

Uncovering the Depths of UXO Contamination:

A Town-Level Analysis of Three Areas in Syria

February 2024

Alongside armed combat and a dire socioeconomic downturn in Syria, civilians must continue to navigate the hidden threat of unexploded ordnance (UXO). The United Nations Office for the Coordination of Humanitarian Affairs estimates that half of people in Syria are living in areas contaminated with explosive ordnance.¹ The presence of UXO is likely to affect multiple generations of Syrians due to their impact on civilian life, economic activity, and environmental health. In recent years, efforts have been made to clear unexploded munitions, but clearance operations have been limited by access issues and safety concerns. Significant concentrations of UXO remain along present-day front lines, which are largely inaccessible to demining organizations. These efforts could benefit from high-fidelity mapping, creating opportunities for more geographically precise political coordination and cooperation across conflicting parties.

As of February 2023, The Carter Center estimates more than 324,600 pieces of UXO in Syria². The scale of the problem is so large that there is no way any single actor can address it. For comparison, it took 23 years to clear 86,000 UXO from Mozambique.³ It took five years to clear 69 of the 186 square kilometers contaminated by UXO in Iraq.⁴ The pressing need for all parties to address UXO clearance in Syria can serve as an opportunity for cooperation across political divides among local and international actors. A U.N.-backed demining effort in southern Lebanon in 2006 demonstrated that clearance of UXO allowed communities to better implement development projects, revitalize local economies, and unite various conflicting parties to pursue a common goal.⁵ Syria has witnessed some of the worst violence in the 21st century, and the need to reconcile communities is acute.

Using the Carter Center's unique dataset on explosive weapons use in Syria and novel methodology to estimate the density of UXO across the country, there are an estimated

¹ <https://reliefweb.int/report/syrian-arab-republic/humanitarian-update-syrian-arab-republic-issue-18-november-2023>

² It is important to note, though, that it is likely that some incidents have not been recorded, and the count is likely much higher. The Carter Center has documented as many verifiable conflict events as possible, but the restrictive reporting environment and sheer level of violence in Syria make getting an exact count extremely difficult. For more information on the Carter Center methodology, please refer to "[A Call to Action](#)" and [Mapping Unexploded Ordnance in Syria](#).

³ <https://www.mineactionreview.org/assets/downloads/Mozambique-Clearing-the-Mines-2018.pdf>

⁴ https://www.mineactionreview.org/assets/downloads/907_NPA_Clearing_the_Mines_2020_Iraq.pdf

⁵ <https://www.un.org/humansecurity/wp-content/uploads/2017/08/Social-economic-empowerment-of-mine-affected-communities-Removing-threat-of-landmines-and-UXOs-and-promoting-post-demining-rehabilitation-in-South-Lebanon.pdf>

