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of Conventional Weapons Destruction

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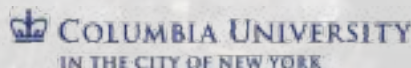
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# THE JOURNAL

of Conventional Weapons Destruction

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### **The Journal of Conventional Weapons Destruction**

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*The Journal of Conventional Weapons Destruction* is a professional trade journal for the humanitarian mine action/conventional weapons destruction community, including but not limited to mine action, physical security and stockpile management, small arms and light weapons, and other related topics. It is a forum for best practices and methodologies, strategic planning, risk education, and survivor assistance.

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**ON THE COVER:** A female deminer working in Colombia.  
*Image courtesy of The HALO Trust.*

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# A message from the director

Our thoughts are with those in Syria and Turkey following the catastrophic earthquakes, and with those in Ukraine who continue to face the devastating impacts of war. We also recognize that many other people continue to live with daily challenges caused by the presence of explosive remnants of war.

Whether we are sending aid or pivoting our work to help civilians affected by both natural and man-made disasters, creating sustainable programs that support peacebuilding and development goals through our humanitarian mine action (HMA) and conventional weapons destruction (CWD) work grows in importance. This triple nexus within our sector, “has matured from the technical parlance of donor agencies’ policy papers to a widely recognized concept among aid workers,” as noted by Markus Schindler (Foundation Suisse de Déminage, FSD) in his article, “Mine Action and the Triple Nexus.”

With this in mind, this issue of *The Journal* focuses on sustainable programming in the HMA/CWD sector, reflecting on programs that integrate development, humanitarian aid, and peacebuilding efforts and, as noted by Josh Ridley (The HALO Trust), present “tangible example(s) of mine action making a direct contribution to stabilization and peacebuilding efforts at local and national levels.”

- Mark Wilkinson, PhD, Albert Schevey, and Ahmed Al Zubaidi, PhD, reflect on DanishChurchAid’s (DCA) integrated programming approach, merging DCA’s peacebuilding efforts, advocacy initiatives, and development and humanitarian work to bridge the gap between practice and policy, and to support sustainability and long-term capacity building across their global operations.
- In “Safer Stockpiles: Developing Regional PSSM Instructor Cadres,” authors David Häfner and Joseph Farha (Bonn International Centre for Conflict Studies) outline the approaches of African regional organizations to develop physical security and stockpile management expert and instructor rosters based on a train-the-trainer program. Minimizing the reliance on outside expertise, these programs create baseline best practices and a cadre of instructors able to design and deliver training across the African continent.
- In his article, “When a Safety Measure Becomes a Risk Accelerant,” Lieutenant Colonel Geir P. Novik (Norwegian Defence Research Establishment) notes that when dealing with explosive remnants of war, the priority must be on safe recovery and disposal while making every effort to contain potentially negative environmental and civilian impacts. Novik concludes that the priority should not be on determining whether to use low- or high-order disposal techniques but rather on determining the safest and most environmentally friendly option on a case-by-case basis given “proper risk-mitigating actions.”
- Josh Ridley discusses HALO’s operations in Yemen in his article, “Mine Action in Support of Yemen’s Peace Process,” reflecting on their operations and peacebuilding efforts to deliver a comprehensive mine action program that has facilitated the re-opening of roads in Ta’iz, a city affected by widespread explosive hazard contamination.
- Salomé Valencia Aguirre, MD, Angela de Santis, PhD, Sandra Salas-Quijano, MA, and Sebastián Tovar Jaramillo from Fondation Suisse de Déminage (FSD) and Liliana Duica, PhD’s (consultant) article reflects on the progress made by the mine action sector in Colombia toward gender equity and diversity, finding progress in policies and data disaggregation, and the need to reflect these advances in both recruitment processes and ground operations.
- Sean Sutton’s (MAG) photo essay “The Road Ahead: Clearance Toward Sustainability in Bosnia and Herzegovina,” tells the stories of civilians living in areas heavily contaminated with explosives following the Yugoslav wars, and MAG’s ground operations to clear land so that it may be returned to productive use.
- REYLANT Global’s Drew Prater uses case studies from Afghanistan and Iraq to relay the importance of the IMAS for standardization of training for explosive ordnance disposal and improvised explosive device disposal operators, whether for civilians, NGOs, or military personnel.
- And we have a unique article from research students and professors at Binghamton University, the University of Pennsylvania, Columbia University, and Villanova University on “Inspiring the Next Generation of Humanitarian Mine Action Researchers.” The authors reflect on how HMA is an under-researched field and emphasize the importance of engaging with students in undergraduate education: “Early engagement, active guidance, and mentorship of such students by mid-career and experienced HMA scholars and practitioners could dramatically reduce the learning curve associated with entry into the HMA sector and allow for fruitful long-term collaboration between academic institutions, private industry, and leading NGOs operating across the different facets of HMA.”

As I reflect on the articles in this issue, I am struck by the expertise and dedication of every individual working in the HMA/CWD sector—from undergraduate researchers to EOD experts to policy advocates—as we all work toward the common goals of making the world safe from explosives while ensuring the local sustainability of our programs for the betterment of civilians living in conflict and post-conflict environments.

Sincerely,

*Suzanne Fiederlein, PhD*



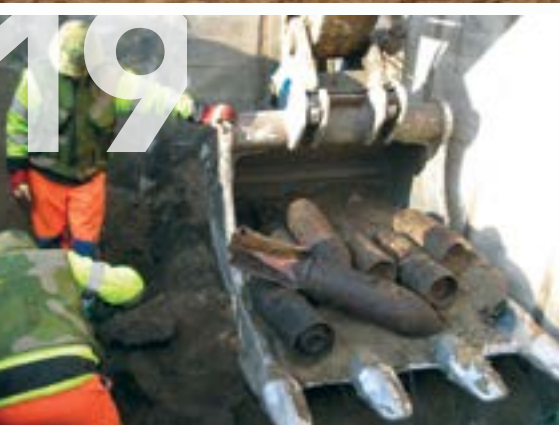
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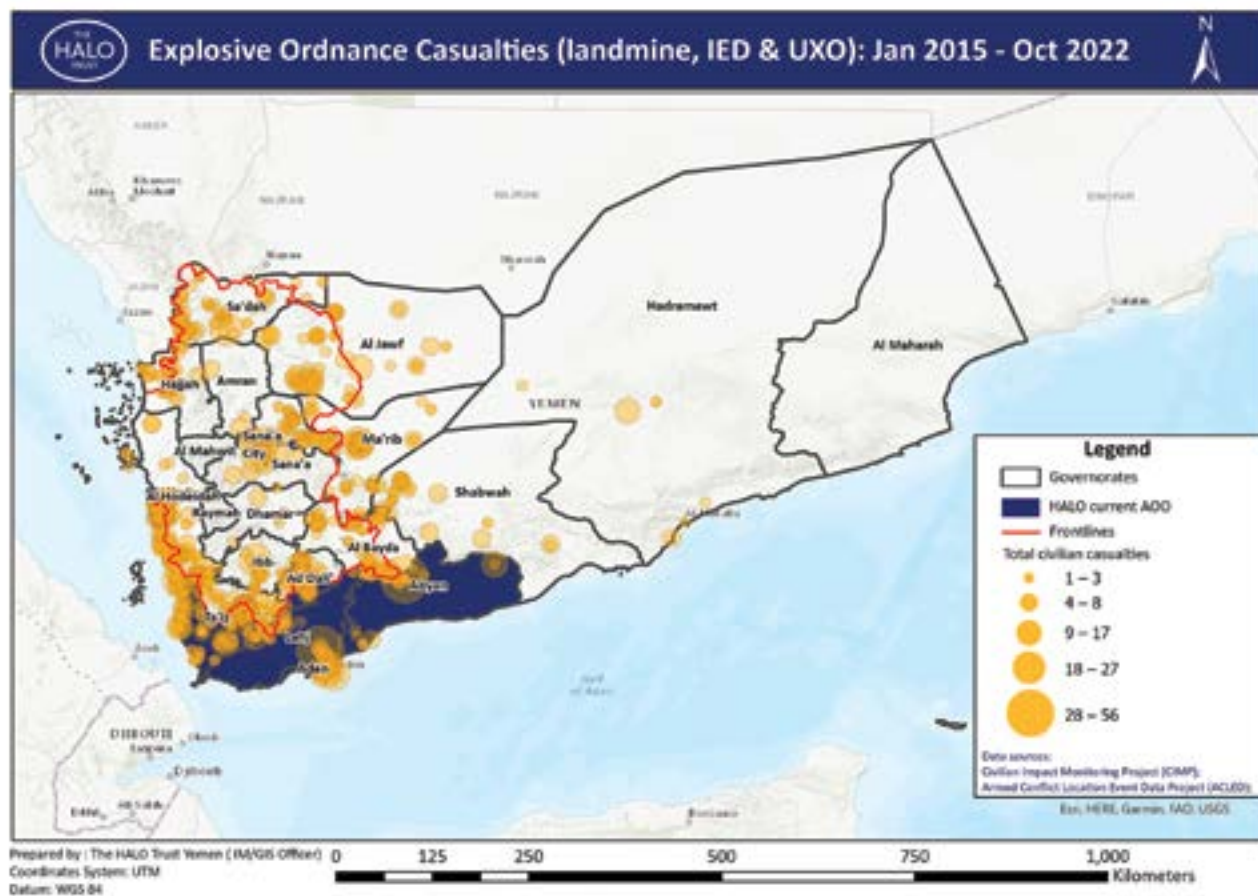
# MINE ACTION IN SUPPORT OF Yemen's Peace Process

By Josh Ridley [ The HALO Trust ]

**B**etween April and October 2022, the two major parties of Yemen's ongoing conflict, the internationally recognized government (IRG) and the de facto authorities (DFA), agreed to a truce brokered by the UN Office of the Special Envoy of the Secretary-General for Yemen (OSESGY). A central component of the UN-brokered truce included the re-opening of roads around Yemen's third largest city, Ta'iz, which all parties agreed to in principle. While an expected extension of the truce did not go beyond October 2, there has not been a significant escalation in violence since the truce expired. The re-opening of roads in Ta'iz is likely to remain a key aspect of any future agreement.

Once known as the cultural capital of Yemen, the war has bestowed a new title on Ta'iz—"the city of snipers".<sup>1</sup> It has been bisected by the frontline for the past six years, resulting in extensive landmine and explosive ordnance (EO) contamination, including the main roads spanning the frontline due to be re-opened under the truce agreement. The HALO Trust (HALO) has been operating in Yemen since 2019, and in support of peacebuilding efforts, from October 1, 2022, HALO began delivery of a comprehensive mine

action response to facilitate the re-opening of roads in Ta'iz. As well as supporting the peace process, the initiative will mitigate an otherwise inevitable spike in EO casualties as increased freedom of movement and normality returns in a heavily contaminated city home to approximately 1,000,000 Yemenis. This article describes a tangible example of mine action making a direct contribution to stabilization and peacebuilding efforts at local and national levels.



**Figure 1.** Geographical locations and extent of civilian EO casualties recorded between January 2018–April 2022. Data source: Civilian Impact Monitoring Project (CIMP) and Armed Conflict Location and Event Data Project (ACLED), which use publicly available open-source data of recorded EO accidents. Map is overlaid with HALO's area of operations (blue) and the IRG/DFA frontline (red). Map courtesy of The HALO Trust.



**A HALO deminer sweeps a Minelab F3 detector on a minefield 4km north of Aden.**

*Image courtesy of The HALO Trust.*



## **Background and Yemen Mine Action Sector Overview**

Yemen is one of the most landmine- and EO-contaminated countries in the world, recording several thousand civilian casualties since the outbreak of the conflict in 2015.<sup>2</sup> In addition to the toll on human life, extensive EO contamination is denying road access and the free movement of goods and people, community access to farmland, the delivery of critical humanitarian aid, and hinders the return of internally displaced persons (IDPs).<sup>3,4</sup> Open-source data analysis highlights that the two governorates recording the highest numbers of civilian EO casualties are Ta'iz and Hodeidah, roughly equivalent to one known casualty per day. Data about EO-related casualties is patchy, so true casualty figures are likely significantly higher than what open-source datasets suggest.

Clearing mines and EO in Yemen is complex. HALO analysis has established a wide range of ordnance including at least thirty-seven different types of anti-personnel/anti-tank mines (including minimum metal mines), widespread cluster munition contamination in DFA territory, and an extensive improvised explosive device (IED) threat including reports of passive infra-red IEDs. As with casualty data, accurate estimates of Yemen's EO contamination are hampered by a lack of survey data. However, the sector has made progress over the past two years with the roll out of a national baseline survey aimed at recording explosive hazards in all affected districts.

The international nongovernmental organization (INGO) mine action sector in Yemen is still relatively young, with most operators establishing programs in the last few years. While Humanity and Inclusion (HI) is the only mine action INGO registered and operational in DFA-controlled territory (in the northwest), those registered in IRG territory (the south and east) include HALO, Danish Refugee Council (DRC), Norwegian People's Aid (NPA), and Humanity and Inclusion (HI). Non-INGO actors include the

Yemen Executive Mine Action Centre (YEMAC), a governmental entity funded by the United Nations Development Programme (UNDP) which has been deploying teams across Yemen for over twenty years, and Project Masam, a Saudi-funded initiative.

Established in 2019, HALO Yemen's operations span four governorates (Aden, Ta'iz, Lahj, Abyan) and include a broad spectrum of activities, including manual mine clearance and battle area clearance, non-technical survey (NTS), explosive ordnance disposal (EOD), and explosive ordnance risk education (EORE). The program also has two mechanical clearance teams, with a third to deploy shortly, which have cleared a large exploded ammunition storage area in the heart of Aden, approximately two hundred meters away from residential areas. HALO teams have to date destroyed over 135 tons of EO in and around Aden through clearance. The program pivoted its mechanical teams from bunker clearance to mine clearance activities in early 2023. The import of dual-purpose equipment, such as metal detectors and EOD equipment, has proven extremely challenging for INGOs in Yemen, delaying the deployment of manual mine clearance and IED disposal capabilities for the INGO sector.

As a national prerequisite, all INGO staff conducting clearance or EOD activities are seconded from YEMAC. This model is unusual for some operators and can create downsides but does provide more opportunity for ongoing training and mentorship of national operators than capacity development programs typically allow. The mine action sector is coordinated by the Yemen Mine Action Coordination Cell (YMACC), which was established in 2020 by UNDP. YMACC oversees prioritization, tasking, coordination, quality assurance, and information management across the mine action sector. Prior to 2020, YEMAC was performing the dual role of operator and coordination body.

# Peacebuilding Through Mine Action – Ta’iz Road Re-opening

This year has seen increased optimism for peace and stabilization after the UN-brokered truce between all warring factions came into effect on April 2, 2022. The initial two-month truce was extended until it expired on October 2, 2022, due to disagreements between the parties involved. The truce brought about a sustained reduction in conflict and casualties which has continued, as well as increased humanitarian access to previously inaccessible areas.<sup>5</sup> The reduction in violence is still broadly the case despite the truce not being extended. However, a key component of the truce, the re-opening of roads in and around the frontline city of Ta’iz, was not fulfilled. During the truce, a committee consisting of senior IRG and DFA representatives met on a regular basis along with OSESGY officials to seek agreement on which roads should be re-opened, as well as other considerations, such as when and how.

A major barrier to Ta’iz roads re-opening is widespread EO contamination on and around the roads, bearing in mind the six years of active conflict in the area. Numerous civilian EO accidents have taken place on the roads, which are now closed and/or scarcely used by the public out of fear for personal safety. While nobody denies the existence of a substantial EO threat, limited-to-no non-technical or technical survey activities had been conducted on or around Ta’iz roads prior to HALO’s project due to proximity to the frontline, making access challenging and hazardous. The reduction

in violence during and since the end of the truce represents a window of opportunity to conduct mine action activities and gain a clearer understanding of contamination along and around Ta’iz roads. Such data is not only of use to the mine action sector but also to OSESGY, IRG, and DFA authorities to inform road re-opening coordination, in addition to benefitting other aid organizations and the wider international community.

While the truce was an undeniably positive development for Yemen, the resulting increased movement of people and the return of IDPs in Ta’iz and other frontline areas led to a significant spike in EO casualties.<sup>6,7</sup> The second quarter of 2022 recorded the highest quarterly landmine and EO casualty count on record at the time, with 195 civilian casualties until the third quarter reported 228 EO casualties.<sup>8</sup> Meanwhile, there are multiple reports of displaced people being forced to return to contaminated neighborhoods and homes in Ta’iz out of economic necessity. Without a comprehensive mine action response, the re-opening of Ta’iz’s roads, which lie in densely contaminated and populated areas, would only exacerbate the increase in civilian EO casualties and undermine the truce. An acute need exists for increased mine action support, not only for road clearance, but also in surrounding areas where high levels of civilian traffic will take place following road re-openings.

**Figure 2.** Location of Ta’iz city and major road locations in relation to the frontline between IRG and DFA forces. Figure courtesy of ACAPS Analysis Hub.



- Governorate border
- Ta'iz city
- Hawban area
- Main route
- Detour
- Open route
- Close route
- De-facto authority (DFA)
- Internationally recognized Government of Yemen (IRG)
- Air Defense\_60th\_50th (closed-proposed by DFA)
- Karsh-Al Shrija-Al Rahada road (currently closed-proposed by DFA)
- Az Zaylai-As Sarmin-Salah road (currently closed-proposed by DFA)

**Summary:**

With the agreement to extend the truce in Yemen, one significant unresolved issue remains the re-opening of access to Ta'iz. As outlined in the ACAPS report *The Key Economic Incentives of Peace*, the reopening of transport routes will likely see a significant improvement of the humanitarian situation. Currently, the DFA have rejected the UN proposal to open all roads to Ta'is, and instead have indicated that only three roads to the city should be permitted. This map shows the roads proposed by the DFA based on limited public available sources and ACAP's discussions with key stakeholders. One road connects the north of Ta'iz city from Bir Basha to DFA-controlled Hawban area through the 50th-60th street and can also lead to Sana'a. The other two roads would connect Ta'iz to Lahj and to the main road towards Aden.





One of Ta'iz's contaminated streets. An IED has detonated on the left of the image, destroying the side of the house. More contamination is suspected on both sides of the road.

*Image courtesy of The HALO Trust.*

## Objectives

Thanks to funding from the Foreign Commonwealth and Development Office administered through Chemonics, HALO has deployed two mixed-gender multi-task teams prioritizing NTS, marking, and EOD activities in addition to EORE. Given the lack of existing data, NTS will be the project's priority focus to enable follow-up clearance activities of confirmed and suspected hazardous areas as a phase two initiative conducted by HALO or other operators in early 2023. HALO has secured additional funding for the project and will likely scale-up capacity in early 2023, including manual and mechanical clearance; however, capacity is still far off the level required to address the extensive contamination.

HALO's Ta'iz road mine action initiative sits at the triple nexus of humanitarian, development, and stabilization efforts. The project's objectives are as follows:

- **Stabilization and Peacebuilding:** To enable the safe re-opening of Ta'iz roads to support parties meeting obligations of the UN-brokered truce. The prospect of restoring safe access to the roads will provide the parties with a common objective and a platform for dialogue between the IRG and DFA. Even if roads are not re-opened in the immediate future, survey, EORE, and EOD activities in previously difficult-to-reach areas will generate tangible positive results from the truce and recent dialogue between IRG and DFA delegations. Positive results from the truce will increase the likelihood of future collaboration and a truce, or a future peace agreement.
- **Survey, assess, and report to all stakeholders the nature of EO contamination near and around Ta'iz roads:** Survey data will enable the planning of clearance and other activities in advance of roads re-opening. Given the lack of previous mine action activities in the target areas, accurate characterisation of contamination will be vital to estimate funding requirements for clearance and inform the selection of roads to be re-opened by the IRG, DFA, and OSESGY. If survey finds no threat of contamination or clearance requirement in some areas, this alone is valuable information and could accelerate momentum for road re-opening efforts.
- **Alleviate human suffering from EO:** Given that existing high casualty rates will otherwise increase following roads re-opening, the project will minimize EO casualties through marking of hazardous areas, EORE delivery, and conducting EOD spot-tasks in heavily contaminated and populated areas. NTS will contribute to casualty reduction through enabling clearance of hazardous areas.
- **Improve civilian access and livelihood opportunities:** The safe re-opening of roads will improve access to affected neighbourhoods, helping to restore a sense of normality and providing a range of social and economic benefits. Increased freedom of movement will boost commercial activity, improving business opportunities and access to healthcare, education, and markets.<sup>9</sup>



A child plays and roams around a grassy area that is a suspected hazardous area.

*Image courtesy of The HALO Trust.*



## Operational Approach

HALO teams have so far deployed to front-line areas in two of the three main districts of Ta'iz city: Al Qahirah and Salah (see Figure 3), targeting roads in Salah first. HALO has categorized roads and neighborhoods into the following order of priority:

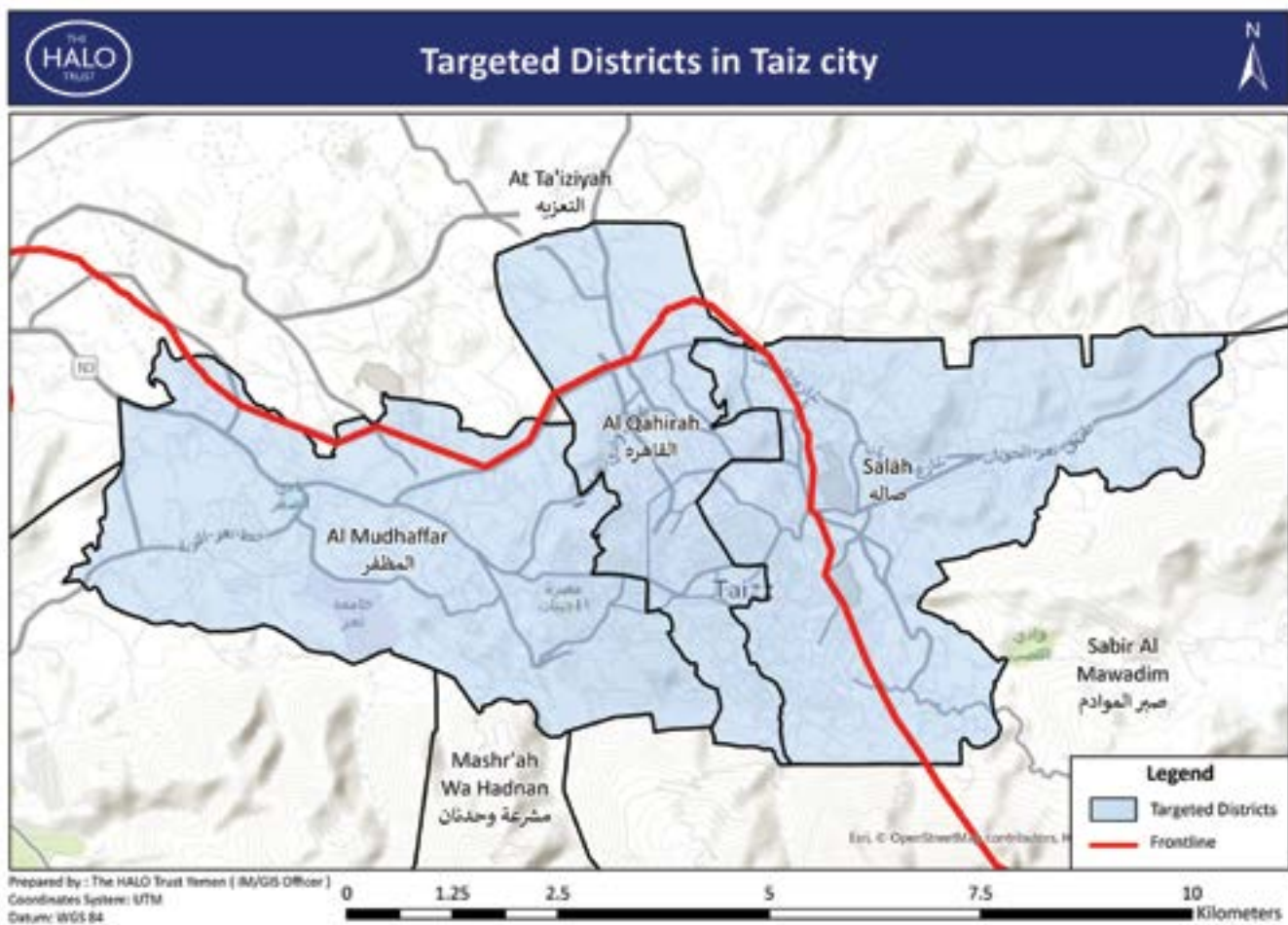
1. Roads provisionally agreed to be re-opened by IRG and/or DFA authorities
2. Other roads previously discussed during committee meetings in Amman
3. Roads of geographical importance that could be re-opened
4. Other roads/surrounding neighborhoods where increased flow of people/traffic is expected following roads re-opening.

