

BAKU DIALOGUES

POLICY PERSPECTIVES ON THE SILK ROAD REGION

Vol. 5 | No. 3 | Spring 2022

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The now-liberated areas of Azerbaijan are contaminated by mines and explosive remnants of war (ERW), the clearance thereof being one of Baku's highest post-conflict priorities. Before proceeding any further, we must provide proper definitions of these terms, since they are technical in nature and thus may not be familiar to the general reader.

According to the Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on Their Destruction that was adopted in Oslo in 1997 and

entered into force in 1999 (it is colloquially called the Anti-Personnel Mine Ban Convention, or APMBC), an *anti-personnel mine* “means a mine designed to be exploded by the presence, proximity or contact of a person and that will incapacitate, injure or kill one or more persons.” An *antivehicle or antitank mine* is effectively the same thing, except that it is designed to explode when triggered by a vehicle. Together, they fall under the catchall term *mine*, which the same document defines as a “munition designed to be placed under, on, or near the ground or other surface area and

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to be exploded by the presence, proximity, or contact of a person or a vehicle.” Furthermore, *explosive remnants of war* (ERW) are defined as explosive munitions left behind after a conflict has ended. They include unexploded artillery shells, grenades, mortars, rockets, air-dropped bombs, and cluster munitions. If such weapons fail to detonate as intended for whatever reason, they are called *unexploded ordnance* (UXO); if, on the other hand, they have not been used during an armed conflict and have been left behind by the party that brought them to the battlefield, they are called *abandoned explosive ordnance* (AXO). Lastly, *cluster bombs or*

cluster munitions, which are defined as weapons containing from several to hundreds of explosive submunitions. They are dropped either from the air or fired from the ground and are designed to break open in mid-air, releasing submunitions and saturating an area that can be as wide as several football pitches. Based on past practice, the failure rate of cluster munitions to explode as intended stands at between 10 and 30 percent.

The contamination of Azerbaijan by mines and ERW is primarily a result of a period of armed conflict between Armenia and Azerbaijan that effectually began in February 1988 and ended in November 2020 (secondarily, it is also the result of ammunition abandoned by the Soviet military in 1991). The conflict over Karabakh can be divided into three basic periods: the First Karabakh War, which concluded with a May 1994

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Russia-brokered ceasefire that temporarily left most of Azerbaijan's former Nagorno-Karabakh Autonomous Oblast (NKAO) and seven surrounding districts in the hands of separatist ethnic-Armenian forces; the period of Armenian occupa-

tion that came in its wake; and the Second Karabakh War that lasted 44 days and culminated in the signing of a tripartite statement between Armenia, Azerbaijan, and Russia on 10 November 2022 as well as several follow up documents, including a second tripartite statement made on 11 January 2021.

Aside from establishing a “complete ceasefire and [the] termination of all hostilities in the

area of the Nagorno-Karabakh conflict,” providing for the return of Azerbaijani territory as well as the return of IDPs, and defining the terms of the temporary presence of a Russian peacekeeping force, the strategic thrust of the documents in question is, in the words of the second tripartite statement, the “unblocking of all economic and transport communications in the region.” The inherent logic of the documents in question is that the “unblocking” process is meant to help lay the groundwork for the normalization of inter-state relations between Armenia and Azerbaijan, which would, in turn, result in the establishment of a sustainable peace.

A Carpet of Landmines

Integral to the fulfillment of this vision is the clearing of all minefields and ERW from the liberated areas. Doing so is also an integral part of Azerbaijan’s commitment to achieve the sustainable development goals (SDGs), the chief deliverable of the UN 2030 Agenda for Sustainable Development that was agreed by world leaders in September 2015. At a minimum, the presence of mines and ERW hampers access to and use of resources and infrastructure, which in turn makes it next to im-

possible to achieve the sustainable resettlement of IDPs to Karabakh, which in turn makes it next to impossible to reconstruct and reintegrate the liberated areas into the country’s “green growth” economic plans and activities.

Technical mine action survey processes are still ongoing, and thus it is not yet possible to precisely determine the exact extent of mine and ERW contamination in the former conflict zone, including the former “line of contact,” which varied between 3 and 7 kilometers in depth. Indeed, two years prior to the Second Karabakh War, a report issued by the Azerbaijan National Agency for Mine Action (ANAMA) had estimated that between 350 and 830 square kilometers of occupied land was contaminated by mines. As it turns out, these figures were a significant underestimate.