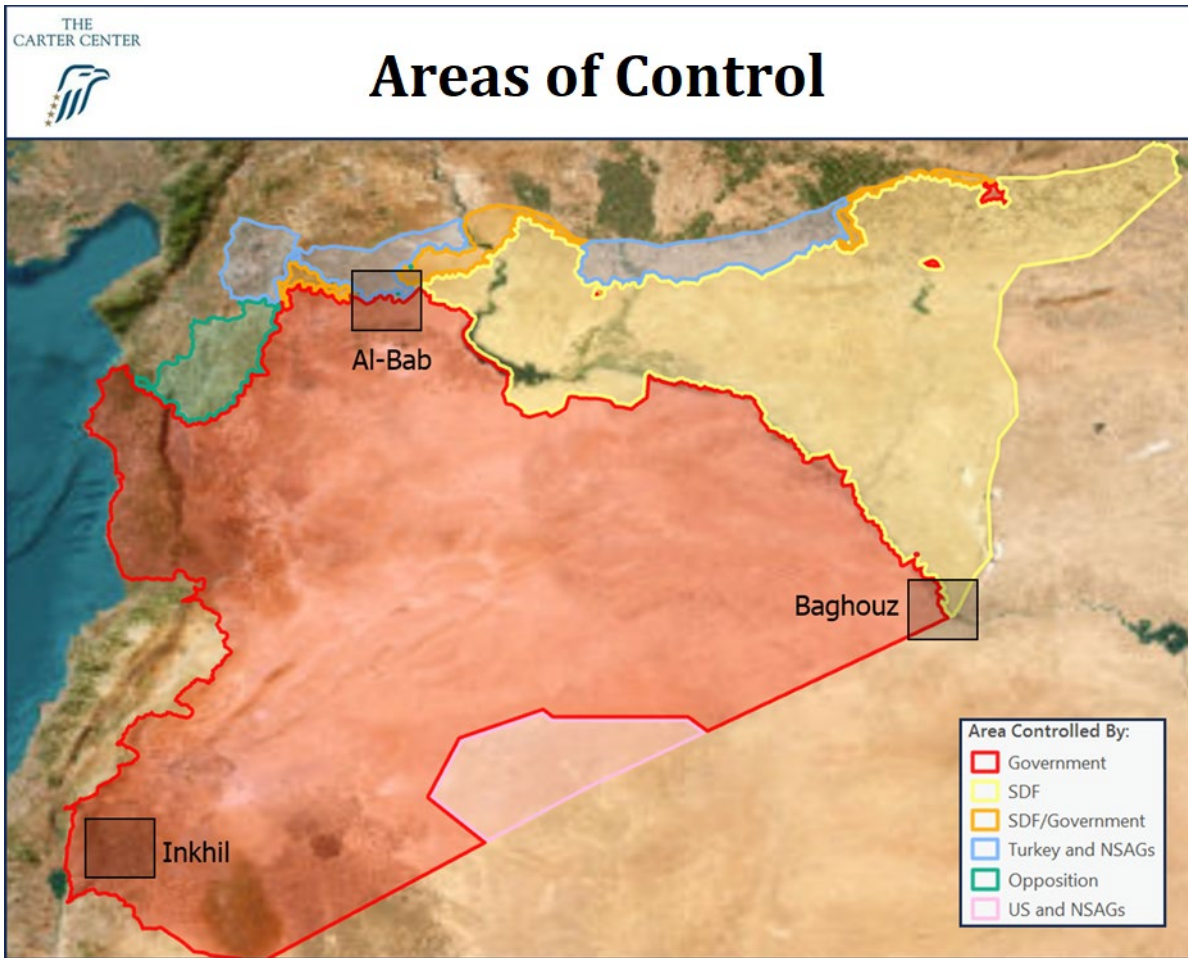


Figure 1: The dominant actors' area of control and influence in Syria as of Feb. 1, 2024. Data from The Carter Center.

4,461 recorded communities impacted by UXO across Syria. This report focuses on three such communities: Al-Bab, Baghouz, and Inkhil. These communities only provide a brief snapshot of the complexity and scale of explosive weapons contamination in Syria. These locations, like others, are now controlled by factions, such as the government of Syria, the Turkish-backed Syrian National Army (SNA), and the Kurdish-led Syrian Democratic Forces (SDF), among others. They once were home to middle-class jobs, business activities, and agricultural production. They are also surrounded by farmland, water, and electrical infrastructure. All these sectors have been heavily disrupted by the conflict and UXO contamination.

To understand the scale of the problem and potential solutions, this report seeks to shed light on the estimated town-level contamination, impact on livelihoods, and the potential for early recovery. As the violence in Syria continues, the already dire state of contamination is compounded, making the need to reach a cease-fire and political solution more crucial than ever.