Should access to the key roads be temporarily unavailable, teams will deploy to more accessible areas away from the frontline until access is granted. For similar reasons, the project target area is kept deliberately broad, anticipating fluctuating levels of security and access, and the need for flexible deployment in response to a range of possible outcomes of IRG/DFA negotiations.

**Security and Access:** A safe and permissive environment is crucial to the project's success. Complex local and national dynamics make liaison vital to securing access for teams at several locations along the sometimes-volatile frontline. Access for HALO teams to sensitive militarized areas was considered to be the main challenge of the project; however, this has not been an issue to date. Indicative of the project's need, HALO has strong support from influential people and decision makers in Ta'iz, including from the governor's office, district managers, and local military forces. Through this support, HALO has managed to arrange audiences with military commanders on the frontline as key informants for NTS. Additionally, there has been significant high- and local-level engagement on the issue of the mine action response to date. OSESGY has coordinated negotiations with the joint military committee and the road committee, composed of representatives from both IRG and DFA, at talks held in Amman, Jordan.

As a trusted, neutral NGO known by both sides of the conflict, HALO is well situated to access such sensitive areas. Several sources report that NGOs, as neutral humanitarian actors, are best placed to lead on mine action





**Figure 3.** The three main districts of Ta'iz city where HALO's activities will take place close to the frontline. Another key road runs southeast into Sabir Al Mawadin which the project anticipates working on in early 2023. Figure courtesy of The HALO Trust.

conducted as part of peacebuilding efforts.<sup>10</sup> HALO's previous mine action activities in the West Bank serve as a prime example. Additionally, anecdotal information from sources close to DFA military commanders on the Ta'iz frontline indicates DFA forces would not distinguish between YEMAC and the IRG military, given that YEMAC field personnel are military. The proximity of opposed

forces in the urban setting raises unique security risks that require close management, with deployment of civilian personnel of considerably lower risk. As a result, HALO is only deploying civilian staff in these areas to maintain full neutrality and ensure conflict sensitivity.

## Results

Securing access to the roads and surrounding neighborhoods was the project's first priority in October 2022, which has gone smoothly to date. Channels of communication and ways of working with the multitude of stakeholders (including YEMAC, the military, government institutions, and district managers) involved in the project were agreed on. Despite a politically turbulent month (the truce expiring without extension) and with some minor flare-ups on the frontline and within the city, HALO deployed teams (following a thorough risk assessment) in target areas and began NTS and EORE activities. In their first couple of months, teams identified fourteen confirmed or suspected hazardous areas in densely populated areas and completed survey of two major roads which may be re-opened under a truce agreement. Being an urban context, hazardous areas

are smaller than conventional rural minefields, with polygons ranging anywhere from 100m<sup>2</sup> to 10,000m<sup>2</sup>. HALO teams are also clearly marking all identified hazardous areas to communicate the danger posed by contamination to communities and mitigate the risk of accidents, and have to date conducted fifteen spot tasks to dispose of EO.

From the first weeks of operations, the vast need for EOD clearance capacity in Ta'iz is abundantly clear. Teams have encountered several items lying in plain sight and residents are reporting EO on an almost daily basis, often storing items in their homes with children playing in the immediate vicinity. The lack of mine action presence in the densely contaminated city due to the previously active conflict and limited access is noticeable, and HALO will do

A Bobcat excavates a collapsed ammunition bunker in the heart of Aden city which exploded in 2015. Mechanical teams have cleared over 70 tons of EO across three collapsed ammunition bunkers, all of which HALO teams have destroyed.

*Image courtesy of The HALO Trust.*



its utmost to elevate capacity and attract new donor funding to the city. Similarly, HALO will seek to increase EORE capacity and has already started targeting schools in the city, reaching 3,500 beneficiaries by the end of November 2022. The lack of security and access has meant minimal risk education has been conducted in the city, despite being fiercely contested and under siege for almost

seven years. HALO teams are reporting many recent accidents in the city, particularly on grassy verges next to roads, including two sisters who were seriously injured in a mine accident in October 2022. The storage of EO underscores an important role for risk education, both as a tool for raising awareness and for communities reporting EO to teams.

## Timeline and Next Steps

The primary priority of HALO's current Ta'iz road project is NTS of the roads that are likely to be re-opened under any future truce agreement. Teams will also focus on neighborhoods and roads in proximity to the closed roads of interest and prioritize the most heavily contaminated parts of the city. Given the pressing humanitarian needs identified in Ta'iz and the scale of contamination, the program will seek further funding to increase NTS, EOD, and EORE capacity in the city in early 2023.

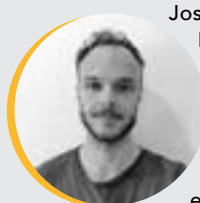
HALO anticipates starting clearance of Ta'iz's hazardous areas in March 2023, following the completion of manual clearance training in the governorate which started in October. From the hazardous areas surveyed to date, deploying mechanical clearance teams in Ta'iz will be critical and the program will be able to draw from HALO's urban mechanical clearance experience in countries such as Afghanistan, Libya, and Iraq.

HALO's work in Ta'iz serves as an example of mine action's multi-faceted contribution to peacebuilding and stabilization. While facilitating road re-opening as part of a truce agreement may be a unique circumstance, facilitating the return of IDPs, reducing high casualty rates, enabling socio-economic development, and supporting a return to normality for local communities are mine action's bread and butter. Clearance of roads in Ta'iz, when re-opened, will enable free movement of people, access to previously inaccessible areas, and improve economic opportunities.<sup>11</sup> Other

domains for mine action to support peacebuilding are through employment and re-integration of ex-combatants, which HALO has conducted successfully in countries such as Afghanistan, and by using mine action as a platform for cooperation and trust building. Mine action is generally an under-utilized tool for stabilization programs. Through improved communication of case studies such as HALO's Ta'iz road activities and improved messaging of the sector's potential, the international community and mine action operators can work together more closely to facilitate peace and stability in fragile contexts. ©

*See endnotes page 66*

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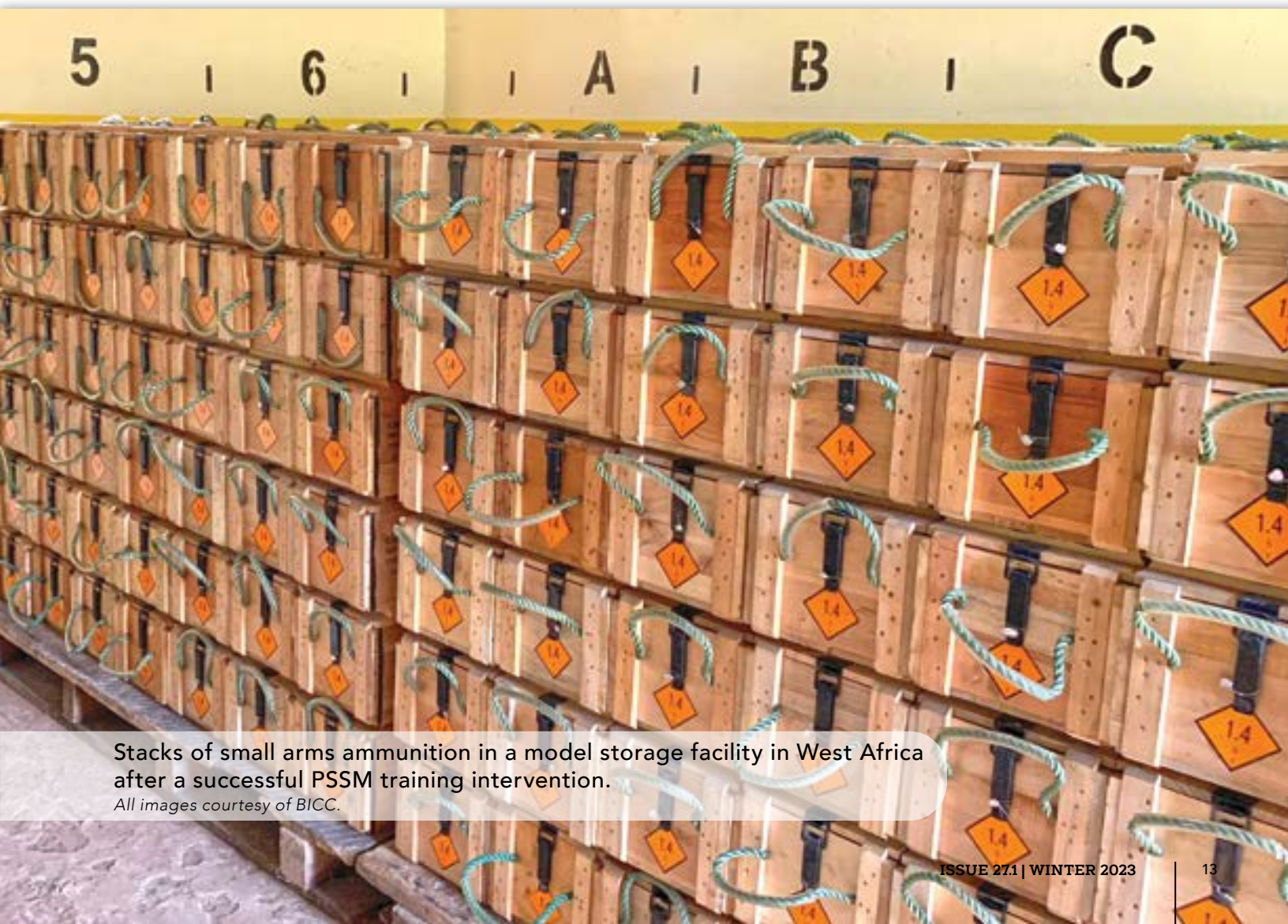
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# SAFER STOCKPILES: Developing Regional PSSM Instructor Cadres

By David Häfner and Joseph Farha [ Bonn International Centre for Conflict Studies ]

**T**his paper outlines the approaches of regional organizations and bodies in Africa, in particular the Regional Centre of Small Arms and Light Weapons in the Great Lakes Region, Horn of Africa (RECSA) and the Economic Community of West African States (ECOWAS) and their partners in developing regional physical security and stockpile management (PSSM) expert and instructor rosters based on a train-the-trainer program developed by the Multinational Small Arms and Ammunition Group (MSAG). This training has been designed to provide a baseline of best practices across participating states based on international standards, as well as a cadre of instructors able to design and deliver training across the African continent in an attempt to reduce the reliance on outside expertise. The information in this paper highlights the process of developing these programs and calls on national governments, as well as regional bodies, both in Africa and globally, to commit to supporting the continued development and deployment of the regional PSSM program and instructor rosters.



Stacks of small arms ammunition in a model storage facility in West Africa after a successful PSSM training intervention.

*All images courtesy of BICC.*



RECSA is an intergovernmental organization established in June 2005. The Secretariat is mandated to build the capacity of Member States, and coordinate and monitor the implementation of the Nairobi Protocol within the RECSA region. The Nairobi Protocol for the Prevention, Control and Reduction of Small Arms and Light Weapons is a legally binding instrument requiring state parties to introduce certain national legislative measures, strengthen their operational capacities, and install measures to control state-owned small arms and light weapons (SALW).

In order to discharge its mandate to address the proliferation of illicit SALW and provide a conducive environment for sustainable development, RECSA undertakes a range of activities with its partners across its fifteen Member States and engages at the international level in various disarmament fora. One pillar of RECSA's approach is to build the national capacities of states in the field of PSSM. In this vein, RECSA negotiated a multi-year regional PSSM training-of-trainers project with the government of Germany that began in 2013 with technical support from MSAG and the Bonn International Centre for Conflict Studies (BICC). This project aims to do two things: The first is to develop national PSSM expertise in member states by establishing a best practice "baseline" of expertise for PSSM instructors. The second is to develop a cadre of instructors and senior instructors who are able to run their own training courses, as well as certify new instructors, thus contributing to the sustainability of the program and further capacity building following MSAG's exit. The course run by RECSA was developed in conjunction with MSAG, who officially handed over the course to RECSA in 2019. It is now entirely administered by RECSA.

In 2018, the insights gained from the design and the implementation of the regional PSSM training process in East Africa were used to negotiate and establish a similar regional training-of-trainers process in West Africa under the auspices of the ECOWAS Commission with funding from the government of Germany, technical expertise from MSAG Member States, and support from BICC. All fifteen ECOWAS Member States contributed to the conceptualization of the West African version of the PSSM training project during a statutory meeting of all National Commissions on Small Arms in the ECOWAS region. These bi-annual meetings are organized by the ECOWAS Commission and serve as a vital coordination platform for the Commission, Member States, and implementing organizations and donors to discuss developments and project activities in the field of small arms control. By including each Member State, this established the regional, as well as national, ownership of the project required to maintain a strong and sustainable interest throughout the training.

The ECOWAS Commission and its Small Arms Division are tasked with coordinating regional small arms control

A regional PSSM course participant taking part in an MSAG exercise on ammunition, UN hazard classification, and compatibility groups.







and are the custodians of the *Convention on Small Arms, Light Weapons and Other Related Materials* (ECOWAS Convention), a legally binding instrument requiring all Member States to enshrine in national law many provisions related to state stockpile security (Article 16) and the import and export of SALW, among others. Article 25 (1b) states the obligation for the ECOWAS Commission to provide Member States with financial and technical support for the

realization of activities to implement the ECOWAS Convention.<sup>1</sup> The Commission has also elaborated a PSSM roadmap document with envisaged action points to improve PSSM measures across the West African region in which the implementation of the regional training-of-trainers and the creation of an ECOWAS pool of PSSM experts are major components.

## Why Do Regional Organizations and Their Member States Continue to See PSSM as a Priority within Broader Weapons and Ammunition Management Processes?

Enhancing PSSM capabilities is one important aspect of building broader Weapons and Ammunition Management (WAM) capacities of different security agencies within individual states across the entire arms and ammunition lifecycle. For instance, RECSA has developed a comprehensive PSSM model focusing on a range of actions that complete a holistic lifecycle management approach. This model includes the following technical components:

- **arms marking**
- **safe storage**
- **digital record keeping**
- **destruction of obsolete arms, ammunition, and unexploded ordnance (UXO)**

Although RECSA is undertaking PSSM training in individual Member States, it also recognized the need for a broader regional approach to strengthen capacities across States rather than viewing

PSSM activities solely in isolation. Although a focus on PSSM alone is not a panacea for all issues relating to the illicit trafficking of SALW or unplanned explosions at munitions sites, enhancing PSSM practices does reduce the potential for diversion of SALW from state stockpiles, a key source of illicit trafficking, as well as enhance the safety of communities and personnel who live and work in the vicinity of stockpile storage facilities. The regional trainings and expert rosters are also increasingly used as important platforms for cross-border exchange and skill-sharing as many security agencies face similar challenges and can share success stories to inspire others. Regional training courses, as in the case of the ECOWAS region, additionally support the streamlining and harmonization of different standards across the region and create equal opportunities for all Member States.

## Structure of the Course



A group of regional PSSM course participants assessing the outside security parameters of an ammunition storage facility during a practical exercise.

Both regional training-of-trainer programs are two-week courses running twice a year, around March and October. Each course is split into two components: The first week involves training new instructors or senior instructors and the second week is dedicated to teaching new students. Candidates are nominated by their respective agencies or governments according to a pre-determined profile as negotiated with MSAG to ensure the right caliber of personnel attends, e.g., individuals with sufficient experience in PSSM, a suitable rank, and who are likely to remain in active duty for a number of years so as to retain expertise and bolster capacity building by sharing the newly acquired knowledge more widely once back in their organizations.

Although mostly attended by participants from military and policing agencies, these trainings are inclusive and generally open to all arms-bearing (and storing) security agencies in a given country. Regional organizations are increasingly attempting to prioritize the nomination of female candidates. This continues to





A regional instructor candidate conducting a module during a regional PSSM training-of-trainers in East Africa.

be challenging in a traditionally male-dominated sector, though PSSM provides a level playing field for female and male instructor candidates to share their experiences. Female PSSM instructors and senior instructors play a powerful dual role in sharing their military expertise with fellow practitioners and in connecting with female community members—often the most affected by the consequences of inadequate PSSM practices, such as armed violence and unintended explosions. The majority of course participants are represented by their countries armed or police forces, but the trainings are also open to immigration services, gendarmerie, wildlife services, and others.

The training curriculum is based on a series of PSSM modules that have been developed by MSAG to accurately align with principles related to effective weapons and ammunition management practices and standard operating procedures outlined in the United Nations Modular Small-arms-control Implementation Compendium (MOSAIC),<sup>2</sup> the International Ammunition Technical Guidelines (IATG),<sup>3</sup> and the UN SaferGuard Programme.<sup>4</sup> This core structure is complemented by the operational and context-specific experience of the candidates and instructors, making for a varied and dynamic teaching environment. In addition to the classroom-based theoretical modules that

include group work sessions and extensive use of visual teaching aids, practical exercises in live ammunition storage facilities are also included. A selection of modules taught during the courses, such as in the current ECOWAS regional training, includes:


- **ammunition basics**
- **net explosive quantity distance calculations**
- **United Nations hazard classification**
- **inventory management**
- **physical security**
- **SALW**
- **fire safety**

After participation in the basic PSSM Competence Building Seminar, the most successful candidates are selected to participate in the next training session, the Instructor Candidate course, followed by a Senior Instructor Candidate course. After successful graduation as a Senior Instructor, participants implement the training-of-trainers approach.

## Opportunities and Risks

The programs are thus far a success. In East Africa, more than 280 PSSM practitioners from eighteen countries have been trained, with certification of six senior instructors. Increasing numbers of RECSA Member States are asking for support in the field of PSSM, evidenced by the requests to RECSA from their Member States, as well as the priorities listed in the regional chapter of the Silencing the Guns program, which list PSSM as one of the areas where support is required. The Silencing the Guns program is an initiative by the African Union aspiring to end all wars, conflict, and gender-based violence, as well as prevent genocide. Similarly, in West Africa, the regional training-of-trainers initiative has so far seen 120 participants from fifteen countries trained in the basic course and sixteen certified as instructors out of which ten have been certified as senior instructors. The ECOWAS regional training will include two sessions in 2023, with the total numbers trained likely increasing to 160 basic course participants and twenty-eight instructors. It should also be noted that national PSSM trainings undertaken in individual Member States, such as those in South Sudan and Liberia in 2021, have been trainings solely conducted by PSSM instructors trained at the respective regional training programs. In the case of South Sudan, PSSM components form part of the benchmarking process (Benchmark 2 Article 21<sup>5</sup>) required to be in place before the arms embargo is lifted. National trainings are also often accompanied by a policy level workshop aimed to sensitize key political and security sector decision makers on the need

to continue to adequately support robust national PSSM standards. The regional trainings are consistently highlighted as inspirational to the establishment of new national-level training programs, some even based on the certified instructors' own initiative. These trainings on the continent of Africa can serve as inspiration for the development of similar initiatives in other parts of the world.

There is a clear risk in relation to funding PSSM activities. To date, a relatively narrow donor base has funded both the regional courses and the individual national-level trainings. Their generosity has allowed the programs to be a success, however, there is a need for a more diversified donor base to ensure the projects sustain themselves into the future. While there are many states in Africa not yet able to resource PSSM training or capacity building effectively, those countries that are able to do so should evaluate whether they would be willing to donate more resources to building capacities in this area. Shared by all, the benefits of good PSSM practices produce safer communities by limiting illicit SALW and ammunition trafficking both nationally and in a cross-border context. States should also make use of the funding options available through mechanisms such as the UN Trust Facility Supporting Cooperation on Arms Regulation (UNSCAR) or the Saving lives Entity (SALIENT), which can provide support in this area and ensure that hard-won gains are secured for the future. 

*See endnotes page 66*

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David Häfner joined BICC in November 2018 as an Advisor for small arms control. An emphasis of this advisory work lies in regional approaches to weapons and ammunition management and physical security and stockpile management. He has worked on a range of small arms management approaches and processes with regional and multilateral bodies in both East and West Africa. David holds a Master of Arts in Violence, Terrorism and Security from the Queen's University of Belfast, Ireland.

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# WHEN A SAFETY MEASURE BECOMES A RISK ACCELERANT:

## Removing the Option to Blast-In-Place When Clearing Explosive Remnants of War

By Lieutenant Colonel Geir P. Novik [ Norwegian Defence Research Establishment ]

**T**he legacy of unexploded ordnance (UXO) and abandoned ammunition following armed conflict will, in many cases, have a severe impact on society and daily life, even for years or decades after hostilities end. These explosive remnants of war (ERW) represent a grave threat in many aspects, and the human, societal, and environmental impact can be severe. These explosive objects must therefore be located and disposed of—a job in itself that involves serious risks. Therefore, various safety measures are implemented to mitigate these risks. Some safety measures, however, could prove to have less than the desired effect, and in the worst cases, could even increase the risk.



Unearthing vast quantities of explosive remnants of war (ERW). More than eighty unexploded German WW2 aircraft bombs were discovered in the center of a Norwegian village.  
*Image courtesy of Geir P. Novik.*

## Introduction

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ERW contamination is a major problem in many countries, especially those that have experienced armed conflict in recent years. Munitions can remain intact and functional for decades, and even centuries, after the end of hostilities, resulting in a great number of countries where they still represent a severe threat.

Clearance of ERW is therefore a prioritized task in many affected countries and is recognized as a vital risk-reduction tool. ERW—UXO and abandoned ammunition—represent serious risks in several aspects, both humanitarian and societal, as well as economic and political. We need only look at the numerous unintentional explosions and accidents involving ERW all over the world each year to recognize how this can affect human life and societal values. Furthermore, there is increasing concern that the leaking and bioaccumulation of toxic constituents from corrosive munitions threaten ecosystems, as several of the chemicals used in ammunition are known to be highly poisonous and carcinogenic and have been proven to contaminate living organisms and the surrounding soil and groundwater. To deal with these risks, the majority of countries that deal with ordnance put in place legislation, regulations, and provide detailed instructions, as well as implement safety measures that regulate what can and must be done in order to mitigate the risk of explosions.