On the basis of approximations derived from presently reached mine lines, mine incident reports, information provided by the Azerbaijani Armed Forces, and other such sources, ANAMA now asserts that of the 11,784 square kilometers of liberated territory (8,725.50 square kilometers are presently under the full operational control of Azerbaijan while 3,058.50 square kilometers fall

within the Russian peacekeeping zone), 1,605 square kilometers are categorized as highest level contaminated areas and 7,120.50 square kilometers are categorized as medium and low level contaminated areas.

In other words, Karabakh is one of largest mined areas in the world—a “carpet of landmines,” as some have called it. The shocking level of contamination of the now-liberated territories of Azerbaijan is a direct consequence of the actions of Armenian forces during the entirety of their deployment in Karabakh. To be precise, for three decades, Armenian forces massively and deliberately laid mines on Azerbaijani lands: during the First Karabakh War, the occupation period, the Second Karabakh War, and even in the days and weeks between the moment at which the tripartite statement was signed and the end of the period of withdrawal of the Armenian armed forces from various occupied parts of Karabakh in accordance with the timetable indicated by the tripartite statement and subsequently slightly extended, in some cases, by mutual agreement. Mines were

planted in civilian infrastructure, lamp posts, canals, road junctions, rural and urban paths, courtyard entrances, cemeteries, and riverbanks, amongst other locations.

The mine and ERW contamination of the former conflict zone has also had a massive human toll. According to ANAMA’s records, in the period 1992-2021, a total of 3,445 Azerbaijani civilians became mine victims: 639 were killed and 2,806 were injured (of this total, 65 children were killed and 365 were injured; 35 women were killed and 143 were injured; and 539 men were killed and 2,301 were injured).

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The UN and ANAMA

In the immediate aftermath of the Second Karabakh War, the government of Azerbaijani expressed a need for humanitarian mine action (HMA) assistance, fully cognizant that, as leading mine action expert David Hewitson wrote in the Fall 2021 edition of *Baku Dialogues*, this consists of a plethora of integrated activities that “include more than just clearance” but also

“destroying stockpiles of unused mines, advocating for the cessation of manufacture, sale, and use of landmines, providing affected populations with risk education, and helping victims of landmine accidents.” In other words, the term *humanitarian mine action* covers activities aimed to reduce the social, economic, and environmental impact of landmines and UXO, and it is not limited only to de-mining (mine and UXO survey, mapping, marking, and clearance), but also covers other activities like explosive ordnance risk education, victim assistance (including rehabilitation and re-integration), stockpile destruction and advocacy against the use of anti-personnel landmines and cluster munitions. Together, they constitute the “Five Pillars of Mine Action.”

Accordingly, ANAMA requested assistance from the United Nations Development Programme (UNDP)—an arm of the UN with which ANAMA has been in continuous collaboration on mine action for more than two decades. In a response to this request, UNDP lead a UN inter-agency mine action assessment mission that visited Azerbaijan on 10-16 December 2020—around the time that Azerbaijan began large-scale clearance of mines and ERW.

The story begins with the formal establishment of ANAMA in July 1998 by presidential decree as a body under the State Commission for Reconstruction and Rehabilitation. (In mid-January 2021 and then in mid-September, ANAMA was re-structured by two presidential decrees, which, inter alia, upgraded its status to that of a public legal entity with planning, coordination, and standard-setting responsibility for mine clearance and other mine action activities, in accordance with International Mine Action Standards (IMAS) that have been developed by leading experts in the past few decades.)

In April 1999, the Azerbaijani government and UNDP signed their first agreement on financial and technical support for a joint mine action program. Since then, UNDP has played a key and continuous role in the further development of ANAMA and has provided invaluable support to mine action programs in Azerbaijan. As a result, UNDP has gained in-depth knowledge of mine and explosive ordnance disposal in Azerbaijan and has been actively involved in analyzing existing priorities. UNDP has also helped to build up ANAMA’s capacity, which in turn has helped it to establish an internationally-recognized mine action brand that has provided services

in a number of post-conflict zones abroad whilst enabling it to concentrate on its primary task: demining sovereign Azerbaijani territory.

