Project Office in Ukraine used to organize roundtables on specific mine action topics. The Office has recently resumed its activity in Ukraine

Recently an **intra-EU coordination network** on demining has been informally set up by the Mission of the European Union to Ukraine for all the EU member states. These meetings aim at increasing coordination and coherency of demining in Ukraine both of the EU (Service on Foreign Policy Instruments)

and individual Member States which have committed themselves to help Ukraine with demining.

In response to the calls from Ukrainian decision-making authorities on setting up a **Demining Ramstein format**, the G7 countries through their Embassies in Ukraine have also taken this topic into consideration. A meeting of First Deputy Prime Minister Ms Yulia Svyrydenko with G7 Ambassadors took place on March 27, 2023. During the meeting the Ukrainian side proposed the creation of a structure to coordinate humanitarian demining in Ukraine and will effectively implement all related organizational tasks in a single and clearly formulated vision. It was suggested that representatives of partner countries be members of a supervisory board to oversee the activity of this overarching body in demining. In addition, the G7 ambassadors were offered to take patronage over the mined regions of Ukraine and help clear them of mines and unexploded ordnance. It is expected that this meeting might be considered as a pre-step to setting a Demining Ramstein format.



IV. Potential for Development.

New Areas to Explore.

In order to address the challenges, the government of Ukraine is currently considering a number of options of how to cope with scaled tasks and develop the necessary capabilities. Among the flagship initiatives the following are worth considering:

1. New Technologies with the use of IT Innovations

Given the success of using drone technologies for situational awareness on the battlefield, the government is also looking at using drones for non-technical and technical surveys of potentially contaminated land. It has been demonstrated already that drones are useful for conducting initial surveys and detecting dangerous metallic (and even plastic) explosive ordnance on flat areas like fields. However, this approach has its limits as drones proved to be ineffective in surveying forests and bushy areas, as well as water basins.

Nevertheless, the Government of Ukraine announced a pilot project to test new technologies for surveying potentially contaminated territories in live operational conditions. Upon its completion, those technologies, which demonstrate efficiency in demining will be used in humanitarian demining works in Ukraine. To date there are over 15 manufacturers from different countries, that are ready to participate in the project.

2. Bringing Private Sector on Board. Support to Start ups with Innovative Solutions

The war has given rise to the phenomenon of the private sector getting involved in developing innovations to support the enhancement of Ukraine's military capabilities. The same trend is currently being observed in addressing demining needs. New start-ups are emerging and proposing innovative solutions to the government to address demining needs. These are mostly being coordinated and supported by the **Ukrainian Start Up Fund** (its mil-tech cluster and respective demining section). A more comprehensive initiative 'Brave One' project²² is to be launched officially in May 2023. There also a number of solo innovation initiatives like Safe Fields for Ukraine by FRENDR or **Bees Against Mines**, which are currently being developed.

3. Enhancing Capacities to Produce Demining Equipment in Ukraine

The issue was addressed at recent MOD meeting on April 7, 2023 looking first at the case of UkrOboronProm²³. It was decided that the government will encourage Ukrainian heavy machinery enterprises to construct and produce more demining machines and equipment. This work is to be coordinated by the Ministry of Strategic Industries of Ukraine.