Al-Bab

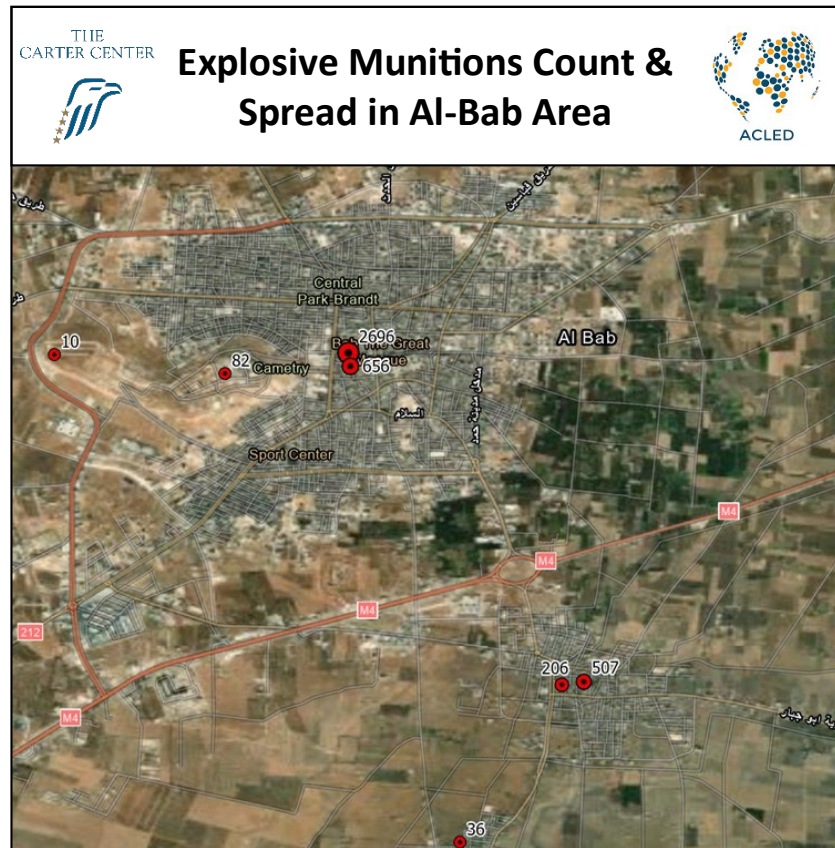


Figure 1: The smallest dot represents the use of 10 explosive munitions at that location, while the largest represents 2,696 uses. Data from ACLED and The Carter Center.