In March 2021, UNDP agreed to scale up its support for mine action in Azerbaijan by the heightened provision of technical expertise, equipment, capacity development, funding, the conduct of a mine action needs assessment, the procurement of personal protective equipment and mine clearing equipment, and the development of heat maps for mine detection. Various other bilateral partners have also lent their support to what UNDP has called Azerbaijan’s “heroic steps to eliminate landmines.”

A Broader Environmental Narrative

But all this is but a part of a broader narrative of the environmental impact of mines and ERW on Azerbaijan as well as to the overall process of sustainable development. The lingering presence of mines and ERW constitutes an ecological, economic, and social

problem. It severely constrains and even prevents access to natural resources, limits the development of the affected area, destroys ecologically fragile environments, depletes biological diversity by destroying flora and fauna, causes direct (and in some cases irreversible) damage

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to soil structure and water quality due to the leakage of highly toxic substances, and increases the vulnerability of soil to erosion caused by wind and water.

It not only covers the surface with non-biodegradable and toxic garbage, but it also means arable land can’t be farmed and pastoral fields can’t be used for grazing, which denies the livelihood rights of potential returnees.

In short, mine action is an integral part of the recovery and, indeed, the sustainable development of Karabakh.

The challenge is all the greater because the Armenian forces did not keep full records of the mines they laid, but also because it is almost impossible to do so for a particularly nefarious category of armaments: cluster bombs or cluster munitions. These too were used during the Second Karabakh

War within both the combat zone and against civilian targets outside it—in cities and towns located dozens of kilometers from what was at the time the front line (e.g., Ganja, Barda, Mingachevir).

Moreover, mines, ERW, and cluster munitions can remain active for up to a century, as the experience of more than 60 countries attests. Decades after an armed conflict comes to its end, these continue killing, injuring, and orphaning children. In many mine-affected countries, children account for one in every five victims of mines, ERW, and cluster munitions. Indeed, an estimated 15,000 to 20,000 people are killed or maimed by such weapons each year.

Mines and ERW accelerate environmental damage through their explosions. These indiscrete weapons commonly contain trinitrotoluene (TNT) and cyclonite or hexogen (RDX). These substances can leach into the surrounding soil and water as their metal or timber casings disintegrate. These substances, and the compounds derived from them as they decompose, are soluble in water, long-lived, carcinogenic, and quite toxic, even in small quantities.

TNT and RDX are lethal to mammals, aquatic microorganisms, and

fish. RDX is particularly toxic to mammals, including human beings. The devastation to the environment and civilian population caused by mines, ERW, and cluster bombs is well documented—and similarly with armaments enhanced with depleted uranium.

Although no publicly-available evidence indicates at present that Armenian forces used uranium-tipped projectiles during the conflict over Karabakh, raising the issue here has merit because it helps to round out the discussion regarding the long-term damage that toxic munitions of various sorts can inflict on civilian populations in post-conflict settings around the world.

Depleted uranium is nuclear waste—a byproduct of the enrichment process where natural uranium from the earth's crust is “enriched” with higher energy uranium isotopes to produce a chemical compound suitable for use in nuclear reactors and nuclear weapons. What remains is “depleted” of about 40 percent of its radioactivity yet retains the same chemical toxicity as natural uranium.

Depleted uranium is also twice as dense as lead, making it particularly effective as an armor-piercing weapon. It is also pyrophoric, meaning that it has a tendency to

ignite spontaneously, or with a target on impact—and its fine particles can spread over a large area and be easily ingested.

Reportedly, exposure to depleted uranium can result in a staggering increase in cancer rates. The bombs detonated have chemical by-products. Chemicals supporting war activities, such as herbicides or chemical weapons, have effects that are seen for generations. In 1991, Iraqi forces had destroyed over 700 oil wells and spilled ten million gallons of crude oil, the largest human facilitated discharge of oil ever, into Kuwait's waterways and deserts. The occupying Iraqi army had also laid an estimated nine million mines in the country. In other words, Saddam Hussein used the environment itself as a weapon of mass destruction. The black smoke from burning wells during First Gulf War got deposited on the high snow peaks of Himalayas and affected the water supply downstream in the Hindu Kush, located thousands of kilometers away.