Safety measures can be implemented for a variety of reasons. First and foremost, there is a desire to protect against danger, risk, and injury. We also seek to further develop existing good practices to ensure that our efforts not only do no harm but also, to the greatest extent possible, to consider and reduce any environmental

impacts as a result of our actions. There could also be safety measures that are implemented for legal, economic, or political reasons. Consequently, there are a great number of possible standards that can regulate ERW clearance, as well as several local, self-imposed restrictions. We see, however, that several of the implemented safety measures do not always have the intended effect and can, in fact, have the opposite effect to what was originally intended.<sup>1,2</sup>

One of the ERW-related safety measures that is being discussed and that has already been implemented in several countries is to reduce the environmental hazards related to underwater high-order detonation (i.e., an exothermic reaction wave which follows, and also maintains, a supersonic shock front in an explosive)<sup>3</sup> techniques by effectively banning the procedure. As environmental concern is increasing in society in general, so are the demands for and expectations of environmentally friendly ERW-clearance processes, and rightfully so. However, many contributors to the debate do not differentiate between various disposal techniques when discussing potential environmental consequences, and it seems obvious that there could be unidentified and unintended consequences of eliminating one of the most used ERW-disposal procedures. Moreover, alternative procedures are often presented as quick fixes, not taking into consideration all the potential unintended negative effects these techniques would entail. Undoubtedly, there are various inherent disadvantages and limitations related to all relevant disposal procedures, and in order to make informed decisions, we need to increase our depth of knowledge of what these are and how they can be feasibly mitigated by introducing specific actions.

## Choosing the Right Disposal Technique

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When clearing ERW, the use of high-order detonations remains the primary disposal method, since it is cost-effective, can be used across a diverse range of munitions and does not require sophisticated infrastructure and equipment.<sup>4</sup> It is not particularly resource-demanding in terms of time, cost, and training, and for blow-in-place operations, it normally does not require the use of any specialized tool, equipment apart from basic explosives, or initiators for donor charges. The major disadvantages of employing this methodology, however, are the explosive effects, such as the blast, fragmentation, earth shock, and the generation of flying debris.<sup>5</sup> Underwater, the detonations generate low-frequency shock waves and subsequent pulsations of the bubble sphere at high pressure, which can propagate for long distances.<sup>6</sup> A high level of impulsive noise poses a serious risk of injury or death to marine mammals and other fauna.<sup>7,8,9</sup> As the potential negative effects of high-order detonations are well documented, there is pressure toward discontinuing the use of this methodology in favor of more environmentally friendly techniques.<sup>10</sup> Some countries and international organizations already prohibit the use of high-order detonation as a suitable technique for disposing of ERW,<sup>11,12</sup> as the environmental impact of this technique is considered too severe.

There are some potential alternative techniques to clear ERW without the need for detonation, such as freezing techniques, the use of robotic equipment, water abrasive suspension cutting, the photolytic destruction of explosive substances, etc.<sup>13,14</sup> However, these are all relatively resource-demanding and normally require the object to be moved, either remotely or manually, with the subsequent risk of unintentional detonation.

While high explosives are designed for detonation, they can also deflagrate in the absence of shock initiation, provided that the combustion initiates and proceeds under minimal clearance volume so that rapid and localized pressure rise is avoided.<sup>15</sup> By employing deflagration techniques (i.e., low-order), the explosive materials often decompose at a rate much below the sonic velocity of the material without requiring any input of heat from another source<sup>16</sup> or the introduction of atmospheric oxygen.<sup>17</sup> Low-order techniques (i.e., the incomplete initiation of an explosive or one which has detonated at a velocity well below the maximum stable velocity of detonation for a system, being more nearly combustion than an explosion)<sup>18,19</sup> has the potential to mitigate the acute blast effects by over ninety percent of those associated with conventional high-order procedures,<sup>20</sup> thus reducing the environmental impact





A German SC50 (fifty kg) aircraft bomb following a low-order procedure. Only a small amount of the explosive component was consumed by the deflagration.

*Image courtesy of Geir P. Novik.*

through a lower acoustic output.<sup>21</sup> Low-order can normally be accomplished by applying a sufficient temperature (e.g., with the use of thermites, a laser, etc.) or by detonating a specially designed small explosive charge (not always feasible due to the specific design features of certain types of munitions or the type or composition of their main filling).

In addition to reducing the explosive effect (i.e., blast, fragmentation, pressure, etc.), low-order techniques would potentially also reduce the amount of metallic debris that a high-order detonation of ERW would produce,<sup>22</sup> as well as reduce the disturbance of the sediments and the consequent spreading of harmful substances trapped within the sediments or in their immediate surroundings. As explosive effects are reduced substantially, so is the risk of unintentional sympathetic detonations of undiscovered munitions in the ground or in sediments that could otherwise detonate through detonation transfer. Consequently, this technique would not be suitable for intentional sympathetic detonations. Using low-order techniques, with their significantly reduced probability of high-order detonation-level effects, would also mean that some ERW do not have to be relocated, thereby preventing the potential damage resulting from an unintentional detonation during relocation.<sup>23</sup>

Nonetheless, as low-order techniques are not one hundred percent reliable, all relevant measures (e.g., safety, surveillance, etc.) would still be required in the same ranges expected for high-order detonation. Consequently, if a high-order detonation is not acceptable at a specific location, the ordnance is still required to be relocated, even if a low-order technique is being conducted due to the possibility of a deflagration-to-detonation transfer.<sup>24</sup> This is especially relevant whenever aging and deteriorating ERW are encountered, as positive identification is not always possible and the technical condition of the munitions—e.g., the thickness of the munition casings—could vary from object to object due to individual and local properties, such as metallurgic composition, main filling composition and condition, environmental conditions (e.g., salinity, temperature, current, etc.), and others. Therefore, low-order techniques should be used with caution, as relatively small individual variables could result in not only deflagration but also high-order detonation or no reaction.<sup>25</sup>

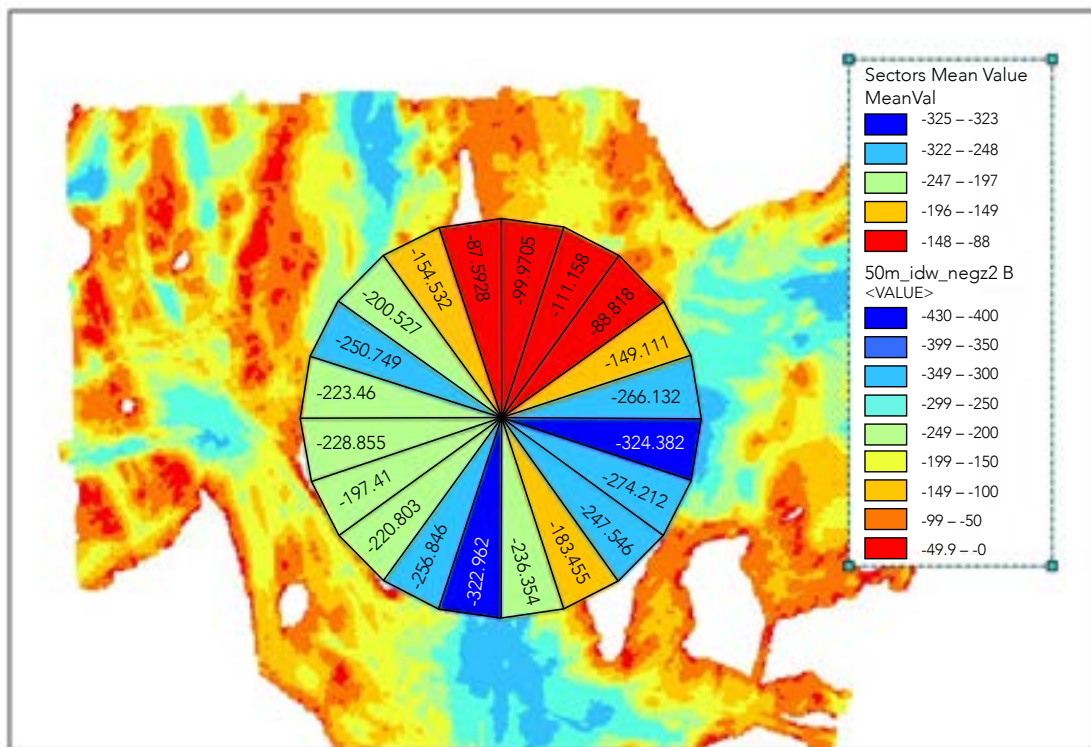
Simultaneous operations on multiple objects in close proximity would also be challenging, as there is a risk of high detonation in some objects and no-reaction results in others, potentially resulting in some objects being moved or covered in sediments and



left undetected. The possibility for the undesired effects involved with low-order techniques entails that one must plan not only for a possible high-order detonation but also for repeated actions on individual objects in case of no reaction. Therefore, it could be expected that using low-order techniques on ERW would be more time-consuming compared to employing high-order detonations. Furthermore, depending on how the technique is employed, it could also require specific training and a high level of personnel specialization,<sup>26</sup> and care has to be taken to ensure that the low-order charges are placed correctly according to the specifics of the individual object design (i.e., the location of vital internal components). As the low-order technique regularly consumes (deflagrates) only parts of the explosive filling in the munitions, sufficient time should be added for the cleanup of unconsumed residual explosives for each object. It must be expected, however, that the majority of particles—which range from micrometers to centimeters in diameter—are unsalvageable and will be deposited in the environment. Therefore, the unconsumed residual explosive constitutes a potentially significant source of explosives for environmental receptors<sup>27</sup> and could pose a great environmental threat.<sup>28</sup> Explosive chemicals, such as RDX, TNT, and its derivatives, are known for their toxicity and carcinogenicity<sup>29</sup> and have been proven to contaminate living organisms, as well as the surrounding soil and groundwater.<sup>30</sup> Dispersed granular particles are easily ingested,<sup>31</sup> and several recent studies have raised concerns about increasing levels of poisonous chemicals used in ammunition being detected in marine life.<sup>32,33,34</sup> Therefore, these chemicals may also enter the

marine food chain and directly affect human health upon the consumption of contaminated seafood.<sup>35</sup> Furthermore, there is a risk that some fuzes, boosters, and/or parts of more sensitive primary explosives could be separated from the munitions, leaving the most sensitive part of the ERW behind. This would increase not only the risk for the operator when removing all debris from the low-order procedure but also the risk of leaving behind potentially deadly explosive objects.

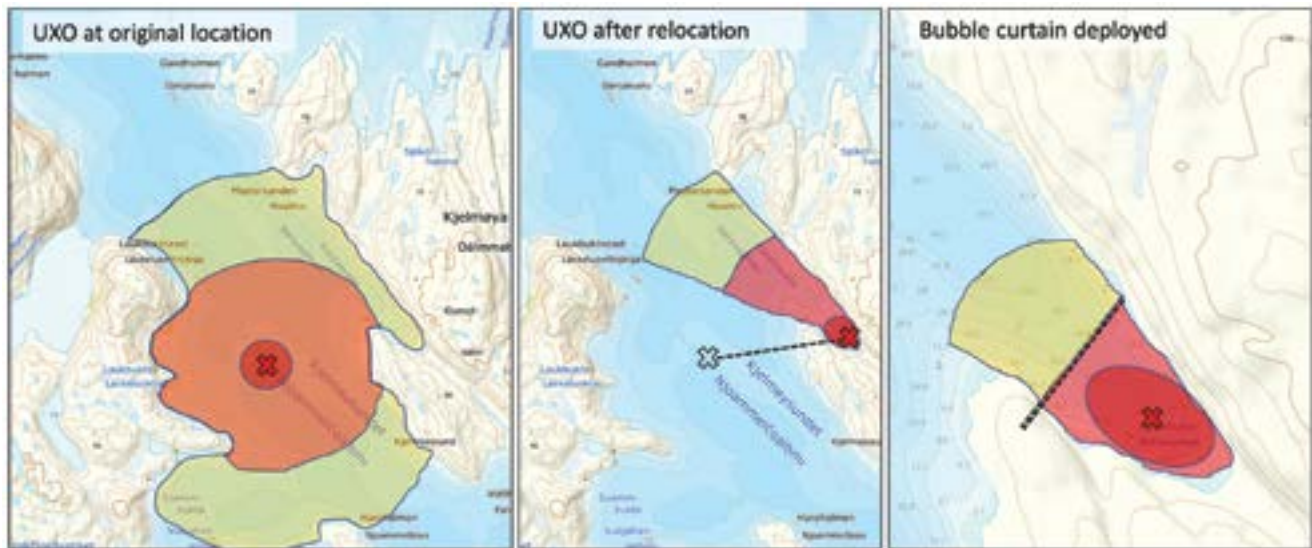
In contrast, a high-order detonation of ordnance will also normally leave some energetic residue in the impact area, but this is generally very little.<sup>36</sup> High-order detonation as a result of live fire operations will consume virtually all energetic material in the ordnance, while high-order detonation as a result of blow-in-place operations using a donor charge is normally expected to consume about 99–99.9 percent of the main charge.<sup>37,38,39</sup> As a rule of thumb, it normally takes 10,000 to 100,000 high-order detonations to deposit the same amount of explosives as one low-order deflagration.<sup>40</sup> This is especially vital, as some ERW are cleared not because they pose an immediate explosive risk but because of the potential environmental threat the dispersal of explosives would represent in case of present or future deterioration of munitions casings. Furthermore, it is imperative to recognize the dissimilarities of the techniques in terms of explosive residue, as many, specifically those who are not part of the EOD profession or experts in the field, do not differentiate between the techniques when discussing potential environmental consequences.<sup>41,42</sup>



**Figure 1.** Example of an interactive decision tool based on shock wave propagation and a geographic information systems program that contains updated information on fisheries activities, environmentally protected areas, aquaculture sites, etc.

Figure courtesy of P.H. Kvadshem (Norwegian Defence Research Establishment).





**Figure 2.** Illustration of how the ERW effect zones (i.e., mortality, injury, and stress/flight) could be reduced by relocation and the use of bubble curtains.

*Image courtesy of Geir P. Novik.*

## Identifying Solutions

First, we should recognize the advantages of using low-order techniques, especially their potential to mitigate many of the negative effects related to high-order detonations, such as the possibility of causing severe injury or death to marine mammals and other fauna. However, we must also acknowledge the most serious limitations and negative effects of the low-order technique: the dispersion of substantial quantities of toxic material into the environment. This risk can be mitigated a great deal by removing all identifiable pieces of unconsumed residual explosives following a low-order operation; still, a substantial part of the explosives will be dispersed in the water and sediments. If the object can be moved without unacceptable risk, it can be relocated to a more suitable location prior to the low-order operation to reduce the time needed to clean up the explosive residues and lighten the burden of locating the explosives. This can be achieved by relocating the object to shallower water and/or to a location where the residues can be more easily observed and collected. When selecting the location, attention should also be paid to the fact that explosives will be dispersed and that some deflagration-to-detonation transfers will probably occur, resulting in high-order detonations. Moreover, we need to acknowledge that the use of low-order techniques will involve a degree of uncertainty, as they are not wholly reliable and that the use of these techniques will require more time and resources spent on each individual object compared to high-order detonations.

Next, we should study how high-order detonations are conducted and how their negative effects can be mitigated. As stated, some low-order operations will most likely result in high-order detonations, although a somewhat reduced effect can be expected, as some of the explosives could already be consumed by the preceding deflagration. Therefore some, if not all, of the safety measures for high-order detonations should also be observed for low-order operations. There are several relevant safety measures

for mitigating the negative effects of high-order detonations. First, if possible, the object could be relocated to a suitable location in which the explosive effects are reduced. Several factors need to be observed, including depth, natural obstructions to reduce shock waves and noise, environmental conditions, infrastructure, safety distances, type of sediment, etc. The utilization of electronic mapping tools that include relevant information (e.g., environmental, infrastructure, etc.) could be helpful in calculating and assessing the potential explosive effects of high-order detonations in various locations. Bubble curtains, which consist of pumping compressed air through hoses laid on the seafloor, have proven to cushion underwater detonations by absorbing much of the energy of the blast and sound wave and effectively reducing the sound pressure and shock wave, thus substantially reducing the danger zone for marine organisms.<sup>43</sup> Bubble curtains and natural physical barriers have been successfully used for many years as efficient tools for noise mitigation in several countries (e.g., Norway, Denmark, and the United States).

Nevertheless, the use of bubble curtains does have some major disadvantages and limitations, such as water depth and prevailing currents.<sup>44</sup> They also require specialized training and sufficient time and resources to set up and run. Additionally, bubble curtains can be quite costly, which could deter a potential user from acquiring them, although increased adaptation of the system would play a key role in driving down costs, demonstrating reliability and fitness-for-purpose, increasing technical capacity, and addressing capability gaps.<sup>45</sup> If there are multiple locations where high-order detonations will occur, the bubble curtains will need to be repositioned between locations. However, if the detonations take place in a favorable location, such as a bay, the entire strait could be covered by a bubble curtain, thus effectively eliminating most of the sound and shock waves resulting from underwater high-order

detonations. So-called soft-start charges, or scare charges, are also regularly used in order to deter marine mammals and other marine life from the area before blast-in-place operations using high-order detonations are commenced in order to reduce the level of noise exposure and risk of injury.<sup>46</sup> However, the soft-start procedure assumes that animals have an avoidance response and will move away from the source, but this has not yet been proven experimentally.<sup>47</sup> Some mammals are known to ignore soft-start devices, and some may also be attracted by the initial weak sound and thus exposed to potential fatal explosive effects as the detonation commences. There is also concern that soft-start procedures may prolong the total duration of operations, possibly increasing the total amount of acoustic energy transmitted into the environment.<sup>48</sup>

In many countries, it is still common practice to use a range of different techniques, including both low-order deflagration and high-order detonation, to clear ERW as safely as possible while ensuring the utmost protection of the personnel, environment, infrastructure, and material. The risk is complex and multifaceted and includes a great number of unknowns that are dependent on several unique factors.<sup>49</sup> The risks involved are made clear by the numerous unintentional explosions and accidents involving ERW all over the world each year.<sup>50</sup> While the number of ERW seems limitless, unfortunately, the same is not the case when it comes to the available resources for clearing the munitions. Arguably, the

most cost-effective disposal technique, high-order detonation, is an important tool in clearing ERW; however, with its inherent negative environmental impact in terms of explosive effects, it is quite clear that using the technique uncritically could do more harm than good. Nevertheless, relevant alternative techniques also have their limitations, such as increased demands in time and cost, increased risk of unintentional detonation, and a potentially devastating environmental impact in terms of the dispersal of toxic chemicals (i.e., low-order).

The obvious solution is to allow for a combination of various techniques. Based on the assessment of the unique locations, objects, environmental condition, available resources, and individual preferences (e.g., training and knowledge), and given the necessary space of possibilities, it would be possible to dispose of every object according to each individual case. Only by allowing for a certain degree of freedom is it possible to assess every object individually and to dispose of it utilizing a safe and practically feasible disposal technique with the least possible negative societal and environmental impacts. Sometimes, the only viable option could be to employ a low-order technique; other times, it could be to do a high-order detonation, even according to the environmental precautionary principle. In any case, great effort should be made to mitigate the inherent risks.

## Conclusion

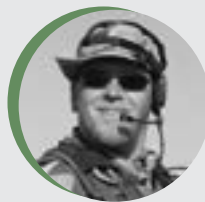
The first priority when dealing with ERW should be their recovery and safe disposal. In doing so, we should also make every effort to minimize the potentially negative societal and environmental impact while also prioritizing resources allocated to mitigating this threat. Only then would we be able to effectively reduce the societal risks related to ERW while also gaining more economic efficiency and a more favorable cost-to-benefit ratio.

While some countries and organizations already prohibit the use of high-order detonation as a suitable technique for disposing of ERW, and others are working toward a permanent ban, we must be cautious not to implement safety measures that could have less than the intended effect, no effect at all, or in the worst case, a negative effect. The priority should not be deciding whether we should use low-order or high-order techniques but assessing what would be the safest and most environmentally friendly option for every unique situation, given proper risk-mitigating actions. We must therefore take caution not to make good the enemy of the best.

A legal obligation not to employ, or even a regulation strongly recommending against, high-order detonation techniques while clearing ERW would effectively eliminate an option that could prove to be the safest, quickest, least resource-demanding and most environmentally friendly, which could ultimately result in an increased societal and environmental risk. ©

*See endnotes page 66*

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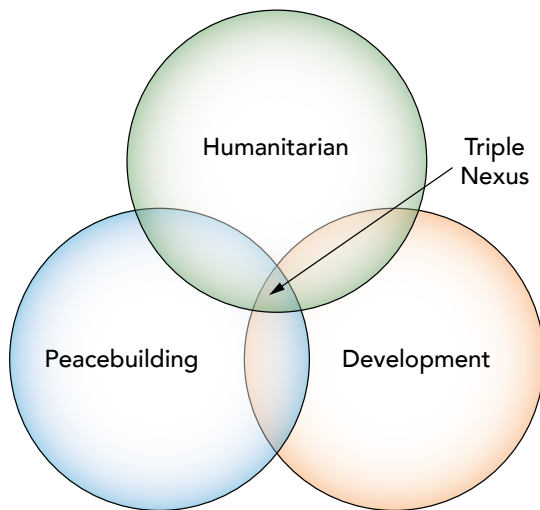
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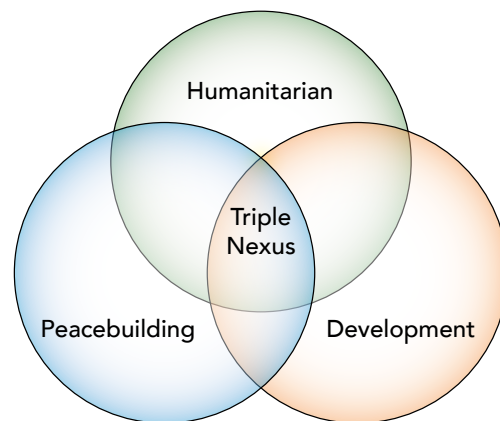
# MINE ACTION AND The Triple Nexus

By Markus Schindler [ Fondation Suisse de Déminage, FSD ]

In less than a decade, the term “triple nexus” has matured from the technical parlance of donor agencies’ policy papers to a widely recognized concept among aid workers. It advocates for closer integration of humanitarian aid, development, and peacebuilding efforts to produce combined effects. The five pillars of humanitarian mine action (HMA) are widely considered to contribute to each of the sectors that make up the triple nexus. However, there are many approaches on how to conceptualize HMA within the humanitarian, development, and peacebuilding nexus. This article explores three approaches and highlights their respective caveats before developing suggestions on how to improve triple nexus sensitive HMA programming.



**Figure 1.** Problem statement: Humanitarian, development, and peace sectors largely separate, limited overlap.



**Figure 2.** Triple Nexus mission: More collaborative, coherent, and complementary humanitarian, development, and peace actions.

## Introduction

Government funders of humanitarian aid brought to prominence the concept of the Humanitarian-Development Nexus during the 2016 World Humanitarian Summit in an attempt to promote greater collaboration between organizations working in short-term humanitarian aid and long-term international development.<sup>1</sup> Later that year, the newly-elected UN Secretary-General António Guterres remarked that “humanitarian response, sustainable development, and sustaining peace are three sides of the same triangle.”<sup>2</sup>

Taking this idea forward, the Organisation for Economic Co-operation and Development (OECD)—an institution comprised of the world’s leading donors—through its Development Assistance Committee (DAC) formalized the new concept as the Humanitarian-Development-Peace Nexus: An approach with the goal to increase coordination and cooperation between humanitarian, development, and peace efforts with the goal to meet peoples’

needs more effectively.<sup>3</sup> Since then, many donors have embraced the “triple nexus” concept, and have, for their part, asked HMA partners to follow suit.