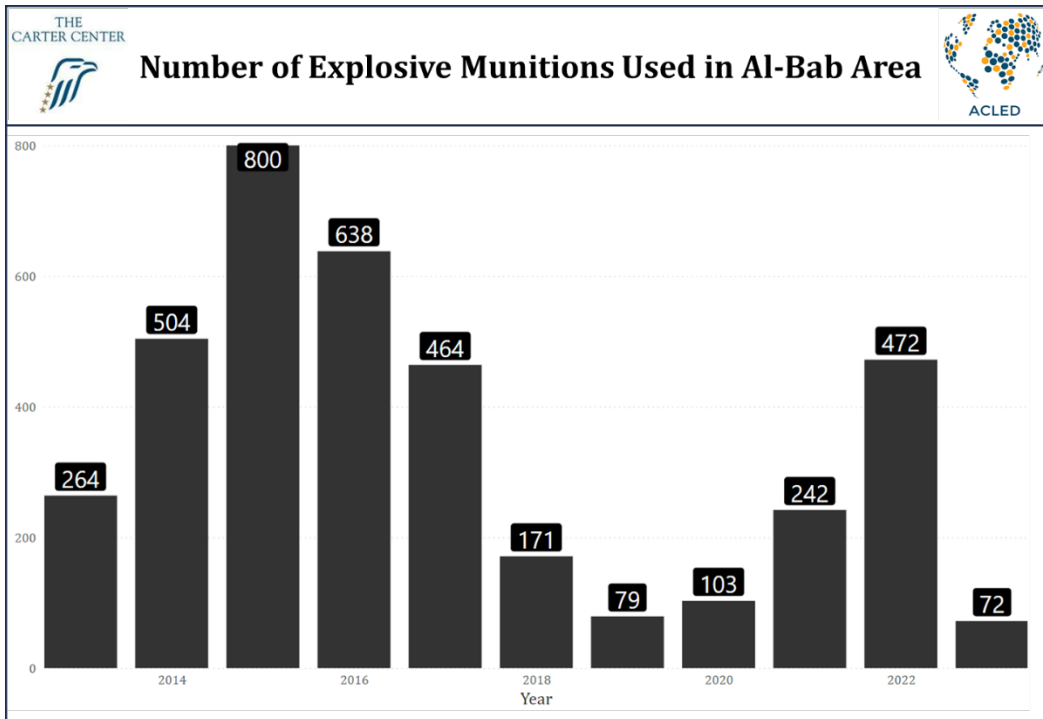


Figure 2: Explosive munitions use in Al-Bab, Aleppo Governorate over time. Data from ACLED and The Carter Center.

Al-Bab is located in the Aleppo Governorate of Syria, with a population of over 400,000 civilians as of 2022.⁶ Since 2017, Al-Bab has been controlled by Turkish armed forces and the SNA. Al-Bab is a significant industrial area and business hub in northwest Syria. It is positioned along the Aleppo-Gaziantep highway and functions as a crossroads for regional and domestic movement of goods and people. Before the conflict, Al-Bab was a thriving commercial center renowned for its bustling markets and economic activities, contributing significantly to the region's trade and business.

Its agricultural sector has suffered since 2017 when the government cut the water supply to Al-Bab. Only two wells supply water to Al-Bab, severely limiting its agricultural sector.⁷ The government cut the water supply in response to Syrian opposition forces gaining control over Al-Bab from Islamic State group (IS) forces who had taken over the city in 2013.⁸ During this time, the volume of munitions used in Al-Bab surged. In 2014 and 2015, there were over 300 conflict events involving air-launched, cluster, ground-launched, and improvised explosive device (IED) munitions, with potentially higher numbers due to reporting inconsistencies.

⁶ <https://www.aa.com.tr/en/middle-east/syrias-al-bab-becomes-safe-haven-for-400-000-civilians/2511678>

⁷ <https://syriadirect.org/years-of-stopgap-solutions-do-little-to-solve-entrenched-water-crisis-in-northern-aleppo-al-bab/>

⁸ <https://syriadirect.org/years-of-stopgap-solutions-do-little-to-solve-entrenched-water-crisis-in-northern-aleppo-al-bab/>

The impact of the conflict has led the Syria Civil Defense (White Helmets) to identify Al-Bab as one of the main areas with a high UXO presence.⁹ Amid the ongoing economic crisis in Syria and limited alternative employment options, successfully removing UXO in Al-Bab would further allow for developing its water resources and electrical infrastructure and ultimately encourage economic recovery.