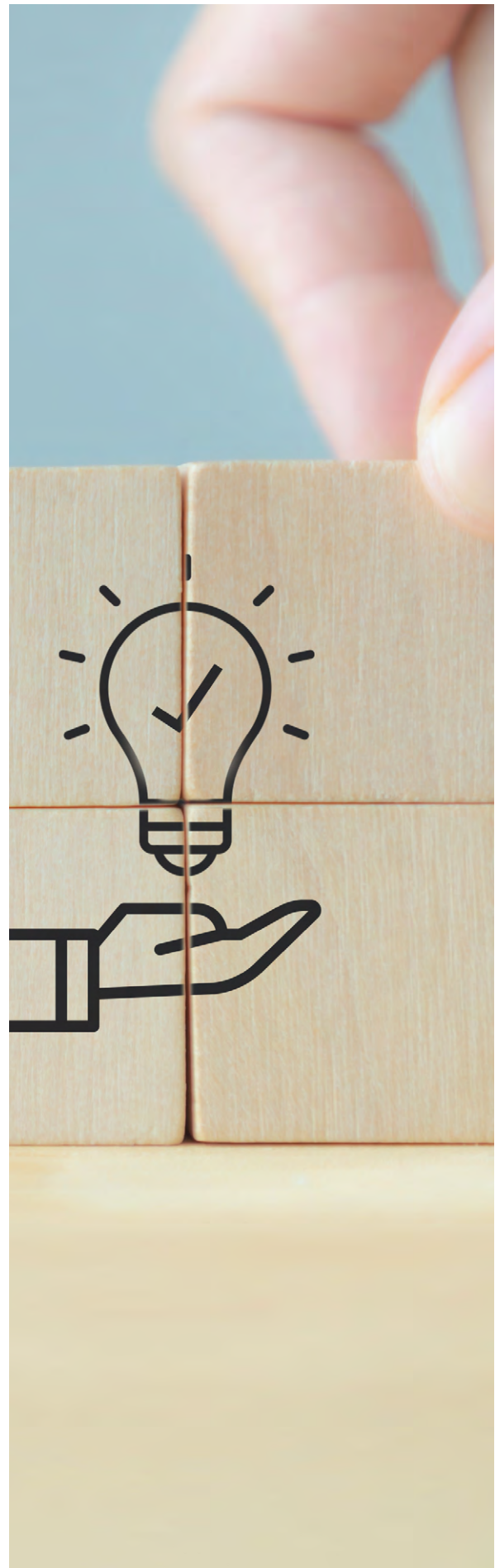
²² Joint initiative of the Ministry of Defence, Ministry of Digital Transformation, Ukrainian Start Up Fund, UkrOboronProm and private sector
²³ One of the UOP enterprises has already been producing demining machines on the basis of T-64A tank.

V. Policy and Actions Recommendations

1. To develop a **comprehensive state policy of humanitarian demining** of Ukraine (short-, mid- and long-term). It should be aligned with immediate needs for combat and operative demining.
2. To develop **annual national plans for demining** with more precise tasks and timelines. These plans should be optimized to foresee an early exclusion of non-contaminated areas and prioritization of areas requiring the most urgent clearance (eg. highly contaminated areas with a high density of civilian population or areas of critical resuming economic activity).
3. To **streamline existing decision-making bodies on demining into a coherent structure** to avoid duplication of functions and unhealthy competition. To make clear divisions of responsibilities between MOD and MI. To define central decision-making body under the Cabinet of Ministers of Ukraine. To consider world best practices of administering demining tasks and to suggest a new model for Ukraine.
4. To **address the issue of under-staffing of deminers by developing comprehensive educational programs and training** of trainers' projects both for governmental agencies and demining training centers, and those of private sector²⁴. To plan for the establishment of a number of centers in different regions in Ukraine in order to increase deminers' staff capacity.
5. To **streamline donor assistance in a comprehensive manner** to ensure transparency and accountability of funds and financial commitments made by partner countries, international organizations and private donors. **To establish a Demining Ramstein format** to enable constant and sustainable coordination with donors on all aspects: financial support, technical equipment, methodological assistance.
6. To **develop legislative proposals aiming at creation of a market for demining** where operators can play under fair rules of competition. To develop policy initiatives to support establishment of new operators.
7. To **align national standards of demining with international ones**; to simplify requirements for national certification to enable new international actors entering the market.
8. To **consider legislative initiatives to enable operators execute the final stage of clearance**, i.e. to destroy explosive objects themselves.
9. To **establish an international testing center for thermite technologies to be used in destruction of the entire range of explosive ordnance** found in Ukraine (over 175 different types to be tested).
10. To consider **joint ventures or other forms of international cooperation in developing manufacturing capacities** of Ukrainian enterprises to produce demining machinery and equipment.

²⁴ A pilot project has already been suggested by Tetra Tech (US) to SESU. The company is ready to open a training center to train around 500 deminers annually with full educational cycle from beginners to EOD-3+ level

- 11. To develop policy encouraging participation of private sector and support to start ups** in innovative solutions for demining. To consider international donor/investor support to such start-ups.
- 12. To develop policy initiatives addressing the problem of ‘dark demining’**, including respective education and risk-awareness programs for population.
- 13. To design a state communication strategy on ‘mine-hygiene’ and mine risk awareness** for the population of Ukraine.
- 14. To consider solutions for enhancing risk-education programs** for Ukrainian population, especially in rural areas. To develop regional programs and to establish a network of regional mine-education centers.



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