This article explores three approaches in locating mine action within the triple nexus. The first is descriptive: It seeks to explain how mine action in its current form fits into the nexus of humanitarian, development, and peace efforts. The second approach is normative: Donor agencies specifically ask mine action organizations to design programs in ways that not only further humanitarian goals but also contribute to development and peacebuilding. The third approach is to design holistic programs that include expertise from all sectors within the triple nexus, including HMA. Such programs require coordination and collaboration between several organizations specializing in the humanitarian, development, and peacebuilding sectors, respectively, for example through forming a consortium.

## Describing Mine Action within the Triple Nexus

Having committed to supporting and incentivizing activities that further the triple nexus approach, many international donors, scholars, and institutional researchers are interested to learn how the five pillars of mine action are at the “nexus” of humanitarian, development, and peace efforts.<sup>4</sup> Common questions include how HMA and conventional weapons destruction (CWD) programs are contributing to conflict de-escalation, post-conflict development, and peacebuilding in conflict-ravaged environments.

The contributions of HMA (as well as most other types of interventions) can be divided into two types: Contributions resulting from the *product* of HMA, such as released land, and contributions that arise from the *process* of implementing HMA programs.

**Product.** Post-conflict development requires physical space—land on which development activities can take place. However, the risk of contamination with explosive hazards makes land in post-conflict societies inaccessible, resulting in reduced development activities, particularly in the areas most affected by prior conflicts. The release of land through HMA tackles this problem by allowing access to previously unsafe areas, making them available for post-conflict recovery activities. Mine action enables and, thereby, often contributes to economic recovery through land release by providing one of the key conditions for development to occur.

Access to previously inaccessible land makes subsequent improvements possible. Development of released land can result in sustainable landscapes and increased environmental resiliency, for example through the expansion of irrigation systems and the planting of crops and trees in previously barren areas. Aside from positive environmental impacts, sustainable landscapes also provide significant economic, social, and environmental benefits to affected populations.



Previously barren, IED-contaminated land being used for irrigation and agriculture in Northern Iraq one year after clearance by Shareteah Humanitarian Organisation (SHO). Image courtesy of SHO.

A significant result of HMA activities is the potential improvement in physical capital and infrastructure. Aside from rural electrification and enhanced water and sanitation systems, studies show that the clearance of transportation networks and trade hubs in particular improve market access and stimulate economic activity.<sup>5</sup> Access to transportation routes and road construction reduces both travel times and transportation costs, and contributes to the diversification of primary production. Additionally,

improved road infrastructure allows populations in post-conflict areas to participate in market activities, leading to economic empowerment of people affected by explosive hazards.

Economic empowerment of mine-affected populations is

also a result of victim assistance programs that seek to empower its most marginalized and vulnerable members through reintegration into their communities as well as into the local economy.

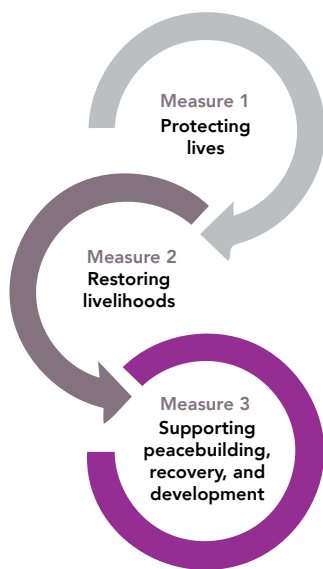
The output of HMA and particularly CWD also translates to improvements of national security: Unexploded ordnance (UXO) and loose stockpiles of mines and other munitions can be captured and used by non-state armed groups (NSAG), either conventionally or to build improvised explosive devices (IEDs). Meanwhile, the proliferation of anti-aircraft weapons, especially shoulder-fired MANPADS<sup>6</sup> can pose a serious threat to civil aviation. Mine action and CWD organizations can bolster a country’s national security by contributing to CWD—the coordinated destruction of surplus and degraded stocks of explosive ordnance (EO) as well as small arms and light weapons (SALW) and their ammunition. This and related activities, such as training in physical security and stockpile management (PSSM), lead to smaller, better-secured stockpiles and reduce the risk of their diversion to NSAGs. Mine action and CWD thereby contribute to the strengthening of national security in post-conflict societies.

**Process.** The process of implementing HMA/CWD programs in itself contributes to a variety of social goods. For example, Fondation Suisse de Déminage (FSD) implements an HMA program in the southern Philippines, which supports the coordination of UXO spot tasks between state security forces and NSAGs. This allows explosive ordnance disposal (EOD) teams of the former to safely access and render safe items found in areas with a strong presence of the latter. This not only results in a reduction of explosive hazards, it also facilitates coordination on tangible issues with immediate positive outcomes and helps to build rapport and trust between mid- and low-ranking members of state security forces and NSAGs—an important aspect of conflict de-escalation that is often overseen by high-level peace talks.

**“The land was not used due to risks of mines and ERW, but after the land was cleared and handed over by FSD it was changed to a garden with apple trees and agriculture land for cultivating onions.”**

*~Nazer Shah, land owner, Badakhshan Province, Afghanistan, October 2019*





**Figure 3.** UNDP’s conceptualization of mine action program contribution, articulated in three measurement and focus areas. *United Nations Development Programme (UNDP): Mine Action for Sustainable Development (New York, NY: June 2016), p. 21.*

centers (NMAA/NMAC). These bodies often receive support from UN agencies and international mine action organizations. Their collaboration and cooperation on immediate issues that produce tangible results contributes to the strengthening and professionalization of national institutions.

These examples notwithstanding, there is a notable scarcity of publications and studies on how mine action currently contributes to triple nexus goals.<sup>7</sup> Of the available works, most emphasize that surveying the contributions of mine action activities on development and peacebuilding are a complex and resource-intensive endeavor, particularly when done on a large, nation-wide scale, as (a) the timeframes and scales for measuring changes in these sectors based on tangible indicators are often beyond the scope of mine action programs; and (b) mine action is being conducted in environments with a myriad of other external factors that contribute towards (or disrupt) triple nexus goals, in most cases far too many to control for in any serious study.

However, reducing the scope from country-level indicators to the local level presents a variety of challenges. Despite the increased assessment of medium- to long-term impacts of HMA activities on beneficiary communities, the United Nations Development Programme (UNDP) notes that “there has been no consistent and rigorous way of measuring the socio-economic impact of mine action.”<sup>8</sup> Obtaining information on the progress of peacebuilding on the local level is even more difficult. For one, the methodology and practices in measuring the impact of peacebuilding programs are often highly contingent on the respective context and generally

As a highly specialized and regulated sector, mine action also contributes to capacity-building and localization: Members of mine-affected communities make up the bulk of all HMA staff, while many countries, as well as institutional donors, encourage the formation of national mine action nongovernmental organizations (NGOs) that can build on the skill set that has been developed over years of HMA work.

Capacity-building also happens on a national scale. While other humanitarian efforts are often primarily coordinated within UN clusters and on local political levels, most countries set mine action priorities and coordinate mine action activities in great detail on a national level through national mine action authorities and/or centers

not as well established as those of other triple nexus sectors.<sup>9</sup> Moreover, most HMA organizations are not well-equipped to measure changes regarding peace and security, leaving HMA actors to resort to community surveys recording local perceptions of peace that only offer a very temporary glimpse of the situation and at times fail to reflect wider trends.<sup>10</sup> On the other hand, regional or local data sets on peace and security are less often available compared to nation-wide data, and the more tangible events in peacebuilding often happen on the national level.

Nevertheless, to some, the contributions listed previously are already examples of how mine action operates in and expands the overlap between the sectors of the triple nexus. However, others seek to explore how mine action needs to adapt its current philosophies and practices to better integrate triple nexus goals.



Example of capacity development as an FSD Technical Advisor conducts training for an operator from Iraqi NGO Shareteah Humanitarian Organisation (SHO). *Image courtesy of FSD.*



Armored excavator from FSD’s mechanical clearance team in Iraq removing rubble so that villagers can return to their land and rebuild their homes and livelihoods. *Image courtesy of FSD.*



**Figure 4.** Direct and indirect links between mine action and the Sustainable Development Goals. *GICHD-UNDP: Mine action and the Sustainable Development Goals, p. 29.*

## Calling for Mine Action within the Triple Nexus

Far more than an academic exercise, in many instances the appeal to locate mine action within the triple nexus is normative in nature: A call by the international donor community to mine action actors to design their programs holistically and to ensure that their activities, traditionally understood as part of the humanitarian sector, tangibly contribute to the achievement of development and peacebuilding goals.

In principle, expanding the scope of mine action organizations and their activities into other sectors of the triple nexus is relatively unproblematic. The vast majority of tasks and routines of humanitarian, development, and peacebuilding NGOs in any given context are virtually the same: administration and HR in accordance with local labor laws; budgeting; accounting; reporting to donors and other stakeholders; procurement and logistics; renting offices; registering vehicles; managing staff; monitoring and evaluating projects; assessing security risks; designing and applying policies; writing grant proposals; reporting to and coordinating within the cluster system or similar setups; etc. Skill sets, expertise, and experience within particular sectors and their sub-branches, though by no means immaterial, can be transferred and acquired with relative ease. Experienced staff can be hired, consultants can be contracted, and employees can be trained. However, there are a number of systemic obstacles that restrain mine action organizations from expanding their programming to a more holistic range—one that would increase the overlap between the triple nexus sectors.

Firstly, the international donor community funds mine action primarily from monies set aside for humanitarian assistance—a pot that is significantly smaller than that for development assistance.<sup>11</sup> If the same government agencies and UN structures that fund mine action would begin to contribute to more holistic approaches that link HMA action with other humanitarian, development, and peacebuilding goals, this would reduce funding available specifically for HMA efforts. Less land would be released, fewer victims would be supported, and risk education sessions would reduce in number. As a result, donor agencies that fund particular activities are often reluctant—or restrained—to spend their limited funds outside of their mandated core areas. At the same time, collaboration between institutional donors' internal agencies is often bureaucratic and time-consuming, making funding for holistic triple nexus-sensitive programming difficult.

Secondly, NGOs and UN agencies often define their mandates in ways that focus primarily on activities rather than end effects. This ultimately restricts them to their original fields of operations, which are typically linked to the previously mentioned compartmentalized pots of donor money.

If positioning HMA within the triple nexus is too challenging a task for mine action organizations to do on their own, one alternative would be to work together with aid organizations from outside the HMA sector.



## Mine Action as a Component of Triple Nexus Cooperation



Socioeconomic impact assessment—trees cut by locals on land that was cleared and handed over by FSD in Afghanistan.

*Image courtesy of FSD.*

In its *Recommendation on the Humanitarian-Development-Peace Nexus*, the OECD’s Development Assistance Committee encourages adherents to “support, incentivise, and implement more collaborative, coherent, and complementary humanitarian, development, and peace actions.”<sup>12</sup> The document emphasizes the need for coordination and cooperation between actors in each of the sectors and joined-up, multi-stakeholder programming within the triple nexus.

Understood in this way, locating HMA within the triple nexus means linking mine action programming with other efforts within the triple nexus, with the aim to generate synergies between humanitarian, development, and peacebuilding programming that are greater than the sum of their separate impacts. While this approach to the triple nexus enjoys prevalence among many representatives from donor nations and UN aid agencies, there are yet a number of caveats that need to be considered. For one, the challenges to obtain funding for holistic, triple nexus-sensitive HMA programming outlined in the previous section affect joined-up triple nexus programming in similar ways. However, there are also other issues that require consideration.

During and post-conflict, the three aspects of the triple nexus do not usually gain prominence at the same time. Mine action experts Ted Paterson and Eric Filippino therefore suggest that mine action can—broadly speaking—be placed “within four main stages of a country’s conflict and subsequent recovery:

1. Conflict
2. Immediate, post-conflict stabilisation (including peacekeeping/peace-building)
3. Reconstruction
4. Traditional development”<sup>13</sup>

While these stages and the required mine action response may at times overlap, their respective prominence and relevance wax and wane over time, making space for subsequent stages. For example, during and in the immediate aftermath of a conflict, mine action responses will primarily focus on humanitarian and internal security needs; however, with increasing stability and security, mine action will transition to contribute primarily to development needs.

Created at a time when peacebuilding was not yet considered part of the nexus, this argument applies to it as much as it does to development. Peacebuilding, too, has a variety of components and stages that become relevant at different times within a given (post-) conflict environment, and that may, respectively, be linked with specifically targeted mine action activities.

While Paterson and Filippino urge mine action planners and managers to “forge earlier and stronger links to a country’s development efforts,” such connections require the buy-in of key actors within the national development planning processes, and will likely not yield many tangible results in the early stages of a mine action program.<sup>14</sup> This means that mine action can indeed contribute to all aspects of the triple nexus; however, the respective extent of each contribution is largely contingent on external factors, such as the stage of a country’s conflict or recovery.

## Lessons Learned and Ways Forward

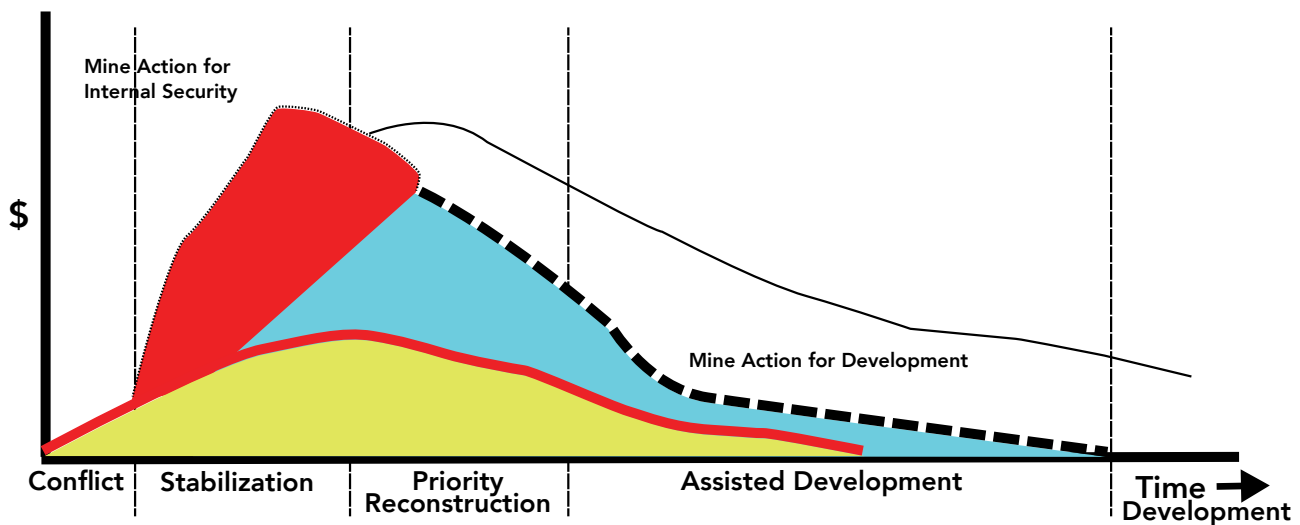


Figure 5. Stages of a mine action program.

Figure courtesy of Ted Paterson and Eric Filippino: *Mine Action and Development*, p. 55.

A brief glance at the agendas of donor conferences of late leaves little doubt that the demand for HMA programming to be sensitive to the humanitarian, development, and peace nexus is only set to increase. Nevertheless, there are still a variety of disparate approaches, a lack of consensus about the meaning of the concept, and above all, a number of structural barriers that need to be resolved before triple nexus-sensitive HMA programming can reach its full potential.

Mine action organizations can address this challenge in many ways. A fast and simple way forward is to design project outcomes and indicators that better document HMA contributions to sustainable development and peacebuilding. More than words are needed, however, to achieve actual progress toward this goal. What is truly required is the strengthening of linkages with other humanitarian organizations and improved coordination between mine action NGOs and actors in development and peacebuilding.

Moreover, HMA organizations need to learn to become more flexible and results-focused in their overall mission and their programming on the ground.

Such changes are only possible if they receive the strong support of donors, not only in encouraging words but, above all, in delivering better, more flexible, long-term financing. This is far from a new insight. The OECD has early on called on its adherents to “use predictable, flexible, multi-year financing” and to identify “financing mechanisms that bring together humanitarian, development and peace stakeholders.”<sup>15</sup> Governmental and institutional donor agencies need to do more to develop funding mechanisms that bridge departmental trenches and that are compatible with the triple nexus’ multi-year and multi-stakeholder approach. Only then can holistic programming and nexus-focused approaches be rolled out to full effect. Mine action organizations are ready to play their part. ©

See endnotes page 68

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Project Manager  
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Markus Schindler is currently a Project Manager for Fondation Suisse de Déminage (FSD) in Iraq, where he is leading a capacity development project that aims to build the professional competence of a local mine action NGO. His experience spans eight years working with FSD in various roles spread across multiple countries, including Afghanistan, Tajikistan, and the Philippines. Schindler holds a Master’s Degree in Strategic Studies from University College Cork, a Master’s Degree in Social Science and Ethics from Ruhr University Bochum, and a Bachelor’s Degree in Philosophy from the University of Regensburg.



# INSPIRING THE NEXT GENERATION OF Humanitarian Mine Action Researchers

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Alex Nikulin, PhD,<sup>i</sup> Garrett M. Clayton, PhD,<sup>iv</sup> and Timothy S. de Smet, PhD<sup>i</sup>

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Setting up a ground control point for unmanned aerial vehicle (UAV)-based controlled experiments at Oklahoma State University's Center for Fire and Explosives (CENFEX). Note inert PFM-1 in the background.

*Image courtesy of Jasper Baur.*

**H**umanitarian mine action (HMA) is a critically under-researched field when compared to other hazards fields of similar societal impact. A potential solution to this problem is early exposure to and engagement in the HMA field in undergraduate education. Early undergraduate education emphasizing technical and social aspects of HMA can help protect lives by building a robust pipeline of passionate researchers who will find new solutions to the global explosive ordnance (EO) crisis. Early engagement of the next generation of HMA researchers and policy makers can occur through various classroom experiences, undergraduate research projects, and public outreach events. These include but are not limited to course-based undergraduate research experiences (CUREs); presenting research results at local, national, and international conferences; dissemination in edited and peer-reviewed publications; local community events; and through social media outreach. Early engagement, active guidance, and mentorship of such students by mid-career and experienced HMA scholars and practitioners could dramatically reduce the learning curve associated with entry into the HMA sector and allow for more fruitful long-term collaboration between academic institutions, private industry, and leading nongovernmental organizations (NGOs) operating across different facets of HMA.

## Introduction

Young scientists tend to share a singular goal: to make the world a better place. Guiding this passion from initial inspiration to meaningful contribution is an important task of the broader HMA community. In this paper we discuss how different levels of engagement are an effective tool to inspire the next generation of HMA researchers at the university level. We propose that thoughtful and consistent implementation of HMA-inspired technical and non-technical curriculum and practical research elements could drive awareness of the challenges faced by practitioners and allow university students to both contribute to meaningful research projects and avoid some of the pitfalls associated with transitioning

theory into practice. We brought together several academic perspectives that span the range from early undergraduate students just entering the field to career researchers active in HMA research and development. We present these perspectives to both reveal the inspiration and passion driving students to enter the field of applied HMA research and highlight some of the practical and institutional knowledge gaps that students and their academic advisors may not be aware of. The intention of this paper is to start an active dialogue in the community as to what practices might help engage the next generation of HMA researchers.

## The Student Perspective

As first-year researchers, several student authors were introduced to HMA efforts early in their undergraduate studies. Prior academic experiences at the university level did not expose us to the extent of the EO crisis in post-conflict nations until we began working with the researchers of the Geophysics & Remote Sensing Laboratory (GRSL) at Binghamton University (BU) and the Center for Nonlinear Dynamic & Control at Villanova University. It was through this involvement that we learned about the importance of EO detection and the novel research that was being conducted in these labs. The strategic introduction of HMA by professors and research advisors who strongly advocated for and informed students about unique challenges in demining also played a vital role in getting us involved. HMA is an extremely interdisciplinary field, meaning students from all

disciplines, such as engineering, physical sciences, humanities, and more can be inspired to work in HMA.

We believe an impactful way to accelerate progress in the HMA sector is to involve those from all disciplines to collaborate and communicate ideas. A CURE, such as the First-year Research Immersion (FRI) program at BU, is a fast-growing pedagogical approach that emphasizes active student learning. In the FRI program, students address high-impact, realistic “sticky wicked” problems from their first day of class. The FRI program seeks to cultivate the hard and soft skills necessary for the twenty-first century knowledge economy by introducing incoming undergraduate students to complex research problems. Specifically, our HMA-directed research provides students with the opportunity to learn invaluable skills, such as collaboration and working in a team setting. Through this program students also gain quantitative, communication (both written and oral), leadership, and critical and analytical thinking skills. Many students emerge from this program with a new-found passion for HMA research on EO detection and elimination.

Fieldwork campaigns have been crucial to the success of student led HMA research projects at both BU and Villanova University and present a particularly engaging and exciting opportunity for students. HMA is an active applied discipline and should be taught as it is practiced. By actively engaging students, we create a life-long learning experience where the students learn to appreciate the gravity of HMA research in their daily lives. Conducting fieldwork with students, whether it be in Cambodia or local experimental test trials, introduces them to the exciting, inspiring, and rewarding aspect of HMA while also being labor intensive and challenging. Showing the challenging nature of the field is another method of our outreach that enables students to appreciate the demining process in its entirety. Introducing students to the fieldwork we conduct is a fantastic way to gauge their interest on the subject and recruit them into HMA research. Being in the affected areas, seeing EO in person, and collaborating with those directly impacted by this problem is a very rewarding and inspirational experience that can motivate students to become a part of the solution.

EOD near Kampong Chhnang, Cambodia,  
July 20, 2022.

*Photo courtesy of Timothy S. de Smet*





## Making HMA Research Commonplace

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Disseminating the results of HMA research efforts with the scientific community is imperative for an open discussion on the merits of this evolving field.<sup>1</sup> These efforts include presentations and publications geared toward the scientific community. Our research groups frequently present at major conferences like the American and European Geophysical Union (AGU<sup>2,3</sup> and EGU respectively) meetings and the Geneva International Centre for Humanitarian Demining (GICHD) Mine Action Technology Workshops.<sup>4</sup> Publishing in open access journals like *The Journal of Conventional Weapons Destruction* and *Remote Sensing* allows the scientific community, the HMA sector, and the public at large to evaluate the veracity of our research results.<sup>5,6,7,8,9</sup> Making data from our research (such as imagery of mine fields) available on open-source repositories and websites such as the Open Repository at BU (ORB)<sup>10</sup> and GitHub<sup>11</sup> improves the accessibility for other groups to begin similar HMA research projects and build off of existing work. The utilization of these platforms allows for our research to be available to potentially have a much broader impact. Presently, we are exploring the use of social media (which has shown success in increasing landmine awareness among children) to attract younger audiences to HMA research.<sup>12</sup>

## Growing Social Media Awareness

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Sharing the importance of HMA with the public via social media is key to growing the demining community. Social media is a viable medium for spreading awareness about the lives of those living in areas plagued by mines, as the utilization of large platforms can reach widespread, diverse, and younger audiences. Social media platforms like Instagram are particularly useful to attract younger college-age audiences. The question is now what kinds of posts will capture the attention of younger audiences? For instance, an effective use of social media that does not use exploitive imagery of victims is light-hearted posts about current methods of detection. A unique example of this approach is the heroRATS used by APOPO, a Belgian NGO that trains rats to sniff out landmines, which has accumulated over 36,700 Instagram followers.<sup>21</sup> These rats are likely to be more physically appealing to younger audiences who are unaware of HMA than the traditional drones and sensors used to detect mines on account of their “cute” and familiar appearance as well as the novelty of using rats to detect bombs/mines. The social media presence of heroRATS is not huge at the time of this publication but there are many ways to boost their pages as their media appeals to numerous kinds of audiences. People who are enthusiastic about animals, interested in HMA, environmentally driven, etc., can all appreciate the content posted by heroRATS. It is now a matter of bringing attention to their pages in order to spread awareness about the issues at hand and how they are creatively combating them. Other HMA groups also have an

Spreading awareness to the general public through community engagement is an important way to mainstream HMA research. This can be done by speaking on panels, visiting local high schools, and participating in outreach organizations that host insightful panel events in communities. For instance, author Madison Tuohy gave presentations and demonstrations flying unmanned aerial vehicles (UAVs) with the Women and Drones organization. Authors Jasper Baur and Gabriel Steinberg co-founded the Demining Research Community (DRC), an NGO focused on researching and developing innovative uses for remote sensing and machine learning to improve the efficiency and safety of landmine and unexploded ordnance (UXO) detection. Our team has also been interviewed by popular news outlets like Scientific American,<sup>13,14</sup> Popular Mechanics,<sup>15</sup> PBS,<sup>16</sup> DER SPIEGEL,<sup>17</sup> TECH BRIEFS,<sup>18</sup> Eos,<sup>19</sup> NPR, and National Geographic.<sup>20</sup> Maintaining strong ties to legacy news media ensures that our HMA research reaches as broad an audience as possible and raises awareness of this humanitarian crisis.