Baghouz

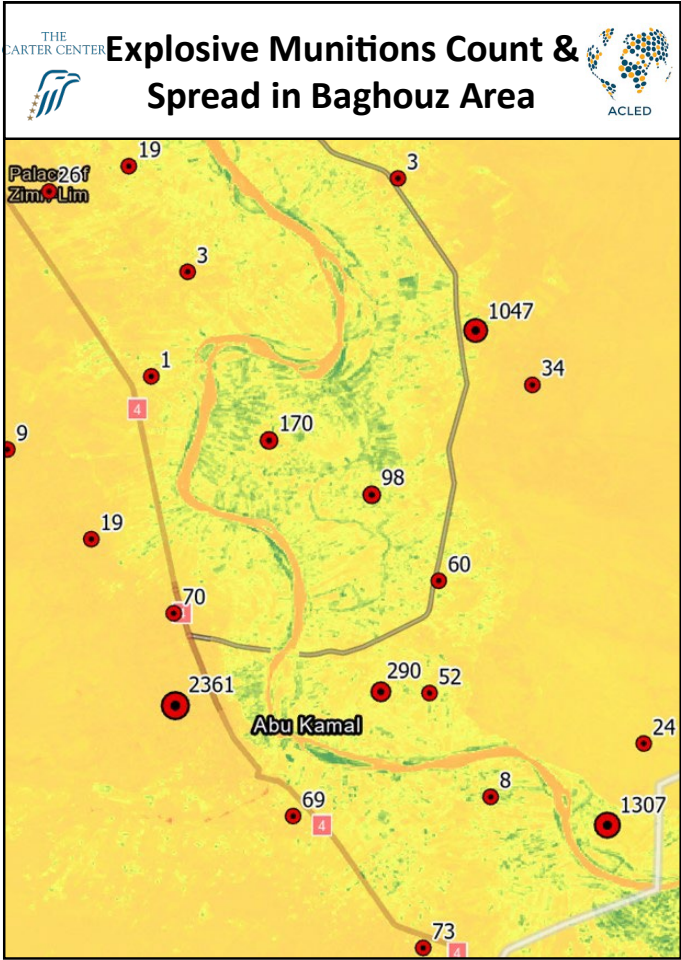


Figure 3: This figure displays the Normalized Difference Vegetation Index (NDVI) on June 9, 2023, in Baghouz and the surrounding region. Darker greens represent a higher vegetation density, which primarily consists of farmland. Each dot represents the number of exploded munitions recorded at that location. Data from ACLED and The Carter Center, and Landsat-8, courtesy of the U.S. Geological Survey.

⁹ <https://www.syriacivildefence.org/en/latest/media-releases/landmines-and-unexploded-ordnance-a-deadly-legacy-for-the-syrians/>

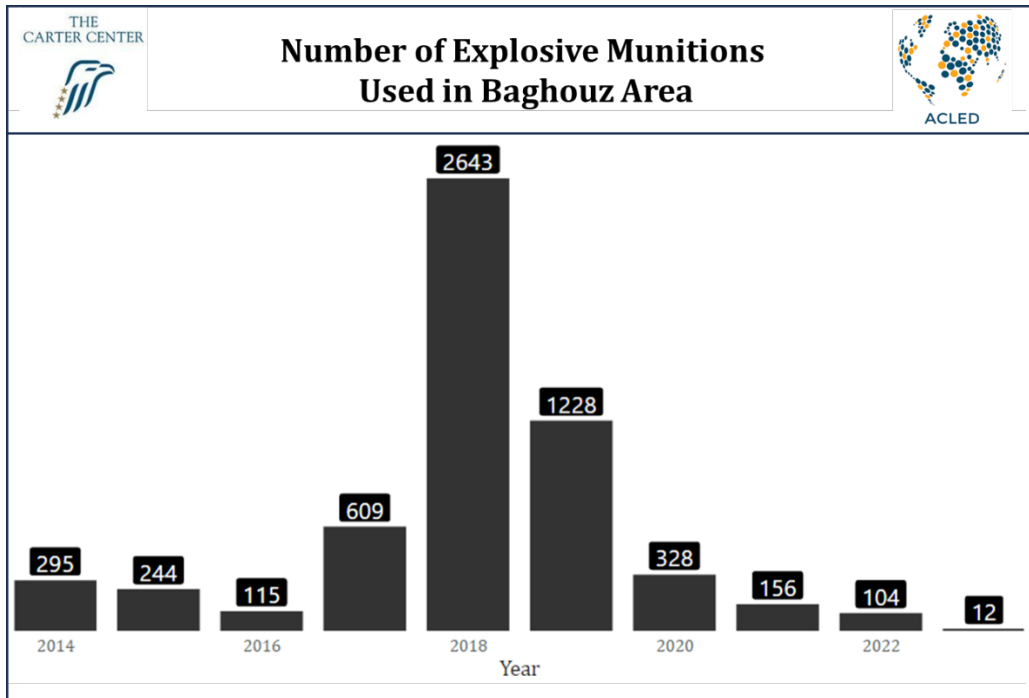


Figure 4: Explosive munitions use in Baghouz, Deir-ez-Zor Governorate over time. Data from ACLED and The Carter Center.