In Afghanistan, conflict has destroyed one quarter of the country's forests, leading to the conclusion that such damage may constitute the greatest environmental catastrophe that occurred in Afghanistan during the war. In the Balkans, brown bears are regular

victims. In India, landmines have killed barking deer, clouded leopard, snow leopards, and Royal Bengal tigers. In Libya, gazelles have disappeared from sites that were mined during World War II. By 1991, decades of civil war in Angola had left the nation's parks and reserves with only 10 percent of their 1975 wildlife population levels. In Sri Lanka, a six-year civil war has led to the felling of over 5 million trees, a crucial resource for the farmers and villagers of the island. And in Vietnam and other parts of Southeast Asia, the industrial-scale use of “agent orange” by the U.S. continues to be associated with massive health problems in the surviving local population decades after the end of the war.

Ecocide

Mine action and related processes are thus parts of a larger environmental whole. Consider the case of Agstafa, which is located in the northwest corner of Azerbaijan near the border with Georgia. During the Soviet period, the district was home to the largest munitions depot in the South Caucasus and included extensive firing and training ranges. When Azerbaijan regained its independence in 1991, departing Red Army troops destroyed the site. As a result,

thousands upon thousands of pieces of ERW were scattered over an area of around 44 square kilometers—a situation that continues to pose a serious humanitarian, socio-economic, and environmental threat to the local population: there have been around 160 UXO-related accidents, including more than 30 fatalities. Working with various foreign partners and stakeholders, ANAMA has been engaged in a major cleanup action in the area.

The lesson to be drawn from the case of Agstafa is that warfare needs environmental rules to regulate the impact of war on civilians and the surrounding environment. Greater efforts must be made to mitigate environmental damage caused by armed conflicts.

Another potential source of environmental damage is the behavior of occupying forces. The ecocide and environmental terror perpetrated by the Armenian occupation of Karabakh provides a stark reminder of how bad things can get.

Soon after the end of the Second Karabakh War, Azerbaijan’s Ministry of Ecology and Natural Resources

produced a preliminary estimate of the damage caused to Karabakh’s environment and natural resources during the Armenian occupation to be about \$265 billion.

In Karabakh, more than 460 species of wild trees and shrubs were present before the onset of the conflict, 70 of which are endemic species—that is to say, they do not grow naturally anywhere else. According to the Institute of Dendrology of

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the Azerbaijan National Academy of Sciences, 21 of these endemic species, as well as hundreds of other rare and endangered plant species, were destroyed during the occupation. Moreover, rare forest species,

including plane trees, nut trees, oaks, and other valuable tree species were plundered and subjected to felling and cutting for timber. Many of these are now on the verge of disappearance. In total, 60,000 hectares of forests were destroyed in this manner.

At the same time, the Armenian occupation forces illegally exploited Karabakh’s natural resources, including gold and other precious metals.

Lists of companies that illegally operated in Karabakh during the Armenian occupation have been made by foreign organizations like Israel’s Koholet Policy Forum and Azerbaijani state organs, including Azerbaijan’s Foreign Ministry. In very few cases has evidence been found that these companies adhered to any sort of serious environmental protection measures.

Most Contaminated Region

One serious consequence of three decades of the Armenian occupation of Karabakh is that it is quite likely the South Caucasus’ most environmentally contaminated region. The recovery and restoration work will require a whole-of-government approach, which, thankfully, is already being implemented. ANAMA will continue to demonstrate leadership in mine action but will need to keep working closely with all other relevant organs of the state to undo the unfathomable damage done to Karabakh during the brutal Armenian occupation.

Aside from all the other reasons to engage in mine action in Karabakh,

it is worth underscoring that doing so helps to advance Azerbaijan’s commitment to fulfilling the terms of the UN 2030 Agenda for Sustainable Development.

The aforementioned International Mine Action Standards (IMAS), which were initially endorsed by the UN Inter-Agency Coordination Group on Mine Action in 2001, have remained a cornerstone of all mine action field interventions for over twenty years.

One of the most telling IMAS standards is IMAS 07.13, entitled “Environmental Management in Mine Action,” drafted in 2017. There is no more fitting way to conclude this brief essay than to quote the entirety of its opening paragraph:

This standard details the minimum requirements for environmental management of all mine action operations on land and underwater including planning, protection and mitigation measures. These requirements shall be complied with to ensure that the environment is not degraded by mine action work and land is returned in a state that is similar to, or where possible better than, before mine action operations commenced, and that permits its intended use. **BD**