Instagram social media following, such as: Norwegian People's Aid (NPA) (930 Instagram followers), GICHD (1,301 Instagram followers), Mines Advisory Group (MAG) (5,659), and The HALO Trust (16,200 Instagram followers). It is obvious that the heroRATS social media presence on Instagram is greater than several NGOs combined. Although successful demining NGOs are clearing more area, they are garnering less social media attention and therefore less awareness than more light-hearted approaches.

Additionally, professional development platforms such as LinkedIn and ResearchGate are also effective at reaching target audiences. Considering that HMA is a relatively niche career field, professional social media is a great way to find and connect with other researchers in the field. Through this, we are able to share our work and communicate ideas with like-minded individuals.<sup>22</sup> LinkedIn and ResearchGate are both beneficial in providing various research and project opportunities. Once connected with fellow researchers, we can discuss our projects and data with other people, often leading to opportunities to discover new perspectives and build our network further. Through these platforms, researchers can stay up to date on recent publications in their field and connect with researchers sharing similar interests. This form of professional social media keeps researchers in similar fields connected for updates and advancements in a rapidly changing research community.

## The Need for Jobs in HMA

It has been said that at the current rate of disposal it will take over one thousand years until we have a mine free world. We desperately need to research more efficient methods of mine detection; however, building a pipeline of researchers ready to directly enter the HMA field is only useful if there are career opportunities available for them pre- and post-graduation. Student researchers need opportunities for early exposure and engagement in the HMA field through paid internships and fellowships. HMA education in college curricula can also help to inform, inspire, and provide critical context for young researchers interested in working abroad in post-conflict countries, even if HMA is not their area of focus. Careers in the HMA field can range from office work on advocacy, risk education, publications, and research, with organizations like the United Nations and NGOs, to direct work in the field as an explosive ordnance disposal (EOD) operator with NGOs. Several coauthors on this publication are academic researchers; and although our contributions to HMA research are growing, as can be seen in the case study found later in this article, it is still nowhere near other hazardous areas of research, like volcanology.

University students are rarely exposed to HMA research and education in their curriculum, even if they're conducting research in post-conflict contexts. Early exposure to and education about HMA is not only beneficial for HMA researchers but for all students engaged in research

in post-conflict countries. At BU, the recently established Institute for Genocide and Mass Atrocity Prevention (I-GMAP) awards six Bloom Family Summer Internships of \$7,000 annually to undergraduate students studying in the field of genocide and mass atrocity prevention. Students who were awarded this internship conducted fieldwork abroad in post-conflict and conflict-affected countries like Cambodia and Armenia. In such countries where mine detection, or the lack thereof, continues to pose a direct threat to civil society, the intersection of mine detection and the nascent field of transitional justice highlights the need for collaboration of HMA across disciplines.

BU students conducting fieldwork in Cambodia and Armenia benefited from a unique perspective drawn from coursework in conflict prevention, early HMA education, and their lived experiences working in the field. In Armenia, the student drew from coursework on the Armenian Genocide to conduct field research on memorialization of the Genocide and long-term impacts of trauma across generations. Their field research was enhanced by the local context of armed conflict with Azerbaijan and the persistence and proliferation of landmines that continue to pose a threat in Armenia. Students conducting research abroad in post-conflict contexts such as Cambodia, Armenia, Bosnia and Herzegovina, and elsewhere often come face to face with the reality of the EO crisis in their research. When HMA education is made available to students at the university level, they are better prepared to conduct research and work in conflict-affected regions post-graduation.

There are also several career development opportunities for recent graduates. The United States Department of State's Office of Weapons Removal and Abatement (PM/WRA) annually awards two Frasure-Kruzel-Drew Memorial Fellowships, which are two-year paid full-time positions administered by the Center for International Stabilization and Recovery (CISR) at James Madison University. Mine Action Canada's Mine Action Fellows program also provides annual fellowship opportunities. Paid internship and fellowship opportunities are key to not only attracting high-achieving students but also increasing diversity in HMA, since socioeconomically disadvantaged groups cannot afford to take unpaid internships during the summer.

Demining research can be successfully introduced to younger audiences of researchers as demonstrated by the efforts from universities such as BU and Villanova. By building a direct pipeline for students to access upon entering higher education, HMA can become a viable career for young, emerging scientists and provide invaluable context for conflict-prevention researchers and practitioners. Through participating in fieldwork, disseminating the result of our research, and getting involved through social media, these outreach efforts will continue to inspire students to iterate novel advancements to this rapidly advancing field.

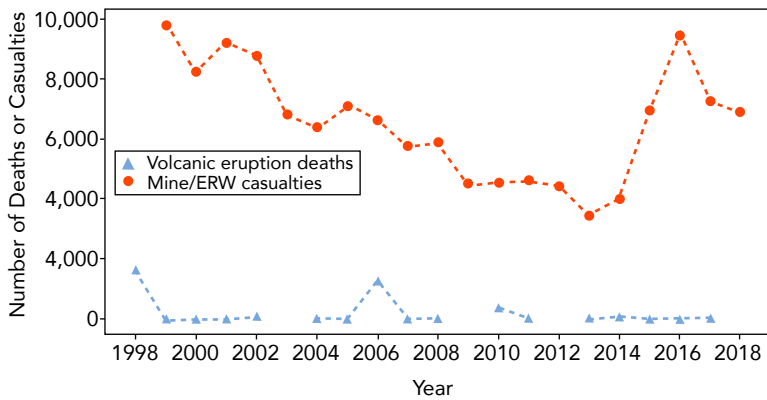
Emplacing EO in a simulated minefield for UAV-based experiments at Oklahoma State University's CENFEX. These EO include anti-tank mines, anti-personnel mines, mortars, and various explosive remnants of war (ERW).

*Image courtesy of Jasper Baur.*





# The Researcher Perspective



**Figure 1.** This figure shows the number of deaths or casualties resulting from mines and EO in orange compared to volcanic eruption related deaths in blue from 1998 to 2018.

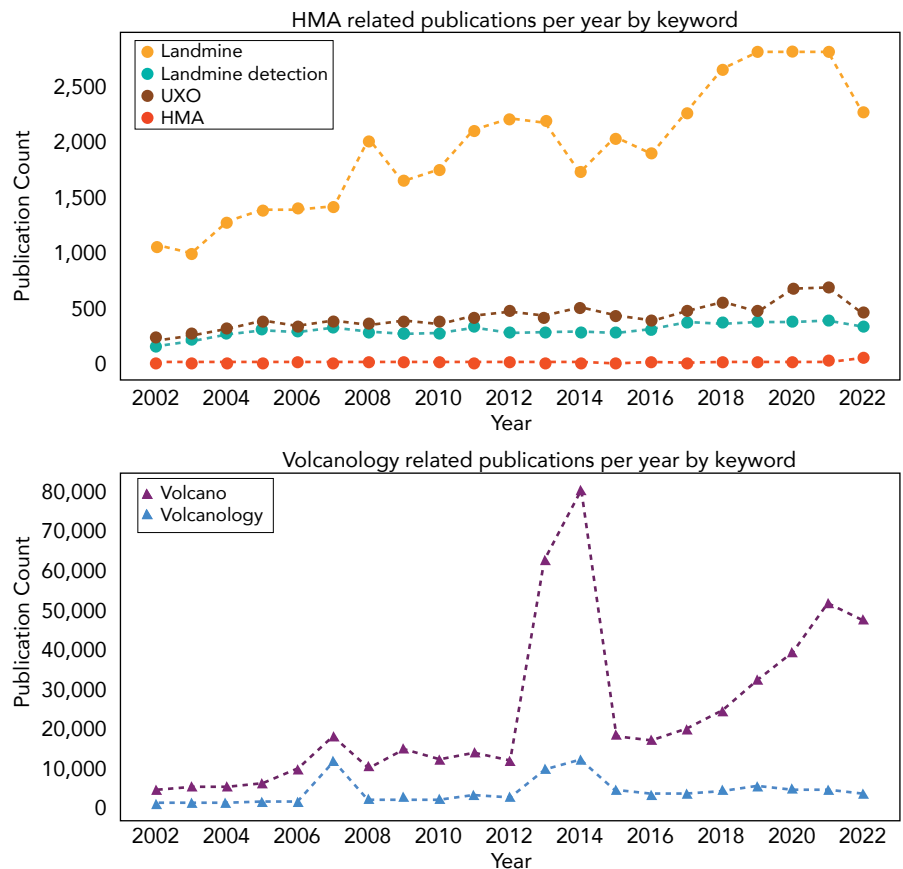
All graphics courtesy of the authors.

To demonstrate that HMA is largely under-researched and less publicly accessible compared to fields of similar humanitarian impact, we have provided a case study on comparing HMA to the field of volcanology. In many ways these two fields are similar in scope of problem and the underlying goal to mitigate risk of explosive hazards, whether that be naturally occurring in the case of volcanic eruptions or anthropogenically produced in the case of landmines. Active volcanoes are found in eighty-six countries and territories globally, with over 29 million people living within ten kilometers of an active volcano, causing an average of 541 deaths per year since 1500 AD.<sup>23,24</sup> Landmines contaminate at least sixty counties and regions, resulting in an average of  $6540 \pm 1900$  casualties per year from 1998 to 2018, of which about three in four are civilian casualties and thirty-nine percent of the total casualties resulted in death in 2021 (see Figure 1).<sup>25,26</sup> Multiplying these statistics to estimate the average amount of civilian deaths over the last several decades yields a harrowing number of approximately 1,900 civilian deaths per year, just less than four times greater than those caused by volcanoes. One discrepancy is that volcanic-related deaths usually are the result of large eruptions causing pyroclastic flows or lahars that kill many people in a single event, whereas mine-related deaths are more constant throughout the year.

Given mines and explosive remnants of war (ERW) on average cause more deaths and harm to society than volcanoes, one

would expect a commensurate amount of research on the subject to mitigate risk in the academic sector. To assess the research activity of volcanology and HMA, we used keywords in publications including “landmine,” “unexploded ordnance,” “landmine detection,” and “volcano” as common keywords and compiled all publications that mention those keywords using the dimensions.ai database. Additionally, we compared “humanitarian mine action” to “volcanology” as keywords representative of the research fields. This method is subject to overestimating the total number of publications due to articles that merely mention the key words in passing but are not the main subject of the paper. Despite this, we believe the relative trends shown in Figure 2 are indicative that there is far greater research activity in volcanology—a field with a similar magnitude of societal impact on human life to that of landmines and ERW. Comparing just the sector-wide keywords of “volcanology” versus “humanitarian mine action” from 2002–2022, “volcanology” appeared an astonishing 183 times more than “humanitarian mine action.” Even in the broader keyword category search, “volcano”

appeared an astonishing 183 times more than “humanitarian mine action.” Even in the broader keyword category search, “volcano”



**Figure 2.** The top panel shows the number of publications that mention the defined keywords related to HMA from 2002 to 2022. The bottom panel shows publication count mentions of volcanology keywords, but the y-axis is much greater than the top panel. Data compiled using <https://bit.ly/3BEW4O1>.

was used 8.6 times more than “landmine,” “UXO,” and “landmine detection” combined in publications in the last two decades based on the dimensions.ai database. It is important to note that much of HMA research is done in the private, government, and military

sectors, and not published in academic journals. This highlights the fact that even if this research is occurring behind closed doors, it is not accessible to the broader community, making it more difficult to push advances in the field.

## Conclusions

The final takeaway is that HMA is fundamentally under-researched for its given impact on society. We propose this issue, on an academic level, stems in part from lack of exposure to the mine action sector at the undergraduate level, creating a negative feedback loop of talented students not being introduced to HMA or trained to research new solutions to the ongoing humanitarian crisis. Active undergraduate research experiences are critical to early career engagement and retention. Dissemination of HMA research through traditional methods at professional meetings and peer-reviewed publications is necessary for open scientific discussion,

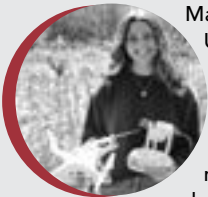
while dissemination via outreach events and social media can potentially attract more diverse and younger groups. To remedy this issue and change the current culture in universities globally, we believe exposure and engagement is crucial to create a paradigm shift towards academic demining research. ©

*See endnotes page 68*

### Acknowledgements

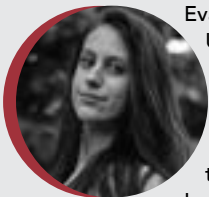
*We would like to thank Jennifer Risser and Sabryn Dotson for their thoughtful reviews that have helped greatly improve the quality of this manuscript.*

#### Madison Tuohy Binghamton University



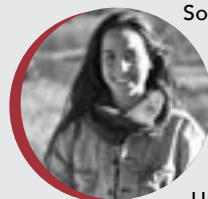
Madison Tuohy is a senior at Binghamton University majoring in Geophysics. Her main research interests are the advancement on novel methodologies like hyperspectral imaging, LiDAR, and time-domain electromagnetic-induction to detect EO, UXO, abandoned explosive ordnance (AXO), anti-vehicle or anti-tank mines, cluster bombs or munitions, and anti-personnel landmines. Tuohy is a United States Department of Agriculture Natural Resource Conservation Service Pathways Geological Researcher. She is the Chief Engineer and founder of the Drone sub-team and Geologist team lead of Binghamton University's Mars Rover team. She has been published in *The Leading Edge* and received funding from the National Science Foundation's (NSF) XCEED Fellowship program, NASA Student Leadership Scholarship, Harpur Edge Student Support fund, and the Harpur High Impact Award. She is an FAA part 107 certified remote pilot and has logged hundreds of hours of flight time.

#### Eva Greenspan Binghamton University



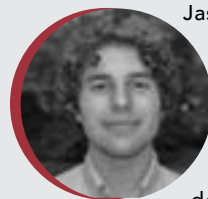
Eva Greenspan is a junior at Binghamton University double majoring in Industrial Systems Engineering and Mathematics. She was introduced to demining through AFROTC and began research in the HMA field through the Freshman Research Immersion program at Binghamton University. She now conducts research in the Geophysics and Remote Sensing Laboratory with a focus on magnetometry, UXO, and other EO. Her current project is for a user-friendly ground-coupling remote sensing “SnakeBot” to be used for humanitarian demining in heavily vegetated areas of Cambodia, established through a partnership between Villanova University and Binghamton University, and funded by the NSF.

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Sofia Fasullo graduated from Binghamton University with dual BAs in Statistics and Geography, with a Concentration in Computer Applications in Human Environmental Analysis. She is currently a master's student at the University of Pennsylvania for dual degrees in Urban Spatial Analytics and City Planning Programs. She has conducted research in Cambodia on the use of robotics and remote sensing to detect EO. She has received funding for her research from the NSF's IRES program and the Institute for Genocide and Mass Atrocity Prevention. She has disseminated the results of her research at the American Geophysical Union Fall Annual Meeting and in *The Journal of Conventional Weapons Destruction*. She also won the State University of New York system-wide Chancellor's Award for Student Excellence.

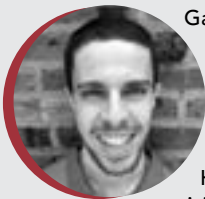
#### Jasper Baur Columbia University



Jasper Baur is a doctoral student at Lamont Doherty Earth Observatory at Columbia University studying physical volcanology with a specialization in remote sensing. He graduated from Binghamton University in May 2020 with a BS in Geological Sciences and a double minor in Geographic Information Systems and Graphic Design and with a master's from Columbia University in 2022. Baur has been an active member of the Geophysics and Remote Sensing Laboratory at Binghamton University since its inception in 2016, primarily researching ways to improve the detection of the PFM-1 butterfly landmine. He was the first undergraduate to receive the American Geophysical Union's David Miller Young Scientist scholarship in 2018, as well as the recipient of the Barry Goldwater Scholarship in 2019 and the National Science Foundation's Graduate Research Fellowship Program in 2020. He is an FAA 107 certified UAS remote pilot and is passionate about merging art and science.



**Gabriel Steinberg**  
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Gabriel Steinberg completed his Computer Science B.S at Binghamton University and is currently studying to obtain his Computer Science M.Sc. at Karlsruhe Institute for Technology with a concentration in artificial intelligence. His main research interest is in computer vision with the goal of detecting scatterable landmines in post-conflict countries. He has published his research in *The Journal of Conventional Weapons Destruction* as a co-author and in *Remote Sensing* as second author and has presented his research at several geophysics and humanitarian mine action conferences. He has worked as an undergraduate research assistant at multiple universities, focusing on data science and machine learning applications in bioinformatics, passive bioacoustic monitoring, and large-scale software agent simulations.

**Linda Zheng**  
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Linda Zheng graduated from Binghamton University with dual BAs in Environmental Planning and Philosophy, Politics, and Law with a concentration in Genocide Studies. She was a student researcher at the Geophysics and Remote Sensing Laboratory where she became acquainted with remote sensing and its multidisciplinary applications, particularly in the field of human rights. Zheng was one of the first recipients of the Institute for Genocide and Mass Atrocity Prevention's Bloom Family Summer Internship. During her internship she traveled to Armenia to research the Armenian Genocide and collect oral histories from descendents of the survivors. Since graduating she has worked for a number of non-profit organizations in Washington, DC and Bosnia and Herzegovina dedicated to genocide prevention, transitional justice, and peacebuilding.

**Alex Nikulin, PhD**  
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Professor Alex Nikulin earned his PhD from Rutgers University in 2011 and joined the Binghamton University faculty as an assistant professor in 2015. His research focuses on the broad field of Energy Geophysics, with applications in classic seismology, exploration geophysics, as well as the emerging field of automated geophysical surveying. Professor Nikulin is co-founder of the Geophysics and Remote Sensing Research Laboratory at Binghamton University, a collaborative academic platform that brings together undergraduate and graduate researchers, faculty from multiple departments of Binghamton University, as well as multiple industry, academic, government, and NGO partners, to work on resolving critical issues facing society through innovative applications of geophysical techniques.

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Garrett Clayton, PhD, is the Associate Dean of Graduate Studies and Director of the Center for Nonlinear Dynamics and Control at Villanova University. His research focuses on the instrumentation and control for nanotechnology, image-based control of scanning probe microscopes, and high-speed scanning probe microscopy for bio/nanotechnologies.

**Timothy de Smet, PhD**  
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Timothy S. de Smet, PhD, is a Research Assistant Professor in the Department of Geological Sciences and Environmental Studies, Director of the Geophysics and Remote Sensing Laboratory, and leader of the Geospatial Remote Sensing/Environmental Visualization with Drones research stream in the First-year Research Immersion at Binghamton University. His areas of expertise are aerial remote sensing and near-surface applied geophysics. Dr. de Smet's research utilizing frequency and time-domain electromagnetic induction, magnetometry, ground-penetrating radar, and aerial LiDAR and thermal infrared remote sensing has been published in *Geophysics*, *Remote Sensing*, *Near Surface Geophysics*, *Journal of Applied Geophysics*, *Sedimentary Geology*, *PLOS ONE*, *Archaeological Prospection*, *The Journal of Conventional Weapons Destruction*, and *The Leading Edge*. Dr. de Smet has received funding for his research from the National Science Foundation, National Geographic Society, National Park Service, and United States Geological Survey. He is an FAA 107 certified UAS remote pilot.

# IMAS LEVELS OF EOD & IEDD Qualifications

By Drew Prater [ RELYANT Global ]

**E**xplosive hazards have caused more than 238,000 civilian casualties over the past decade, which only increases the need for these hazards to be cleared.<sup>1</sup> Clearance takes time, thoroughness, and personnel properly trained and qualified to detect, identify, render safe, and/or dispose of these deadly devices. The International Mine Action Standards (IMAS) were written to provide basic standards for not only explosive ordnance disposal (EOD) and improvised explosive device disposal (IEDD) operations, but also the required training competencies for each level of both disciplines. The different levels delineate the competencies and responsibilities, while allowing for additional subjects as an agency may see fit.



**Image 1 (above).** A tank turret next to a house with the barrel stuck in the ground; may have a cartridge in the chamber, West Mosul, Iraq.

**Image 2 (right).** An IED located on the highway leading into West Mosul, Iraq.

All images courtesy of Drew Prater.

## Introduction

Whether an individual obtains their EOD and/or IEDD training during military service, from a nongovernmental organization (NGO), or a commercial company, the IMAS competency standards guide their level of EOD and/or IEDD certification and ensure those conducting explosive hazard clearance are sufficiently trained and possess the required qualifications.<sup>2</sup> These standards allow personnel to be placed in the appropriate position based on their qualifications and experiences, as well as clearly delineate the steps ahead should they wish to advance their EOD and/or IEDD qualifications. The standards for EOD operators is 09.30,

*Explosive Ordnance Disposal*, and their training is covered under Test & Evaluation Protocol (T&EP) 09.30/01/02022, *Conventional Explosive Ordnance (EOD) Competency Standards*, both of which were recently updated. The standards for IEDD operators is 09.31, *Improvised Explosive Device Disposal* and the training competencies are covered under T&EP 09.31/01/2019, *Improvised Explosive Device Disposal (IEDD) Competency Standards*.

Each respective T&EP lists the minimum occupational competencies for each skillset and allows for training organizations to add additional topics to suit their unique requirements and/or



site-specific needs. All training classes should be listed on the back of the training certificate to assist future employers in verifying what topics were covered in the course, as this allows employers to ensure personnel are familiar with the most recent standards. Courses that combine multiple levels of EOD or IEDD training are acceptable according to IMAS, though practical experience is recommended when progressing through the different levels. Experience is extremely important but theory is needed as a firm foundation and allows the operator to make intelligent, informed decisions when they encounter a new situation.

Ideally, recently trained personnel are placed with mentors of the same or higher level of competency for a limited amount of time. These experienced mentors will certify that the individual understands the specific worksite policies and procedures, and will verify the trainees' comprehension of the training they received and how to implement it safely and effectively. In the military where this is not always possible, a senior team member would be paired with a new team leader to help share as much experience with the team as possible. With the different EOD and

IEDD trainings and courses in countries, it can be a challenge to ascertain not only the validity of certificates, but also the competencies that were trained during the course.