Baghouz is a city under the control of the SDF. It is in Deir-ez-Zor Governorate in northeast Syria and is notable due to its location near the border of Iraq along the Euphrates River. Baghouz served as an IS stronghold until it was seized by the SDF with support from U.S.-led coalition forces in March 2019.¹⁰ Between 2017 and 2019, the fighting between IS, the SDF, and U.S. coalition forces saw hundreds of munitions deployed in the Abu Kamal district, where Baghouz is located. 2018 witnessed a peak with over 2,500 munitions deployed. During the final months of fighting, around 63,000 people, including IS families and internally displaced persons (IDPs), were sent from Baghouz and nearby areas to the Al-Hol camp.¹¹ In the aftermath of IS rule in Baghouz, local residents estimated that nearly 70% of residential homes were contaminated with mines and other IEDs.¹² This large-scale contamination, coupled with the destruction of the city, resulted in a slow return of IDPs, with only half of the pre-war population of Baghouz returning over a year after IS was expelled.¹³

Northeast Syria has been an important center for agriculture in the country, and as shown in Figure 3, the presence of UXO is heavily intertwined with agricultural land. In particular, Baghouz is a prominent area for agriculture. Before the war, 43% of the population in Deir-

¹⁰ <https://www.aljazeera.com/news/2019/3/7/hundreds-of-isil-fighters-surrender-in-syrias-baghouz-sdf>

¹¹ <https://reliefweb.int/report/syrian-arab-republic/syria-humanitarian-response-al-hol-camp-situation-report-no-4-29-may>

¹² <https://english.enabbaladi.net/archives/2021/04/seeds-of-death-mines-claim-lives-in-former-is-stronghold-of-al-baghouz/?so=related>

¹³ <https://english.enabbaladi.net/archives/2020/12/al-baghouz-islamic-states-last-fortress-still-feels-negative-effects-of-islamic-states-destruction/?so=related>

ez-Zor Governorate worked in agriculture, nearly twice the national average.¹⁴ UXO contamination slows the return to agricultural production due to the fear that tillers and other agricultural equipment may set off UXO buried in the soil. The high level of contamination in Baghouz has resulted in local volunteers' attempting to work with the SDF engineering teams to clear the area. However, more aid and collaboration among different parties are needed to scale up operations in a place where so many residents' lives continue to be impacted by UXO.¹⁵

Baghouz's importance as an agricultural hub, combined with the high prevalence of UXO, makes Baghouz an area where demining would be particularly fruitful. By clearing farmland and other infrastructure to support agriculture, Baghouz can situate itself to address issues such as food insecurity, which have riddled Syria.

Inkhil

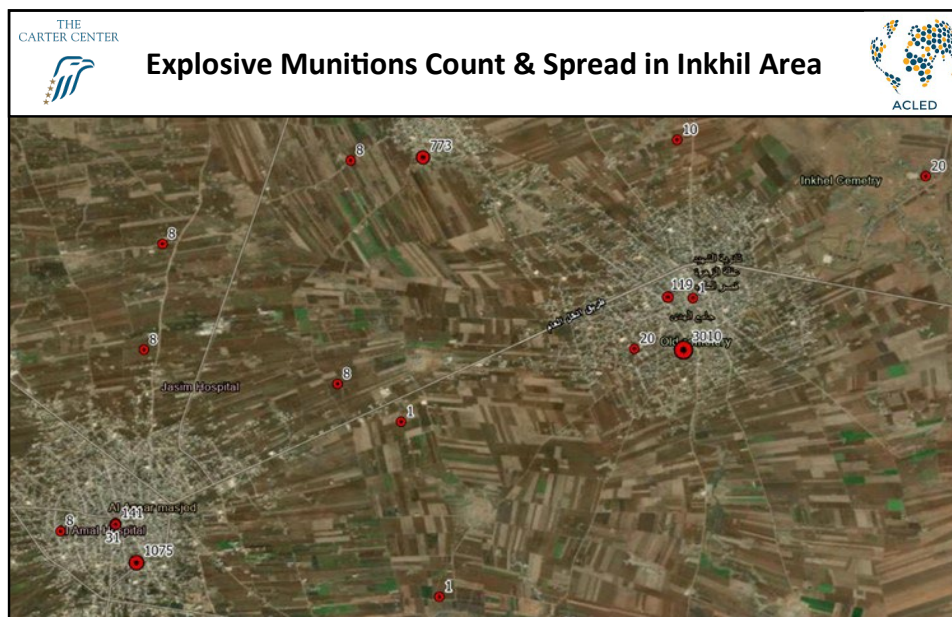


Figure 5: The smallest dot represents the use of one explosive munition at that location, while the largest represents 3,010 uses. Data from ACLED and The Carter Center.