Comprehensive military EOD and IEDD training courses are typically accepted by the United Nations, NGOs, and commercial companies, even though IMAS specified standards are not necessarily covered. However, there is a definite learning curve for former military EOD/IEDD Operators when embarking on their initial humanitarian mine action work. One of the challenges has to do with acronyms and terms, as some meanings are new while others are new terms with familiar meanings. Many standards are different, such as demolition misfire wait times, soak times, personal protective equipment (PPE) levels, etc., as well as their references. The IMAS, country-specific regulations, or agency standard operating procedures (SOPs) will dictate the standards, instead of military reference materials and orders from higher headquarters. There is always new equipment to learn, but that is usually the easiest segment to learn for EOD and IEDD Operators.

## EOD Clearance Levels and Working in the Field

IMAS categorizes EOD into four individual qualifications: Levels 1, 2, 3, and 3+, which build upon each other—Level 1 is the firm foundation and Level 3+ is the capstone. Even qualified and experienced personnel should receive training on local explosive hazards previously encountered prior to commencing operations, as each site is unique and may present special hazards. Site-specific training is typically instructed by the senior EOD or IEDD Operator on site but it is not a requirement. While conducting clearance operations in Iraq (2016–2018), our new EOD operators received a briefing on the current list of munitions encountered, with emphasis on munitions that were particularly sensitive, as well as our operating standards. This information helped to ensure a single standard, and safety, across multiple operational teams. EOD is a challenging career field which requires the operator to identify munitions and fuzing systems from all over the world and from any time period. During our Iraqi clearance operations, we recovered and rendered safe ordnance from twenty-three different countries. Some of the munitions were of recent manufacture, some were first-seen ordnance, while others were of older manufacture, with one example originating from the 1950s.

There are numerous critical skills taught throughout the different levels of EOD. Some are taught in classrooms, while others are taught and/or reinforced during practical exercises. Accessing unexploded ordnance (UXO) and persistence in a task are two of the most important, and difficult, skills to learn.

Another challenge to the EOD operator is accessing the munition. While most are on or near the surface, some are deeply buried in the earth or are in the upper floors

of buildings where accessibility is an issue. On one mission, our team was tasked with checking on a possible aircraft bomb inside of a house in a village south of Mosul, Iraq. The tasking stated there was a hole in the ceiling and a corresponding hole in the center of an interior room with the homeowners testifying that they had been caused by an aircraft bomb when ISIS was occupying the house. After some measurements and discussion with the



**Image 3.** Some clearance locations present special hazards (i.e., mixture of ordnance and IEDs, falling debris, unstable structures, etc.).



**Image 4.** A Hungarian anti-personnel hand grenade manufactured in 1951 and recovered in 2018 in West Mosul, Iraq.

villagers, we theorized the bomb to be a Mk 82 500 pound high explosive bomb, most likely with some type of guidance package due to the precision strike and the description of pieces the homeowners had found and discarded.

Based upon our knowledge of the munition, we encouraged the homeowners to leave the bomb in place, repair the damage, and they would have an interesting story to add to their family history. We knew there was no possibility of the bomb detonating, and this is a procedure long practiced in various parts of the world, most times with bombs much less stable than the current inventory. The homeowners were adamant about removing the bomb, even after we explained the long process to them, so we commenced operations. One of the first steps was to ensure the bomb had not porpoised (when a bomb enters the earth and curves back toward the surface)

and was near ground level outside the home, but this was not the case. We started excavating and dumping the spoils next to the hole.

As we chased the bomb on its downward path, we had to move the spoils outside so we could enlarge the hole several times until it was a ~2.0 meters (~6.56 inches) square, encompassing nearly the entire room. What started as simply stepping into the hole quickly grew to cutting steps into the side, to using a small ladder, then a big ladder, and finally using steps cut into the side to get down to the big ladder. Ultimately, dirt had to be hauled up via rope and bucket due to the depth. The entire excavation took several weeks, especially since the deeper we went, the harder the soil and the slower the digging became. Eventually, we found the tail of the bomb at a depth of ~9.0 meters (29.53 feet) and by that time we knew the bomb was 2.74 meters (9.0 inches) in length by itself.



**Image 5.** A nine-meter-deep excavation showing the tail of a bomb inside a house south of Mosul, Iraq.



**Image 6.** A 500 lb. bomb located on the fourth floor of a building with the stairs mostly destroyed, West Mosul, Iraq.



Accessing munitions, even when they are visible, can still be a challenge. For instance, in west Mosul, Iraq, our teams had been aware for several months of a bomb located on the fourth floor of a building, but the building was barricaded and we were clearing taskings in other areas of the city. In time we received a clearance tasking for that area and following removal of the barricades, our team was able to enter the building, only to find the stairs were partially destroyed. Very carefully, several members of the team made their way to the ordnance and identified the bomb and partially destroyed fuze. After the other members of the team withdrew, the team leader rendered the bomb fuze safe and, after much deliberation, came up with a plan to safely remove the bomb from the fourth floor. Critical thinking is an essential skill which is taught through practical exercise. This can be applied in so many areas of EOD and IEDD and requires not just looking at the problem but understanding all aspects of the issue as much as possible.

Image 7 is one of the pictures we used in our site familiarization training for Fallujah and Mosul, Iraq, as well as subsequent EOD training courses. This rocket is sticking out of a second story wall with no easy access from the interior, exterior, ground, or roof. In many instances, EOD operators will see this and start to think of how to safely remove the explosive hazard because they focus on the munition, but miss the bigger picture of the fragmentation pattern, which denotes that the munition has fired and can be safely removed in a more aggressive manner. The dual fragmentation pattern also allowed us to positively identify the munition.



**Image 7.** Scene from the second story of a house in Fallujah, Iraq. A determination must be made if the munition is live or expended.

Sometimes the problem isn't locating or accessing ordnance but rather figuring out how to remove it safely from its current location. This is where different render safe methods, as well as identifying and understanding the different fuzes, come into play. Even if a munition is accessible, challenges can still exist in safely removing the munition from its environment. The mortar in Image 8 was very easy to locate and access but was stuck in the asphalt parking lot of Ibn Sena Hospital complex in West Mosul, Iraq, and we did not have explosives, so destruction in place was not an option. After identification of the mortar and most likely fuze (based upon the same mortars throughout the immediate area), we determined the safest method of removal was to carefully excavate around the mortar until it could be safely removed from the asphalt.

After several interviews, site visits, and checks with various detectors, a team uncovered a 500 kilogram (1,102.31 pounds) concrete piercing bomb in the middle of an Afghan village (with no concrete within a 100 kilometer radius), as seen in Image 9. Finding



**Image 8.** Carefully chiseling a mortar out of a parking lot in West Mosul, Iraq.



**Image 9.** A bomb in the middle of an Afghan village in Herat Province, Afghanistan.

the bomb was relatively easy but the safe removal of it without endangering any villagers or damaging buildings proved an interesting task. It was determined that the risk from removing the fuze prior to moving the bomb was lower than moving the fuzed bomb. The fuze was successfully removed using an explosive technique, the bomb removed, and the hole refilled so the village could return to normal and be explosive hazard free.

## EOD Certification

The basic level for EOD is Level 1 and there are ninety-three required competencies for certification. This qualification permits the operator to locate, expose, and destroy in place specific individual munitions upon which they have been trained. The clearance is only to take place in a controlled environment, such as a clearance site, technical survey, etc. The EOD Level 1 graduate will also function as a team member, assisting EOD Level 2 and 3 Operators on tasks requiring additional support. The intermediate level for EOD is Level 2 and covers eighty-nine required competencies which build upon the ninety-three competencies already learned in EOD Level 1 training. An EOD Level 2 qualification enables the operator to perform all EOD Level 1 tasks, as well as determine which munitions are safe to move and/or transport, as authorized by an EOD Level 3 Operator or above. An EOD Level 2 Operator can also conduct simultaneous disposals of multiple munitions upon which they have been trained. The EOD Level 2 operator can conduct tasks in all environments with the written approval of an EOD Level 3 or 3+ operator.



**Image 10.** Picture received reporting two explosive charges among rubble and garbage in West Mosul, Iraq.

EOD Level 3 has 156 required competencies that build upon the 182 competencies of EOD Levels 1 and 2, allowing the operator to perform all EOD Level 1 and 2 tasks, in addition to disposal of up to 50.0 kilogram (110.23 pounds) net explosive quantity of munitions and conduct render safe procedures on munitions for which they have been



**Image 11.** With some of the garbage removed, note the remote-control fuzing system under the main charge on the right.

trained. EOD Level 3 Operators can also authorize, in writing, an EOD Level 2 Operator to perform tasks in various environments and to make decisions regarding the moving and transporting of munitions. The advanced EOD Level 3+ covers six different competencies: advanced explosive theory, bombs, armored fighting vehicle clearance, basic chemical munitions and procedures, bulk demolitions, and guided weapons. These competencies build upon EOD Levels 1, 2, and 3 competencies and may be individually taught; therefore an EOD Level 3+ Operator does not necessarily mean they have been trained in all six skillsets.

## IEDD Certification

IEDD is a separate and more complicated skillset of EOD. The IEDD operator must be able to identify explosive hazards placed in or camouflaged as common items (vehicles, rocks, cans, drums, etc.) and adapt to ever-changing scenarios when what is reported turns out to be something different. Even when ISIS put IED manufacture on an industrial scale, IEDD operators could not assume similar-looking IEDs functioned in the same manner as IEDs they had worked on previously. Safely locating IEDs can be a major concern, but once located, access and rendering safe can also present challenges.

IMAS also categorizes IEDD training into four individual qualifications: Levels 1, 2, 3, and 3+, which build upon each other with Level 1 as the solid foundation and Level 3+ as the highest level.

Under IMAS, IEDD qualifications are only recognized if the holder also has the equivalent EOD qualification per T&EP 09.30/01/2014. Having EOD as a base on which to build the IEDD competencies should help ensure that the IEDD operator thoroughly understands explosive safety and allows them to safely identify, render safe, and/or dispose of munitions which may be used in IEDs, a common tactic employed globally. The United Nations *Improvised Explosive Device Disposal Standards* lists slightly different terminology for the four individual IEDD qualifications: Basic IEDD operator, IEDD assistant, intermediate IEDD operator, and advanced IEDD operator.<sup>3</sup> These qualifications fall in line with IMAS and its requirement for equivalent EOD qualifications. All tasks listed are in addition to their requisite EOD level qualification tasks.



A Level 1 IEDD qualification encompasses ninety-two competencies and enables the graduate to prepare IEDD equipment, understand overall threat context, threat analysis and threat assessment processes, search for IEDs while under supervision as part of a clearance team and, after a site-specific brief, recognize IEDs common to the operating area. The Level 1 IEDD Operator may also assist in the execution of semi-remote actions as necessary. The Level 2 IEDD qualification covers sixty-seven competencies, building upon the ninety-two IEDD Level 1 competencies. Level 2 IEDD enables the operator to perform all IEDD Level 1 tasks, as well as supervise the preparation of IEDD equipment, understand and critically evaluate the assessed threat and, under supervision, apply remote or semi-remote actions designed to locate IEDs.

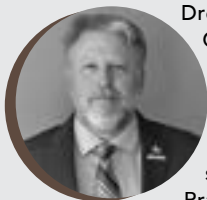
IEDD Level 3 qualifications cover 106 competencies, in addition to the previously learned 159 competencies of IEDD Levels 1 and 2. This qualification enables the IEDD Level 3 Operator in a permissive environment to conduct render-safe procedures for IEDs and their final disposal. The IEDD Level 3+ advanced qualification covers an additional forty-seven competencies over the 265 competencies previously acquired. These further competencies are for specific threats in particular contexts in any environment, not just permissive.

## Final Thoughts

There is no doubt a need for standardization of training for EOD and IEDD operators, not only for civilians, but former military personnel as well is necessary, and IMAS provides these standards. While countries do not have to take notice of international standards, many have used them as a basis for their own EOD and IEDD directives, drawing upon the decades of experience that have been the firm foundation that are written into each standard. ©

*See endnotes page 69*

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C-IED Subject Matter Expert  
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Drew Prater is RELYANT Global, LLC's Counter-Improvised Explosive Device (C-IED) Subject Matter Expert for operations/training across five continents. He provides expert technical solutions, implementation, management, and oversight for C-IED, EOD, and IEDD services.

Prater's over thirty years of experience includes an outstanding record of standing up operations at locations ranging from the world's most remote, austere, and high-threat settings to populated, high-profile sites. Prater served in the U.S. Army from 1987 as Supply/Armorer until he graduated from EOD School in 1992. He served as Master EOD Technician until his retirement in 2011 as First Sergeant of the 202nd Ord Co (EOD). Prater also graduated from the FBI's Hazardous Devices School (1998), IMAS EOD Level 3+ (2006), and numerous explosive-related schools with the U.S. Military, Bureau of Alcohol, Tobacco, Firearms, and Explosives, the FBI, and other organizations. He is also a consultant for Bomb Techs Without Borders (BTWOB.org), providing expertise to international operations with a current focus on Ukraine operations, ordnance, and training.



**Image 12.** Hundreds of IED pressure plates awaiting deployment, Fallujah, Iraq.



**Image 13.** Hundreds of IED main charges and IEDs recovered from a single site, East Mosul, Iraq.



**Image 14.** Cautiously chiseling detonating cord out of Highway 10 in Fallujah, Iraq.

# THE BIGGER PICTURE: Considerations Toward the Sustainable Localization of Mine Action

By Mark Wilkinson, PhD [ DanChurchAid ], Albert Schevey [ DanChurchAid ],  
and Ahmed Al Zubaidi, PhD [ Iraqi Health and Social Care Organisation ]

**D**anChurchAid (DCA) is an international nongovernmental organization (INGO) at the forefront of mine action interventions globally. Currently working in nine countries around the world through projects that have a specific focus on the pillars of mine action, DCA supports a plethora of activities seeking to promote the delivery of an integrated programming approach across the triple nexus, bringing humanitarian interventions, development work, peacebuilding, and advocacy initiatives closer together. This approach is used to bridge the gap between policy and practice at all levels and ensure long-term impact and sustainability.<sup>1</sup> A key element of the DCA global strategy for 2023–2026 is the promotion of locally-led solutions to a range of humanitarian concerns via partnerships with local civil society actors.

Since 2020, DCA has been committed to a United Nations Mine Action Service (UNMAS)-funded project in Iraq where it has worked with the Iraqi national non-governmental organization (NNGO), the Iraqi Health and Social Care Organisation (IHSCO), in a project that seeks to develop IHSCO as an Iraqi organization that can effectively engage in humanitarian mine action (HMA) clearance activities as an

independent actor. This project has placed DCA at the forefront of localization activities for the mine action sector in Iraq. As this project prepares to enter its third year, this article presents reflections on progress along the pathway toward localization, as well as broader discussion around what might be considered “key issues” and “challenges” for those interested in the localization agenda.



DCA clearance teams in mobilization training.

*All images courtesy of DCA/IHSCO.*

## What is Localization in Mine Action?



While it may not be a contested concept, localization does not have a universally agreed upon definition—certainly not within the mine action community. At its most basic level, localization relates to making changes to ensure that the humanitarian system is “as local as possible and as international as necessary.”<sup>2</sup> Within the context of the Grand Bargain, localization also refers to increasing available international funding for the institutional capacity strengthening of local responders as well as making direct funding opportunities available to those same organizations.<sup>3</sup> Where the Charter4Change linked these intentions to explicit commitments, broader definitions reflect the engagement of local and national actors in planning, delivery, and accountability of humanitarian activities.<sup>4</sup>

For HMA, there has been growing international debate on how funding across humanitarian activities should be allocated

A deminer investigates a suspicious signal.



to facilitate the “reshaping [of] partnerships from the international to the local level ... to ensure more effective, sustainable and equitable efforts.”<sup>5</sup> What this actually means is less than clear. For some, localization is simply the inclusion of national staff within country program offices; for others, it is partnering (or sub-contracting) specific activities to local and national organizations. More cynical interpretations see the result as just the creation of chimeras—locally branded NGO clones of their INGO masters—as meeting the requirements for localization.

For Iraq, this DCA project provided a largely operational level response to the strategic and policy interests of its donors in the localization of mine action. In doing so the project avoided engaging with discussions over the need for conceptual clarity in the localization agenda. It also avoided setting down a clear and coherent

strategy for the localization journey, instead focusing on an “effects-based approach.”<sup>6</sup> This project can, in many ways, be considered a straightforward but pragmatic approach by UNMAS for clearance implementation in Iraq in the face of significant budgetary pressures—the resulting so-called “partnership” model capitalizes on the large numbers of trained mine action staff in Iraq who are often the by-products of commercial mine action interventions funded by a range of international donors in the country in previous years.<sup>7</sup> The partnership model offers a cost-effective approach to delivering clearance capacity via INGO’s facilitating NNGO partnership agreements. While this may fall short of true “localization,” it is a welcome first step toward the localization of mine action in Iraq. It is perhaps more importantly also one that offers significant opportunities for analysis, reflection, and learning.

## Reflections on Years One and Two

The DCA/IHSCO partnership set out to play a part in addressing the widespread explosive contamination in Iraq, set against a lack of national capacity to respond to it. Through the provision of cost-effective national capacity, the path to recovery and development could be set. The first two years of the partnership focused on the establishment, training, and deployment of search and clearance teams. Work was also undertaken with regards to gaining national accreditation for IHSCO to conduct search and clearance activities, as well as the establishment of the internal policies and processes necessary for their management. These were based across eight thematic areas of IHSCO’s capacity specified in the grant application process: management, programmatic, operational, support, quality management, leadership, risk management, and resource mobilization. The success of this project to date has been considerable: in terms of clearance activities delivered as an independent actor, IHSCO has completed six task orders from the National Mine Action Authority (NMAA), cleared approximately 150,000 m<sup>2</sup> of land, and recovered 203 explosive hazards (EH), of which 189 were victim operated improvised explosive devices (VOIEDs) containing secondary switches (designed to target an explosive ordnance disposal ((EOD)) operator).

The delivery of International Mine Action Standards (IMAS) technical qualifications and subsequent embedding of staff in mid- and senior-level management positions within IHSCO has seen significant development of operational command and control on clearance tasks. Broader management functions, such as personnel and professional development, continue to be developed with additional recruiting seeking to fulfill specialized HR functions. IHSCO has also gained experience in programmatic functions such as writing reports, though these have not yet been delivered directly to donors. In addition, further development of resource mobilization and proposal writing is also required. Supporting functions such as equipment and logistics management have developed to the point where IHSCO can plan and support their own operational requirements and a specific quality management officer monitors compliance and other quality issues on operational



IED main charges recovered from a DCA/IHSCO work site.

sites to a standard meeting IMAS and national mine action standards (NMAS) requirements. Additionally, IHSCO organizational leadership is clearly present and strong. The broadening of management opportunities to involve female staff is also ongoing. Risk management capacities are operationally focused but DCA has worked to embed a variety of health, safety, and other risk management initiatives and processes within IHSCO.

Of course, there have been important lessons learned along the way. Of note were issues relating to the partnering agreement between DCA and IHSCO—partnering is one of two types of agreements that DCA currently works with, the other being cooperation agreements. It was obvious that partnering in this way required careful and detailed analysis of issues normally taken for granted in other bilateral arrangements—not least those related to ownership of risk as well as financial responsibility. DCA and IHSCO have utilized accountability frameworks to address some of these challenges. It has also been clear that there is a very real need for transitional posts—that is staff that began working for DCA

and moved across to IHSCO during the project. This has at times resulted in issues relating to staff integration and lines of communication. DCA and IHSCO have pragmatically resolved these issues through recognizing the specific challenges faced, recruiting an HR specialist specifically to manage this process. Learning and development needs are clearly unique to organizations and individuals and DCA has recognized the need for internal processes from early on to embed a culture of learning within IHSCO. Open and honest communication between partners is key. Budgets have remained a difficult area through the project, but genuine resolution requires serious reflection on the localization models implemented by and on behalf of donors. Finally, DCA has strived to see capacity development activities as strategic and holistic, not just operational. While the partnership model does necessarily facilitate this approach, DCA has continued to lobby for a broader context to underpin this type of localization project, a key element of DCA localization strategy.

## Identifying Key Tenets of Localization

Progress in the DCA/IHSCO project by the national partner allowed the identification of what might be considered the “four pillars” of localization. Analysis of the project has shown that—from the perspective of IHSCO—these relate in general terms to “needs”:



**Figure 1.** The four pillars of localization: ownership, empowerment, collaboration, and sustainability.

The need for ownership is a central factor in the actual partnership. On the surface, it is easy to understand the need for local ownership. Matching this need with the constraints of donor agreements to which the INGO is bound is far more complex, cutting to the very heart of one of the key challenges in a localization project: how to consolidate ownership within a partnership. Donor contribution and other funding agreements aside, the ownership and management of project risk and liability (both legal and to donors) also complicates project ownership. It is clear that “local ownership” of operational level implementation activities differs significantly from “strategic ownership” of project management and delivery. Without consolidation of these perspectives on ownership there is potential for frustration on the part of the local partner with a perception of them simply being a local provider rather than local partner, excluded from any real opportunity to influence strategic issues as well as take ownership via decision making.

Empowerment in this project relates to the transfer of the skills, knowledge, and attributes from DCA to IHSCO necessary for the independent delivery of mine action activities. The transition of technical leadership is a notable achievement here that facilitated a shift to the autonomous delivery of clearance activities by IHSCO. This project has shown relative success in the transfer of operational level capacity, including in organizational management.

Again, it is at the strategic level where real issues lie. Financial independence is the most obvious issue, specifically the lack of the provision of overheads direct to IHSCO (operating costs) due to current donor procurement rules. But empowerment also signposts other critical issues—the structural relationship between UNMAS and DCA (the only two signatories to the grant agreement) defines a bi-lateral relationship that provides little automatic right of IHSCO to influence this power balance, nor to interface directly with project donors. It is hard to see how this methodology can reconcile with a true localization agenda. The same structural challenges directly affect collaboration. At an operational level, daily interfacing between IHSCO and DCA is extremely effective in facilitating project delivery, yet at the strategic level there is once again an effective exclusion of IHSCO from donor interactions. These types of projects must, in the future, allow the INGO to facilitate international networks that give true visibility to the local partner. Only through this change can the necessary shift in the established norms for funding mine action be driven to ensure localization stands a real chance of success.

Sustainability cuts to the very *raison d’être* for this project. The realities of the project delivery environment have at times placed existential pressures on both DCA and IHSCO. The current system of providing operational implementation in response to

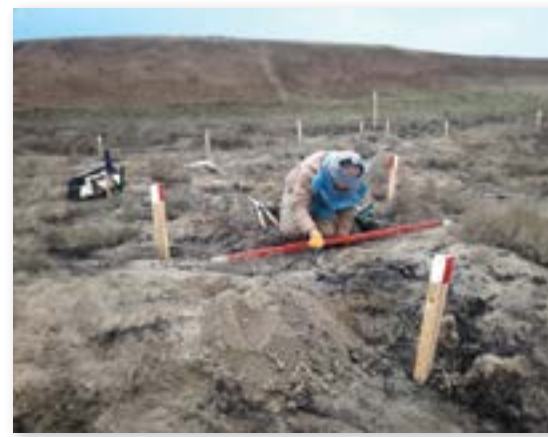


unpredictable available funding levels year on year makes it difficult for long-term commitment to localization projects to be consistently demonstrated, also increasing costs at all levels (especially administration costs). Indeed, during this project, follow-on year funding has sometimes been received so late that demobilization activities have commenced. The use of “cost” or “no cost” monthly extensions as a pragmatic work around does little to generate confidence in higher-level and longer-term commitment to localization. From the INGO perspective this also brings huge risks with regards to “underwriting” the continuation of funding in the absence of a funding commitment. For the NNGO, the effects are also profound—most visibly through the loss of trained staff who, in the possession of termination notices, move to other employment before continuation funding arrives.