¹⁴ <https://www.washingtoninstitute.org/policy-analysis/water-issues-are-crucial-stability-syrias-euphrates-valley>

¹⁵ <https://npasyria.com/en/73532/>

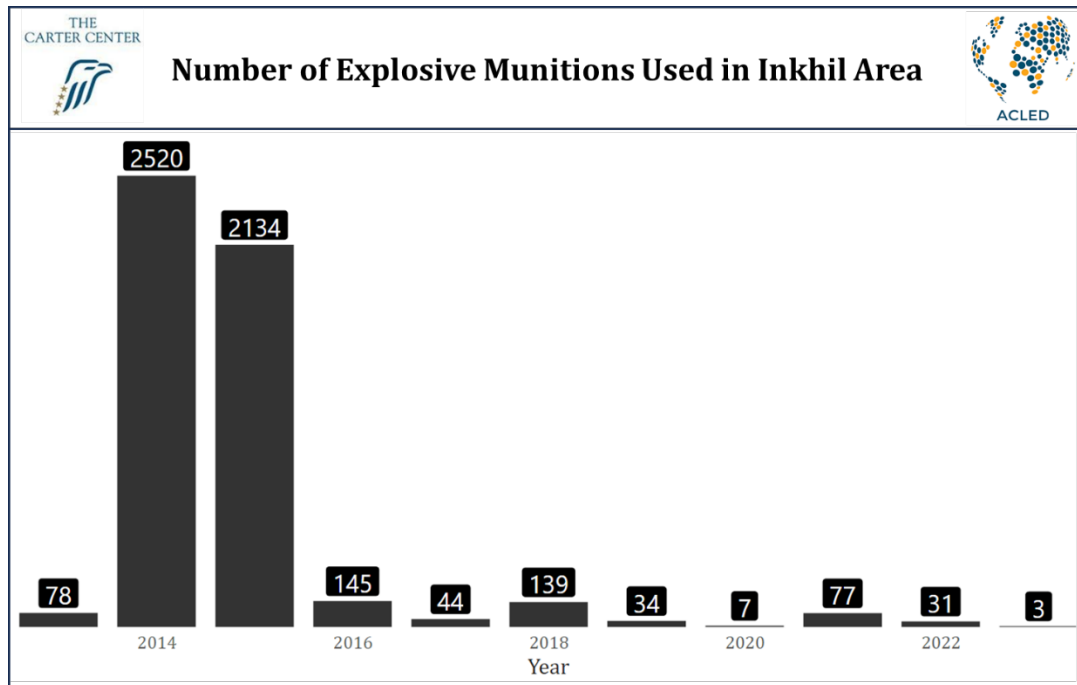


Figure 6: Explosive munitions use in Inkhil, Dara’a Governorate over time. Data from ACLED and The Carter Center.

Inkhil is a town in the southern governorate of Dara’a and is under the control of the government of Syria. It was among the first cities to join the revolutionary protests in 2011.¹⁶ Like other parts of Dara’a Governorate, Inkhil would quickly come under opposition control until August 2018, when the government retook control. Before the government takeover, Inkhil was situated on the front lines between opposition-controlled and government-controlled territories in southern Syria, rendering it a frequent battleground.

Since Ottoman times, Dara’a Governorate has been widely regarded as one of Syria’s most important agricultural regions and a major transit point for trade, facilitated by the Al-Nasib border crossing between Jordan and Syria.¹⁷ While Inkhil and the rest of Dara’a hold significant economic potential for the future of Syria, the lack of political and military stability has hampered its economic potential.