Sustainability of the operating environment is another area where attention is urgently required. In Iraq there are several issues within the NMAA which appear to affect localization. In the first instance, the reluctance of the NMAA to secure any national funding for local mine action actors is clearly problematic. While DCA can perhaps not directly resolve this, its donors could certainly play a valuable role in addressing other factors affecting localization. Most notable is the current NMAA system for the prioritization of mine action activities and subsequent land release. These appear

to require considerable attention, support, and influence—and are key in shaping the enabling environment prior to the launch of any future localization projects.

The very ethos of this partnership project is centered around an innovative approach to localization in mine action in Iraq. While at an operational level there has been clear success in the transfer of operational level capacities, without a more formalized and structured supporting and enabling strategic environment, the localization agenda faces considerable challenges. In localization projects there are specific strategic considerations that must be addressed during project design—one size does not and cannot fit all contexts, needs, and environments.



An IHSCO searcher clearing an access lane.

## Big Picture and Big Issues

This DCA/IHSCO partnership project has attained significant achievements in delivering localized mine action capacity. The UNMAS model used by DCA in project design and delivery is an important part of the operational-level contribution to localization; however, it is not a complete solution in its own right—in particular not a strategic solution—to the full range of challenges that must be addressed before a coherent policy for localization in mine action can be developed. The following points represent what DCA believes to be some of the key areas requiring debate, discussion, and definition by the mine action community to continue to drive the localization agenda forward:

**Conceptual Understanding.** The lack of a conceptual basis for the localization project used here significantly limits the capacity of this methodology to be used as a generic model. Detailed research is required to bring more clarity and understanding to what localization means before efforts can be made to identify the specific requirements of localization project design. Localization is not capacity development, though capacity development can be an element of localization. Regardless, it is clear that detailed research is required to better understand this important relationship, in particular the alignment from the strategic to the operational level.<sup>8</sup> More case studies and evidence must be used in concrete efforts to actually transfer power in localization initiatives. Additionally, key questions must be identified and addressed: how do we ensure more direct funding to local actors, how do we define and deliver core support, what characterizes truly equitable partnerships, and so on.

**Project Design.** The grant application for this project specifically required an INGO lead in a partnership with an NNGO, described as a means to ensure the INGO had “the freedom to use their own expertise and experience to deliver the project as they best see fit.” In reality, this still constrained the INGO within donor operating rules which (it could be argued) profess a rather binary vision of partnership, “based on a division between ‘Northern’ and ‘Southern’ NGOs.”<sup>9</sup> Follow-on work for this project would logically see donors design and pilot a consortium model, characterized by all stakeholders having an equal say in project design and delivery. At the project design stage, cost/benefit simply cannot be the justification for localization, nor should the INGO be seen as the guarantor of success. The level of background analysis required to design a localization intervention must not be underestimated, nor must the process be seen as a uniform pathway across different contexts.

**The Practice of Partnership.** A localization project which gives financial responsibility to the INGO and not the NNGO will struggle to be an equal partnership.<sup>10</sup> Furthermore, this perpetuates control—perceived or real—of the NNGO by the INGO. A transfer of power must be a key element of localization. While the timing and pace of this transfer of power will obviously depend on context, sufficient resources and pathways must be developed to facilitate this shift. One significant gap in this project relates to the lack of provision of overheads to the local partners. Overheads are critical for survival and sustainability and without them the NNGO partner simply cannot exist long term. While the need for overheads is starting to be recognized, how this can be facilitated—especially

within common donor procurement processes—remains unclear.<sup>11</sup> As this partnership was conceived at the project (operational) level rather than a strategic (organizational) one, it is an unfortunate consequence that this has embedded a structural disadvantage on the NNGO, specifically with regards to ownership of the project and the visibility this brings. Partnership management requires specific investment and a clear reference for ‘good practice’ is urgently required.

**Driving and Measuring Progress.** Localization projects require a clear and well-defined end point. This end point must articulate what needs to be achieved and what is good enough to be seen as a successful result. While milestones monitoring and evaluation mechanism in the project governance framework. As a result, there was no way of proving progress beyond the achievement of specified milestones. For a project where the specific activities

delivered were the responsibility of the INGO to achieve, the use of these as a measurement of progress—as well as the driver of payments—is once again indicative of a project methodology that does little to empower the NNGO, nor share the risks present in the delivery of a project such as this. It seems that the role of the INGO as an intermediary in this project partnership more closely resembles that of a direct implementer when seen from a contractual perspective. This is not conducive to a true localization agenda.<sup>12</sup>



IHSCO staff rehearse casualty evacuation.

## Moving Localization Forward

In the current global environment, the localization of HMA capacities could represent a valuable means of effectively working toward a world free from the threat of mines, explosive remnants of war (ERW), cluster munitions, improvised explosive devices (IEDs), and other related hazards. It is, however, also clear that there are a number of significant challenges to the localization agenda, each posing specific questions that require detailed research, analysis, and evaluation:

**Structural Factors.** These issues are directly related to the design of the international aid system—specifically the regulatory and governance frameworks inside INGOs, supra-national organizations such as the United Nations, and national donors who allocate funds. These “rules” impact on procurement processes, project design, and implementation, as well as monitoring and reporting. It is difficult to see how a localization agenda can be effective in the long term when the very innovation and independence it seeks to facilitate is revoked by the mechanisms of organizational control. Equal partnership and collective action should be central to localization project design, implementation, and delivery. Localization cannot simply be a temporary solution to a much larger problem.

**Contextual Factors.** Context matters in localization and it should be fully integrated into the project design phase. For example, how well structured and effective is the NNMA in the target country and are they supportive of and capable of supporting a localization agenda? In Iraq, the processes for prioritization of clearance activities and subsequent land release are not fully clear—this in itself has the potential to undermine partnerships between INGOs, NNGOs, and local actors and society. A certain level of maturity in the strategic management of mine action within a country would seem to be a critical component of any localization project.

**Economic and Risk Factors.** It has been argued that localization “is undermined by the widespread aversion of donors and external partners to engage in the perceived risks associated with applying the principles in practice since they are accountable to other actors along the aid chain ... [it] requires donors and external partners to let go of control and allow flexibility, adaptability and innovative approaches over longer time frames.”<sup>13</sup> Furthermore, projects for localization should be selected based upon need and not just donor requirements. The project DCA is currently delivering risk management in is also of concern—as



Training and mentoring is central to the DCA/IHSCO partnership. In these two pictures IHSCO staff members develop their search skills.



the signatory to the donor grant agreement, DCA is entirely responsible for project delivery. It is hard to reconcile this with a project that seeks to embed and develop—and ultimately transfer—such a broad range of responsibilities.

**Conceptual Factors.** There is a clear need for a conceptual basis for localization activities in HMA. Perhaps best developed through

a doctrinal basis, clear, well researched, and well-evidenced guidelines would be invaluable for the development and implementation of future initiatives. A mechanism for knowledge management, learning, and development across global mine action actors would be a valuable way to begin the process of formalizing the lessons learned across different contexts.

## Concluding Thoughts

Localization of mine action activity offers huge opportunities and benefits. This project has shown that local capacity can be developed relatively cost-effectively and to a high-quality standard. That said, this project falls short of being fully successful in several areas. The development of local mine action capacity is a longer journey, not a destination. Transformation is urgently required in project design and funding modalities, as well as in designing and implementing holistic long-term strategic partnerships, if a genuine commitment to localization is to be created. Localization projects must exist within and be enabled by the strategic context, as well as the operational. A localization project that neglects careful analysis of the strategic element risks being nothing more than any other clearance project. More effort must be made to understand the context for localization projects and to ensure strategic factors are fully integrated; key here is that donors accept and understand the local agenda and context when defining their intent. Finally, a clear end point must be identified, funded, and worked toward—a year-on-year funding process which leaves the award of subsequent



An IHSCO team photograph.

year finding to the last minute is neither fair on local teams nor clear in commitment to the localization agenda. Localization is vitally important in HMA but if it is to succeed then the international mine action community must show a genuine desire to open up and engage in the necessary discussions that are required to create a viable long-term solution. ©

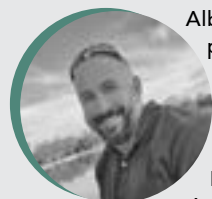
*See endnotes page 69*

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Mark Wilkinson, PhD, is the Chief Technical Advisor for DCA. He has over twenty years of professional experience in the military and HMA. As a former British Army Ammunition Technical Officer, he worked as a High Threat Improvised Explosive Device (IED) Disposal Operator in multiple operational environments before transitioning to HMA. In his previous post as the Chief of Operations for UNMAS in Iraq, Dr. Wilkinson gained extensive experience in developing localization projects for HMA. Dr. Wilkinson has an active research agenda focused around IED clearance in HMA environments as well as localization in HMA.

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Albert Schevey is currently serving as DCA's Operations Manager in Iraq, overseeing the capacity building and partnership grant. Schevey comes from a diverse background with twenty-five years of combined experience in international HMA missions, both commercial and private, and defense. He was previously the explosives and safety director of a leading defense manufacturer in the United States, a former U.S. government contractor overseeing biometrics and forensics analysis for Counter-IED efforts in Afghanistan, and a former EOD technician and Anti-Terrorism instructor for the U.S. Army. Schevey holds a Bachelor of Arts in Emergency and Disaster Management and an Associate of Science in Explosive Ordnance Disposal from the American Military University.

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Ahmed Al Zubaidi, PhD, is co-founder and the director of IHSCO. He holds a Master of Business Administration, Master of Arts in International and Community Development, and a PhD in socio-economic and politics with a focus on the role of Iraqi civil society in post-conflict nation building. Dr. Al Zubaidi started his NGO and HMA career with risk education in Iraq in 2003 and has expanded to cover victim assistance and search and clearance activities.

# GENDER AND DIVERSITY MAINSTREAMING IN MINE ACTION: **Where are we in Colombia?**

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**W**omen, girls, boys, and men are affected differently by landmines and explosive remnants of war (ERW) and hold different views on the challenges presented by them. Gender and other diversity factors, such as ethnicity and disability, condition individual views on vulnerability, needs, and coping capacities. This paper aims to identify the progress made by the humanitarian mine action (HMA) sector in Colombia toward gender equity and diversity through various methodological approaches and indicates that gender and diversity gaps persist. The greatest progress has been made in terms of policies and data disaggregation. We understand that public and organizational internal policies can contribute to equality; however, these should be reflected in both recruitment processes and differentiated approaches to mine action operations.



Women deminers in Colombia.  
*Images courtesy of The HALO Trust.*



Regarding mine action and **gender equity**, Security Council Resolution 1325 (2000) on Women, Peace and Security, specifically links gender and mine action as it is “Emphasizing the need for all parties to ensure that mine clearance and mine awareness programs take into account the special needs of women and girls.”<sup>1</sup> This progress was preceded in 1948 by the UN Universal Declaration of Human Rights, which formally recognizes the equal status of men and women,<sup>2</sup> and in 1978 by the UN *Convention on the Elimination of all Forms of Discrimination Against Women*.<sup>3</sup> To move toward fulfilling the commitments and objectives established in these international agreements, it is necessary to create strategies that acknowledge the differentiated effects of anti-personnel mines according to population groups, including girls and women, as well as the way in which these differences are addressed from the HMA perspective, in order to mitigate their impacts. **Gender mainstreaming** was defined to include women’s and men’s concerns and experiences; assess the different implications that any planned action has for women and men; ensure that women and men benefit equally; and ensure that gender inequality is not perpetuated.<sup>4</sup> In 2006, the “United Nations system-wide policy on gender equality and the empowerment of women: focusing on results and impact,”<sup>5</sup> set the basis for the accountability, results-based monitoring and evaluation for gender equality. This effort was complemented in 2010 by the publication of the “UN Gender Guidelines for Mine Action Programs,”<sup>6</sup> which are intended to help incorporate gender perspectives in all relevant mine action initiatives and operations.

In order to reduce and mitigate the discrimination and barriers encountered by persons with disabilities, the *Convention on the Rights of Persons with Disabilities (CRPD)*<sup>7</sup> was adopted in 2006 and entered into force in 2008, representing a substantial shift from viewing disability through traditional medical- and charity-based lenses to recognizing the rights of individuals with disabilities to participate freely and fully in society. Additionally, the CRPD emphasizes the rights and empowerment of women and children with disabilities as groups facing multiple and interrelated forms of discrimination. In mine action, persons with disabilities face several obstacles to employment because of poor access to education and proper health services; social stigmatization; poor

infrastructure/accessibility; and a lack of knowledge of the rights of persons with disabilities.<sup>8</sup>

In relation to ethnicity as an axis of inequality, there is a series of international standards to ensure the rights of these populations.<sup>9</sup> Within mine action, there are numerous, specific articles and standards addressing gender<sup>10,11</sup> and disability,<sup>12,13</sup> specifically victim assistance; however, we did not find specific documents addressing ethnicity. Despite this, there are several efforts to move toward equity within the framework of diversity. Ethnicity is a key issue within the Colombian context, given the evidence of exclusion and historical inequality to which the indigenous and Afro-Colombian populations have been subjected. We see the greatest progress in the adaptation of mine risk education tools, including the tailoring of content, translation into indigenous population languages, and the participation of individuals from different ethnic groups.<sup>14</sup> However, it is likely that the incorporation of Afro-Colombian or indigenous populations in other mine action activities, including humanitarian demining, are areas where less progress has been made.

The implementation of gender and diversity analysis and programming is crucial to ensure effective, sustainable, and inclusive mine action operations, while leading to higher productivity and a better working environment. Accordingly, through the implementation of surveys,<sup>15</sup> Fondation Suisse de Déminage (FSD) looked at progress made by the mine action sector in Colombia toward gender equity and diversity while also identifying remaining gaps and challenges. FSD reviewed the national regulatory framework related to gender and diversity and conducted a survey with four civilian mine action organizations (one local and three international) working in Colombia as well as one Colombian military operator. The survey consisted of twenty-six questions divided into five modules: 1) distribution of women according to activities within the organization; 2) recruitment of women, black people, indigenous people, and people with disabilities; 3) desegregation of data of beneficiaries and survivors; 4) policies; and 5) challenges and strategies implemented by the organization. Finally, a case study of the Nukak Mku community in Guaviare was analyzed through an anthropological perspective to document diversity mainstreaming in indigenous communities affected by landmines.

## National Framework of Gender

Colombia has tried to rise to the international challenge of including a gender equality approach from a public policy perspective. In 2013, Colombia adopted a National Public Policy on Gender Equality,<sup>16</sup> which includes a set of guidelines, procedures, plans, roles, and responsibilities for public offices and commissions to secure an environment free of gender violence. In 2018, however, there was a setback in the policy, as the National Development Plan 2018–2022 included a chapter called “Pact for the Equality of Women,” changing the framework from a broad, inclusive policy focused on gender to one specifically focused on women, thereby narrowing the definition of gender to a less diverse one.<sup>17</sup> The plan

set forth goals in terms of institutional capacity building for the following: women rights, education, healthcare, political participation and decision making, sexual and reproductive rights, freedom from violence, women in rural areas, and equality for women in peace building. The policy focused on increasing educational opportunities for women to secure better skilled opportunities for women in the labor market. The document uses the terms “women” and “gender” as synonyms.

Furthermore, the Peace Process discussions, beginning in 2012, opened the door to include a gender-sensitive approach for the assistance of victims of the armed conflict in Colombia. In 2013, the

National Planning Department issued guidelines for the prevention of risks, protection, and guarantee of rights for women victims of the armed conflict.<sup>18</sup> The document acknowledges the multiple challenges women victims face in armed conflict and draws on a comprehensive approach to provide access and opportunities for this population in terms of labor, education, health, and access to land, among others. A significant development in the guidelines was compliance monitoring and requesting detailed and disaggregated

data for follow-up activities; however, the guidelines were only valid until 2018 and the indicators were not further monitored.

Finally, the strategy toward a Colombia Free of Antipersonnel Mines (2020–2025)<sup>19</sup> was framed in the postulates raised from the human rights, gender, ethnic, and differential approaches. This framework requires the government to identify the rights of and ensure specific protective measures are implemented for vulnerable groups.

## Progress of Organizations Toward Gender Equality and Diversity

Five out of the seven organizations accredited in Colombia answered the survey prepared by FSD in July 2022. Tables 1 and 2 (next page) show the distribution of employees according to their tasks in each organization (military and civil organizations). Given that the biggest organization is a military one (Table 1), it is possible that the low percentage of women employed responds to characteristics of the military structure and not necessarily to its mine action operations, as explained in the qualitative component of the survey. Hence, a differentiated analysis of civil organizations is made in Table 2 regarding the participation of women within the organizations.

When FSD looked at the type of activity with the highest representation of women within the four civil organizations, we found that women make up 48 percent of administrative positions, followed by managerial positions at 45 percent, and non-technical survey (44 percent). The activity with the lowest percentage of women was explosive ordnance disposal (EOD) (an average of thirteen; two organizations did not report women working in EOD operations).

Regarding recruitment and training of Afro-Colombians, indigenous, and people with disabilities, four organizations reported recruitment and training of Afro-Colombians and indigenous persons, and three organizations reported recruiting and training people with disabilities. In relation to data collection, all organizations record information of beneficiaries and victims disaggregated by sex, ethnicity, and disability. Four organizations have a gender and diversity policy and three carry out awareness trainings.

From qualitative responses to the main challenges in advancing towards gender equity and diversity, three common aspects were pointed out by the organizations:

**Gender roles continue to be stereotyped.** Positions held by women personnel include community liaison, victim assistance, or explosive ordnance risk education (EORE) facilitators. In this regard, the organizations highlighted that few women are technically trained and that they do not tend to apply for other positions outside of those listed previously. This becomes even more critical in military organizations.

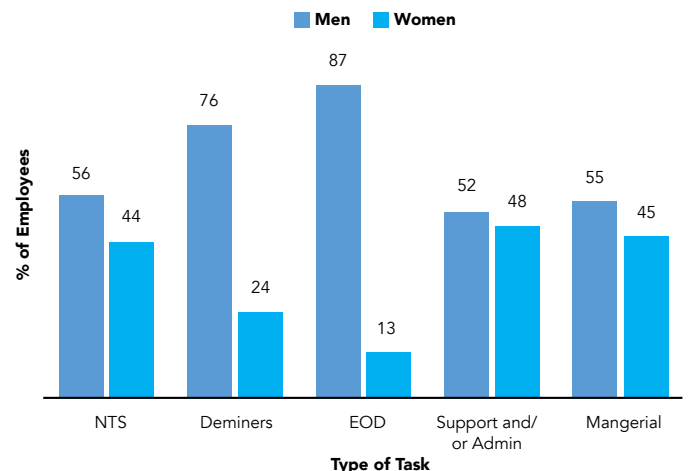
**Lack of policy implementation.** Despite the existence of gender and diversity policies, limited resources are invested in their implementation, and the activities carried out are generally marginal. In addition, although the NTS seeks to understand the context in terms of gender and diversity, it is not always a priority, nor, in

most cases, is there a strategy for equitable impacts for all populations (women, children, people with disabilities).

**Scarce progress eliminating access to work barriers in mine action for persons with disabilities and those belonging to ethnic groups.** Most organizations have established more specific strategies to include women within their teams. However, activities for people with disabilities and those from specific ethnic groups have been focused more on EORE beneficiaries or landmine survivors.

In terms of strategies for mainstreaming gender and diversity, the organizations mentioned the following:

- **Create an analysis tool to verify minimum mainstreaming of the gender approach adaptable to the reality of mine action organizations by area of work**
- **Conduct gender awareness workshops for employees**
- **Establish a team of Gender Focal Points in the field who work to prevent gender-based violence in the population**
- **Create policies on disability, age, gender, and ethnicity**
- **Develop risk education programs and tools with an ethnic focus**
- **Promote the recruitment of local personnel and women, and Afro-Colombian and indigenous persons in humanitarian civilian demining projects**
- **Ensure that women hold managerial and operational positions**



**Figure 1.** Global representation of women in the civil humanitarian demining sector per type of task.





A woman delivers an update on programming in Colombia. Image courtesy of The HALO Trust.

Mine action organization	Non-technical survey		Deminers		Explosive ordnance disposal (I, II, III)		Support and/or administrative		Managerial positions	
	Total Employees	% Women	Total Employees	% Women	Total Employees	% Women	Total Employees	% Women	Total Employees	% Women
<b>A</b> Military	400	1%	2,923	0%	123	0%	399	1%	3	0%

Table 1. Distribution of employees according to their tasks within a military organization.

Mine action organization	Non-technical survey		Deminers		Explosive ordnance disposal (I, II, III)		Support and/or administrative		Managerial positions	
	Total Employees	% Women	Total Employees	% Women	Total Employees	% Women	Total Employees	% Women	Total Employees	% Women
<b>B</b> IOs and/or NGOs	53	55%	229	23%	25	16%	138	46%	6	50%
<b>C</b> IOs and/or NGOs	136	47%	59	44%	5	0%	71	52%	18	50%
<b>D</b> IOs and/or NGOs	23	43%	57	18%	26	23%	40	48%	11	36%
<b>E</b> IOs and/or NGOs	24	29%	37	11%	19	11%	51	47%	11	45%
<b>Total (amount of employees/ average of women)</b>	<b>236</b>	<b>44%</b>	<b>382</b>	<b>24%</b>	<b>75</b>	<b>13%</b>	<b>399</b>	<b>48%</b>	<b>46</b>	<b>45%</b>

Table 2. Distribution of employees according to their tasks within international organizations and/or nonprofit organizations.



A female deminer working in Colombia.  
*Image courtesy of The HALO Trust.*

## Colombia Must Move Beyond Numbers to Mainstream Diversity: Nukak Makú Case Study

There are 115 indigenous groups living across Colombia. Between 2006 and 2022, 456 indigenous people were victims of a landmine accident. This translates into 9.3 percent of total civilian casualties. Sadly, 163 people (35.8 percent) were younger than eighteen years-old and 123 of the victims died. In 2021, 28.9 percent of landmine victims in Colombia were indigenous (forty-four out of 152).<sup>20</sup> In the following paragraph, we will briefly present the case of one of the indigenous communities most affected by landmine contamination, focusing not on the number of victims but rather the cultural, social, and economic impacts.

The Nukak people, the last nomadic tribe in Colombia, settled in the southern region of the country (Guaviare, Guainía, and Valle del Cauca). Guaviare territory was a strategic area and a mobility corridor for FARC guerrillas. Hence, this territory is contaminated with anti-personnel landmines laid by FARC.<sup>21</sup> For that reason, Nukak people had to leave their territory and seek refuge elsewhere.<sup>22</sup> Landmines have changed the daily lives of the Nukak community and contributed to the loss of their traditions. Hampered by the contamination, they have changed their diet

because of the inability to move freely throughout the territory for fishing, hunting, or gathering vegetables, palms, and insects of the Amazon rainforest.<sup>23</sup>

The national government has made efforts to implement mine risk education (MRE) models with an ethnic focus, as well as to strengthen its relationship with the indigenous communities through a land management strategy that recognizes the protection and political-administrative autonomy of indigenous people. For example, in 2019, sixty-four Colombians who identified as indigenous Nukak received MRE. This number increased in 2020, when 150 received risk education. However, it is necessary to move toward the comprehensive fulfillment of the other commitments outlined in the strategic plan and other policies. This includes allocating resources and setting clearance priorities that reflect the specific, ongoing challenges in the territory and the cultural diversity of every community. Among the most visible activities is the participation of indigenous organizations that carry out risk education or the participation of the indigenous population in NTS tasks.