In June 2018, the government and its allies launched Operation Basalt to retake Dara’a and Qunietra governorates. In early July 2018, the government retook Inkhil, with Operation Basalt concluding at the end of the month, resulting in the complete takeover of southern Syria. The government victory was symbolic, as Dara’a Governorate was considered the heartland of the 2011 revolution.

¹⁶ https://www.cnn.com/2012/03/01/world/meast/syria-crisis-beginnings/?hpt=hp_t1

¹⁷ <https://ctc.westpoint.edu/a-profile-of-syrias-strategic-dara-province/>

Before the government's takeover of Inkhil, the primary instances of explosive munitions use involved aerial bombardments and ground-launched explosives. Following the 2018 takeover, IEDs and land mines were the most prominent recorded explosive munitions used in Inkhil. This aligns with the broader conflict dynamic in Dara'a Governorate, where IEDs and land mines have been extensively employed for assassinations. Since the government's takeover of Dara'a Governorate, explosive munitions use has dramatically decreased. However, much like other parts of Dara'a, Inkhil remains unstable. Rivalries between different government-affiliated armed groups, former opposition fighters, and IS remnants have led to frequent clashes and occasional sieges. While most of the violence is concentrated in southern Dara'a, Inkhil is one of the three main cities in northern Dara'a that still frequently experience clashes and occasional explosive munitions use.

While the use of explosives has been much lower since 2018, the presence of UXO continues to endanger civilians. In May 2023, a child was reportedly injured by a remnant of war in Inkhil.¹⁸ And in June 2022, a land mine injured three children.¹⁹ Furthermore, southern Syria is a primary link in Syria's cross-border trade. The M5 highway that runs from the Jordanian capital of Amman all the way to Syria's pre-war economic center, Aleppo City in the northwest, is a major artery surrounded by UXO-contaminated communities. These impacts should be mitigated to safeguard civilians and ultimately encourage economic recovery.

Conclusion

These three cities, controlled by opposing parties, represent only a fraction of the complexity and scale of explosive weapons contamination in Syria. The presence of UXO poses a direct threat to the safety and well-being of civilians, particularly children, and it is likely to affect multiple generations of Syrians.²⁰ These impacts include the loss of life or limb through encounters with live munitions years after conflict ends; disruptions to economic development, especially related to rebuilding in urban areas and agriculture in rural areas; and environmental degradation as munitions break down and contaminate soil and groundwater, both of which are critical elements for Syria's agricultural sector.²¹

In conclusion, both local and international stakeholders share a vital interest in improving the humanitarian conditions within the country. The path to effective demining is complex, necessitating a comprehensive approach that encompasses the importation of necessary equipment, the amalgamation of foreign and local expertise, the execution of UXO mapping missions, the provision of risk education, the facilitation of visa issuance for international participants, and the assurance of safe access to demining sites.

This task, albeit daunting, presents a unique opportunity for cooperation between international and local entities, transcending traditional boundaries to address a problem

¹⁸ <https://www.syriahr.com/en/298482/>

¹⁹ <https://syrianobserver.com/news/75926/mine-explosion-kills-12-civilians-in-daraa.html>

²⁰ https://www.cartercenter.org/resources/pdfs/peace/conflict_resolution/syria-conflict/2022/uxo-rpt5-a-call-for-action-data-on-unexploded-ordnance-in-syria-and-its-implications.pdf

²¹ <https://www.epa.gov/enforcement/environmental-challenge-military-munitions-and-federal-facilities>

that impacts every corner of Syria. Such collaboration promises not only to empower communities socially and economically but also to rejuvenate economies, unify diverse political factions and leaders toward a shared objective, and contribute significantly to recovery efforts.

This is an opportunity for all parties involved to come together and commit to a unified effort to clear Syria of UXO. This collective endeavor is not just a step toward ensuring safety and security but a leap toward rebuilding a resilient and thriving society.