## Final Considerations


In practical terms, implementing gender mainstreaming should include the following: understanding of the political/country context; the consideration of women's and men's needs, rights, and priorities; women and men's participation in decision-making; requirement of gender mainstreaming capacity of all partners; collection of sex- and age-disaggregated data; and adoption of a gender-sensitive terminology.

In the specific case of the mine action sector in Colombia, there is a will to advance toward equity. It is reassuring to see women in decision-making positions, whether in managerial or administrative roles, yet the gender stereotypes of women behind desks continue to be reinforced. This could be caused by a significant lack of monitoring and evaluation mechanisms that make it impossible to ensure and demonstrate progress, and/or setbacks in policy implementation.

While gender and diversity gaps persist in mine action in Colombia, the greatest progress has been made in terms of policies and data disaggregation. Public and organizational internal policies are an important step toward equality; nonetheless, these

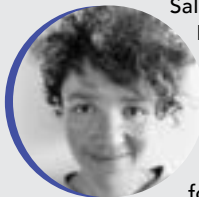
should be reflected in both recruitment processes and differentiated approaches to mine action strategies.

In order to advance the inclusion of disabled and ethnic persons, policies on disability and ethnicity should be implemented and monitored, and disabled and ethnic minorities should be involved in decision making and planning. Risk education programs and tools with an ethnic focus should be available in all regions of the country with indigenous populations. Finally, there should be active recruitment of persons of all genders, ethnicities, and disabilities in civilian demining projects and operations.

This report did not address intersectionality nor was it able to gain in-depth insight into the representation of indigenous, Afro-Colombian, or disabled people among mine action organizations. Therefore, it is important to continue investigating how the axes of inequality mentioned herein are related, and how they impact the survivors of anti-personnel mines and the beneficiaries of mine action programs. Mainstreaming diversity within mine action in Colombia requires moving beyond numbers. 

*See endnotes page 70*

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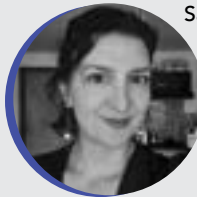
Salomé Valencia Aguirre, MD, currently works at FSD as a Technical Adviser on data analysis. Valencia Aguirre has experience in research carried out in the field of evidence-based decision making in different areas such as the impacts of armed conflict on population health and prioritization of areas of the country for interventions, gender analysis of policies and interventions, and geospatial analysis of mortality and mobility associated factors. She has been working in the field of humanitarian demining, supporting the national authority in monitoring indicators to improve operational efficiency and the systematic and rigorous use of information. Valencia Aguirre is an MD and holds a Master's in Public Health and is a PhD candidate.

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# THE ROAD AHEAD:

## Clearance Toward Sustainability in Bosnia and Herzegovina

By Sean Sutton [ Mines Advisory Group ]

**T**he 1992–1995 Yugoslav wars resulted in landmines and explosive remnants of war (ERW) that continue to contaminate the Balkans. In 2021—over twenty-five years after the end of the wars—the *Landmine & Cluster Munition Monitor* considered Bosnia and Herzegovina to be the most explosive ordnance (EO)-contaminated country in Europe, and characterized the landmine contamination alone as "massive."<sup>1</sup> As of March 2022, *The Landmine Monitor* reported that Bosnia and Herzegovina had more than 945 square kilometers of suspected hazardous areas (SHA) and more than twenty square kilometers of confirmed hazardous areas.



A MAG deminer working in minefield in Brčko.  
All images courtesy of Sean Sutton/MAG.

From 1992–2019, there have been 8,120 known casualties from EO.<sup>2</sup> Since the decentralization of mine action operations post-war, demining teams have steadily cleared land in Bosnia and Herzegovina but operations have been hampered by funding shortfalls, the unwavering scale of EO contamination, and difficult weather conditions.



# BRČKO

Brčko is a strategic and sensitive area in the north of Bosnia and Herzegovina, bordering Croatia. Brčko is a self-governing entity with a diverse population representing various ethnicities and religions. Due to these attributes, it is often held up as a model for the rest of the country. However, eleven square kilometers are still suspected of landmine contamination and are a constant reminder of the Yugoslav wars. Mines Advisory Group (MAG) and Norwegian People's Aid (NPA) are aiming to make the district impact free of landmines by 2024.



MAG demining team heads to a minefield in Brčko.



Demining team in Dubravice Gornje, Brčko.

The suspected minefield area where MAG is working is located about ten kilometers south of the center of Brčko. It is flat and slightly hilly. It includes the communities of Dubravice Gornje, Dubravice Donje, Brezovo Polje, and partly the local community of Šatorovići. According to the 2013 census, there are 2,199 inhabitants in the listed local communities. According to the BHMACE plan, Brčko Istok is a mine suspected area (MSA) divided into six targeted investigations and five systematic investigations. The investigations were mostly

overgrown with tall forest and low vegetation. The Lukavac stream flows through part of the MSA.

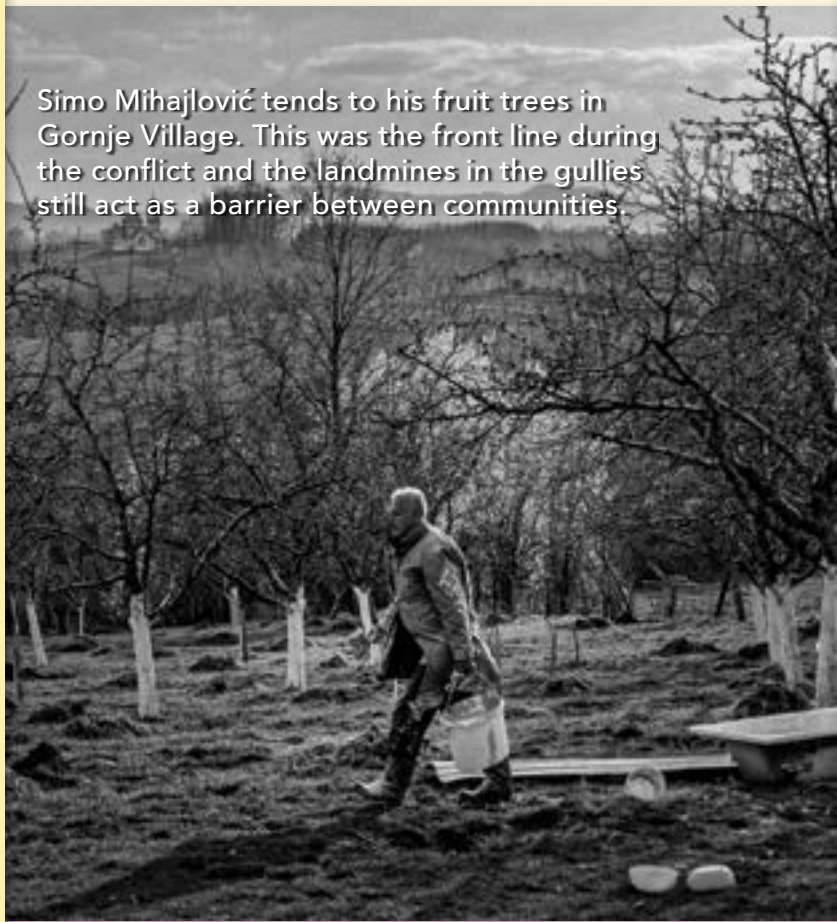
During the war, the MSA Brčko Istok was between the lines of confrontation between the Army of the Republic of Bosnia and Herzegovina, Croatian Defense Council, and the Army of the Republic of Srpska (VRS)<sup>3</sup> in the local communities of Dubravica Gornja and Dubravica Donja. Although not between the lines of confrontation, investigations into the area of Brezovo Polje reveal that anti-personnel mines were laid as security for the then-VRS rear war warehouse. The BHMACE project documentation contains a large number of mine records related to investigations, and it is also stated that there was a self-initiated laying of mines at the MSA where no mine records were made.

After the war, residents of the local communities began repairing buildings and clearing their properties, endangering their lives. After the war, three mine incidents and a mine accident occurred at the Brčko Istok MSA, which indicates a larger number of mines in the field, according to the project documentation. According to the MSA, there was self-initiated mine removal by the local population after the war.<sup>3</sup>

Many people have left Brčko, especially Bosnian Croats who have moved to Croatia, which is now part of the European Union. Many others have moved to Ireland, Austria, and Germany. Maybe if the land is cleared, they will come back? Who would want to live somewhere where their children might stand on a landmine in the forest?

People are very suspicious in this area. Fighting moved backward and forward over a four-year period, from 1992–1995. Technical survey found one PROM-1 mine and evidence of three more. A nearby swamp was drained and two more mines were found. Non-technical survey undertaken in 2019 significantly reduced the size of the suspected area from fifty-four square kilometers to eleven

Simo Mihajlović tends to his fruit trees in Gornje Village. This was the front line during the conflict and the landmines in the gullies still act as a barrier between communities.



A fallen minefield warning sign on Enes Čandić's land.

square kilometers. More work must be done to help people understand the land release methodology. Landmines in this area affect people who want to use and cultivate the land for growing oats and logging. Additionally, there are huge issues when it comes to selling land. If it is suspect land, how can you sell it? The authorities stop suspected land from being sold.

In Gornje village, Simo Mihajlović owns an orchard, which he hasn't had access to for thirty years as it borders a mined area. "I have always lived afraid of my land," he said. "My grandchildren could never be free here, it was very stressful."

Mihajlović explained that the area had been on the frontline which moved throughout the war. A PMA-3 mine was found here, located on the border of a risky area. Mihajlović also showed us the location of the PROM-1 mine, situated just a few meters from the end of his orchard. He told us he is very afraid when his grandchildren visit as he fears they will step on a mine.



*It is very difficult to get people to come and work here during the harvest. They come here, see the mine signs, and then leave. There is nothing else for me to do. I love my farm and growing fruit. We are living next to the landmines still, after all these years. How is that right? I don't understand why this is not a priority, Čandić explained. Whenever I use the land I find more bullet casings—and that immediately sends me straight back to the war.*

*I came back to this land here in 1997. This is ancestral land; my father was here as was his father. It had been neglected and the trees were very damaged. I had 600 trees but everything was destroyed. Soldiers told me that the area was mined, especially along the gully.*

*I waited a long time and the authorities kept telling me that clearing my land was a priority. They said that in 1996, in 1999. In the end I spent €10,000 to have the orchard cleared of landmines.*

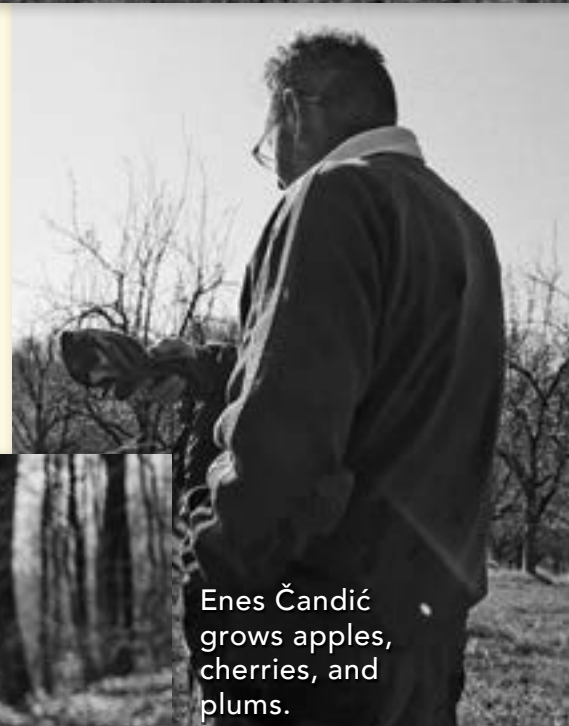
*After that, I was happy and went to work. Seven days later I was driving my tractor when there was a big explosion and lots of smoke. I knew what had happened. It was a landmine. I was with people from the village, we were cutting logs. I was so worried but everyone was fine. The machine took the blast and was destroyed. It had cost me €15,000. That night we bought a lamb and had a party to celebrate we had all survived.*

*Ten years later, in 2008, I was ploughing between the trees in the orchard when I uncovered two PMR-2 landmines. You can't imagine what it is like for people. I am used to it, but when I hire workers and they don't come back, I feel responsible. They are afraid and I am responsible—I can't ask them to work here.*

*I always had to keep a keen eye on my son and daughter. My wife and I were always afraid for them and made sure they didn't go down to the creek. I am happy MAG is here to clear the rest of the land. We know there are more mines here and we are afraid. The deminer I hired cleared just the orchard. The creek is still mined for sure.*



Enes Čandić with the community liaison team close to where the accident happened.



Enes Čandić grows apples, cherries, and plums.



Enes Čandić walking near contaminated land.



Sead Junuzović in Šatorovići, "No Man's Land."

## ŠATOROVIĆI, BRČKO

*My house has a very sad history. This was 'No Man's Land' and my house was used as a place to exchange prisoners. They were taken here by one side at an agreed time and then the other side would come and fetch them. But they would always be dead. Tortured and dead. That is how it was. I was a major in the Army and I never allowed that kind of thing. I always stuck to the Geneva Convention and so did my soldiers. But not everyone was like me.*



A sign marking the danger at Sead Junuzović's property.





This area next to a lake in the forest was a weapons and ammunition storage area during the war and was defended on three sides by minefields.



Workers from the village come to the fields to harvest cherry tree saplings which are sold by the Forestry Department.

## POLJE VILLAGE

MAG teams have just started working in woods run by the Forestry Department, conducting technical survey to determine the high-risk areas. The community liaison team organized for Želiko Jović, a local resident, to visit and assist in determining some of the landmarks highlighted in the minefield sketch map. One reference was a chicken shed which no longer existed. Jović was able to show where it was, and the map suddenly made sense to everyone.

The field is bordered on two sides by suspected minefields.

*We are always afraid of landmines in the village. A man was killed here a few years ago trying to clear them.*



Želiko Jović works with the team to help identify landmarks found on old minefield sketch maps.



Nehrudin and Zuleja Alihodić live a hard farming life high on a hill overlooking a beautiful valley.

## VOZUĆA

This area was a major frontline during the war and was a very strategic area at the time. The battle that happened here is referred to as one of the most defining in the war.

It is amazing to have the landmines cleared and be free. Nehrudin was a soldier here during the war and was shot in both legs. His walking has been a bit unstable ever since he recovered. He said, “War is terrible—we don’t want that to happen again. Not ever.”

*There was a military position at the next village called Cvijetići and there were minefields to defend it. They lost the battle and have all gone, they never came back. We knew the area was dangerous after a man lost his leg there. A cow was blown up as well. A man also used a tractor to clear vegetation from the area. When the pile of cleared bushes was burnt, it exploded. That surprised everyone, no one expected that to happen.*

Zuleja came to the village when she married Nehrudin after the war. “I would look after the sheep, sometimes walk them on the hill. One day I went into the minefield and didn’t know it. This happens to a lot of people. I came back with the sheep and my husband asked me where I went with the sheep. I explained and he was very shocked. “That is a minefield, you shouldn’t have gone there!” We were both shaken up. I had been so lucky. I could have been hanging in a tree in pieces.”



Ruža Spasojević returned home to her house in Vozuća in 2002.





“It feels so much better now. To know that area is now safe is a good feeling.” Nehrudin added, ‘I was up there this morning with the sheep, it is a very good area for grazing ...’”

Since the war, two landmine accidents have been reported in MSA Vozuća. In one accident a member of the local community lost his cow when it activated a PROM-1 mine. A second accident occurred during sheep grazing when a shepherd stepped on a PMA-3 mine, losing his leg. In the summer of 2021, two hunters were killed in a mine accident just two kilometers away from the MSA Vozuća.

During clearance in Vozuća, MAG found 102 anti-personnel mines, six anti-tank mines, and seventy items of unexploded ordnance (UXO). The area released is two square kilometers, and MAG cleared 143 square kilometers, with 530 square kilometers reduced.

*When we came back everything was destroyed. This hamlet of eight houses was mostly damaged. Mine was one of the few not burnt to the ground, so I was lucky. All the windows were looted, anything useful gone. Organizations like [ the Swedish International Development coordination Agency ] SIDA helped us and gave us materials and we rebuilt our farm slowly. We knew that there were landmines around, people had told us. We were always careful but lucky not to lose any animals. My mother was very worried about me living here. Now MAG has cleared the landmines, I really appreciate the second chance it has given me to have a life. It makes me very happy.*

MAG teams found twenty-four landmines and twenty UXO on the hillside behind Ruža’s house. The closest landmine was just fifteen meters away. She is now a widow, and her children live overseas. “Now I have freedom. Freedom to walk where I want.”

# ČAVAS

*I have been with MAG for nine months. It is my first job and I love it. It feels great to be doing something that helps other people. Also, I love nature, so it is nice to be working outside rather than in a hospital. Working with MAG can help me with my career in other ways too. I am saving up to study more. I want to be a pediatric doctor, that's my plan.*



Merjema Hodžić, MAG trauma medic.



Miodrag Živković,  
MAG team leader.

*I worked as a deminer for thirteen years with different organizations. I have been with MAG for five of those years. I was promoted to team leader just five months ago and I am very happy about that. I am still learning of course, and I have established a good relationship with the team. The work we do is vital. People are still going home, coming back. You see that here in this village. Landmines are one of the problems. Often it is the big blockage. People are always very happy to see us, they are so grateful—we see them every day.*

*Every time I find a landmine, I feel like I have saved a life. I have found more than a thousand in my career—that is very satisfying.*

*The PROM-1 landmine is a very dangerous mine. I always approach them with great care. This is the most dangerous mine in Bosnia, and they have killed many people. Usually, they are buried with the top sticking out which is attached to a tripwire—1.5 kilos of pressure will initiate it.*



Speaking of his grandfather, thirteen-year-old Veljko from Slobodan stated, "My family have lost a lot of cows to landmines. The last one died in 2017 when I was nine-years-old. My grandfather cleared about 1,000 landmines. That's why they called him mongoose."



Veljko with his uncle.



Vinka Milosević with son Velmir and grandchildren Teodora, Tasa, and Vasilije.

Only two houses have been fully renovated in the village. The road here is very bad, there is no electricity and many landmines. There is no school, no water, no investment. I was the first one to come back here in 2007. The kids know of the dangers, they hear the [mines] exploding in fires and when animals stand on them. They are afraid and always ask about the mines. ©

See endnotes page 70

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Mines Advisory Group  
International Communications Manager  
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Sean Sutton is an award-winning photojournalist; his well-known pictures show the impact of landmines and explosive remnants of war on communities and have been published and exhibited all over the world. His book documenting how unexploded ordnance affects people in Laos was runner-up for the Leica European Publisher's Award. Sutton is MAG's International Communications Manager and has worked for the organization since 1997.

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**The Road Ahead: Clearance Toward Sustainability in Bosnia and Herzegovina** by Sutton [ from page 56 ]

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Topics of interest include survey, open-source research, clearance, survivor assistance, environmental considerations, and risk education.



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With the need for battle area clearance and debris disposal in the Middle East and Ukraine, what challenges do urban settings and destroyed buildings present for detection, clearance, and disposal activities?

*Figure courtesy of The HALO Trust.*

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How can the community employ gendered analysis when planning for activities within the PSSM framework? How have organizations worked to employ women in these activities and what have the effects been on the programs as well as the local population?

## History of SA/LW & PSSM: Lessons Learned and the Way Forward

How has PSSM evolved over the past decade? Has the process for risk assessments changed? What have organizations learned about accountability/inventory systems, training/risk assessments, maintaining physical infrastructure of storage sites, or destruction of surplus and obsolete stockpiles?

## Legal Considerations for Remote Sensing and Artificial Intelligence in HMA

With the ever-evolving nature of artificial intelligence, what measures are in place and/or necessary for organizations using AI? Is there a need for standards within IMAS? How are organizations using this technology working within national and international legislation?

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When dealing with surplus or obsolete stockpiles of ammunition or SALW, how can countries efficiently dispose of munitions? What techniques or equipment are programs using to ensure these weapons are destroyed at minimal cost while maximizing safety?

*Figure courtesy of Tetra Tech.*



## Linking Explosive Hazards Clearance and Industry

In post-conflict scenarios, key infrastructure with known explosive hazards is prioritized for clearance. However, in situations where large-scale contamination impacts critical industries such as agriculture and energy, how should mine action organizations allocate their resources?

## Quick Reaction/Response Force

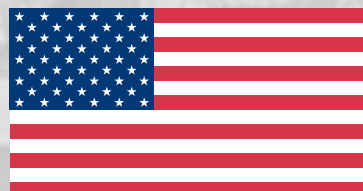
What kinds of resources can the global community employ to quickly address high-risk explosive contamination to civilians and ongoing recovery efforts? Whether it's BAC or PSSM, how are organizations using best practices and cost-effective measures to protect civilians and infrastructure?

## Reporting and Terminology

From terminology to record-keeping, how can we improve the community's reporting of improvised mine casualties so that transferring data between different organizations is seamless and the likelihood of errors is minimal?

Direct inquiries or submissions to  
[cisr-journal@jmu.edu](mailto:cisr-journal@jmu.edu)

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# CALLS FOR PAPERS

# THE JOURNAL

of Conventional Weapons Destruction



## Ukraine

For the 27th edition, *The Journal* is accepting articles on a rolling basis about mine action (MA) and CWD operations in Ukraine.

### Cluster Munitions

How are organizations preparing for survey and stockpile destruction in Ukraine? How is MA tailoring risk education (RE) to reach those most vulnerable to munitions, including children, refugees, and pastoral communities?

### Innovative Training Aids for Mine Action and Risk Education

Advances in 3D printing and augmented reality help EOD instructors communicate abstract concepts. *The Journal* seeks articles on how operators are using innovative methods and technology for MA and RE training.

## Flooding and Mine Action: Yemen, Vietnam, Cambodia, and the Balkans

With increased flooding events occurring or having occurred in Yemen, Vietnam, Cambodia, and the Balkans, how are organizations coping with the potential shifting of landmines due to flooding caused by landslides and mudflows?

### South Caucasus

Due to fighting between Armenian and Azerbaijani forces in the South Caucasus, the conflict zone of Nagorno-Karabakh is contaminated with mines and unexploded ordnance that kill and maim civilians, impede the return of displaced populations, and hinder economic development. What challenges are organizations facing while clearing the region?

### Survivor Assistance and Ukraine

In times of conflict, persons with disabilities face multiple challenges: barriers to evacuation and being left behind in dangerous situations; inaccessible shelters; and an inability to access humanitarian aid. How can the community ensure that survivor assistance is not overlooked by donors, the government, and NGOs? How can the sector ensure digital RE is accessible to disabled persons? Will survivors have access to the services they need and will they be included in the planning and mobilization of operations?



## Interoperability in Mine Action and PSSM

Frequently, humanitarian demining and CWD programs rely on the capacity, expertise, knowledge, and resources of multiple entities. How are programs making connections, building relationships, growing capacity, and strengthening regional security?

*Figure courtesy of ITF Enhancing Human Security.*



## Anti-Handling Devices and Booby Traps

How are mine action operators relying on their training and active information-sharing channels to be aware of known threats so that they can clear landmines and IEDs safely?

*Figure courtesy of Norwegian People's Aid.*

LEARN MORE



## Machine Learning for Open-Source Intelligence in MA

Events in Ukraine demonstrate the value of open-source intelligence. How is mine action integrating computer vision into object detection and identification tools? And how are organizations looking to gather and analyze data from public sources?

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