Past, Present, Future: Mine Action in Motion by Ambassador Stefano Toscano [from page 8]

2. In the late 1990s and early 2000s, much of the detection R&D and trials were related to metal detectors. The hopes at that time were that the Ground Compensation and Large Loop detection were going to be the silver bullet, which wasn’t the case. In the 2010s, R&D moved towards the dual and double sensor detection (metal detection and GPR). While this advancement did enhance the efficiency of work, it by no means provided the silver bullet (for many reasons) that the sector was (is) seeking. However, through this R&D work, progress has been made and its undeniable that efficiency and safety of operations has improved as a result.
3. The foundation behind the Humanitarian-Development-Peace-Nexus (HDPN), also known as the triple nexus, is based on the need for stronger collaboration, coherence, and complementarity towards the delivery of collective outcomes. By leveraging the comparative advantages of its three dimensions, the nexus has the potential to reduce vulnerabilities and decrease the number of appeals that remain unanswered, while strengthening risk management capacities and tackling the root causes of conflict. In addition, this approach has been at the center of multilateral efforts to fulfill the commitments made at the 2016 World Humanitarian Summit and accelerate progress towards the 2030 Agenda for Sustainable Development. The triple nexus promotes a change in the way activities are planned, implemented, monitored, reported, and financed in order to more effectively and coherently meet needs, reduce risks, and build resiliency in the short, medium, and long term.

Mine Action: The Early Years by Ian Mansfield [from page 11]

8. After the Guns Fall Silent; The Enduring Legacy of Landmines, Shawn Roberts and Jody Williams, VVAF, 1995.

Applying “All Reasonable Effort” in the Falkland Islands Mine Clearance Programme: Encouraging Efficient, Confident, and Timely Evidence-Based Land Release Decision Making by David Hewitson and Guy Marot [from page 16]

1. Previous incarnations of the LRC, responsible for work in earlier phases of the programme included Bactec International Ltd and Dynasafe Bactec Ltd.
2. From Phase 5 project contractual documentation, Section 4 – Statement of Service Requirement.
3. IMAS 07.11 Land Release, Edition 1, Amendment 5, February 2019, includes broad guidance on the process elements influencing ARE. The recently released TNMA 07.11/03 All Reasonable Effort (ARE), Version 1.0, March 2021, provides more detailed advice on what constitutes ARE and how to demonstrate its application. Sources such as https://www.hse.gov.uk/managing/theory/alarpangle.htm explain the concept and practice of ALARP.
5. In some cases over 40cm of peat had ‘grown’ over the 1982 mine layer surface level, and on beach areas 11m of sand had accumulated.
6. Suspected hazardous areas (SHAs) in the Falkland Islands were likely to contain other forms of ERW as well as mines. Mine clearance procedures were targeted only on those parts of the SHA where mines were expected until the LRC and DPO were confident that they had all been found and dealt with. At that point the remaining area within the fenced boundary of the SHA could be searched for non-landmine UXO (mortar rounds, grenades, etc.) using the much faster BAC techniques. At some SHAs less than 5 percent of the total SHA area was subject to mine clearance procedures, but the entire area needed to be checked for other UXO hazards.

Linking Mine Action and Development: The Case of Komyshevukha by Nick Vovk [from page 28]

Developing National Landmine Clearance Capacity in Ukraine by Tobias Hewitt and Ronan Shenhav


Due to the fact that Ukraine does not possess a state-run EO incident database DRC-DDG has been tracking EO accidents by collating open resource data since 2014: https://bit.ly/33K3Qvyq.


These include Ukrainians (52%), Russians (40%), Belarusians (5%), and Moldovans (3%). Many are pensioners (40%) with some children (10%).

Employed represent 30% of the settlement as farmers as well as miners, pharmacists, teachers, etc.

Data collected through DRC-DDG needs assessments between 2018 and 2021 through (phone and in-person) key informant interviews, focus group discussions, and participant observations.

By June 2021, DRC-DDG demining teams released 66,417 sq m of land and permanently marked 23,119 sq m of contamination in Komshyshuvaka; their work will continue until autumn 2021.

In doing so, DRC-DDG EORE team reached 619 residents of Komshyshuvaka by June 2021 (or 20% of the entire population): 42.3% male, 57.7% female; 14.7% children (between six and 11 years old), 14.2% adolescent (12 to 17 years old), 38.5% adults (18 to 59 years of age), and 32.6% elderly (60 years old and above).

The M&E system was designed to be both formative (field monitoring visits, programme quality checks, quality assurance and quality control, etc.) and summative (focusing on outcomes and capturing lessons learned). Moreover, participatory methodologies are being used, inclusive of needs assessments, community meetings, collection and analyzes of feedback and concerns shared by beneficiaries via complains and reporting mechanism as well as through focus group discussions and key informant interviews.


Due to delays caused by the COVID-19 pandemic and the consequent quarantines as well as the winter stand-down period (with cold and snowy conditions preventing demining in eastern Ukraine) clearance continues until present day.

DRC-DDG legal assistance team was funded under a different donor.

Developing National Landmine Clearance Capacity in Ukraine by Tobias Hewitt and Ronan Shenhav [ from page 35 ]


2. The most heavily contaminated areas are thought to be around Vinnitsia, Ternopil, Zhytomyr, Dnipro, Odesa and Kharkiv. The Crimean peninsula remains one of the areas most affected by ERW contamination from WWII. Landmine Monitor, Ukraine 1999, http://archives.the-monitor.org/index.php/publications/display?act=submit&pqs_year=1999&pqs_type=lm&pqs_section=lm&pqs_report=ukraine&pqs_section.

3. Until 2012 she called the Ministry of Emergency Situations.

4. Through the SES Department of Pyrotechnic Works and Humanitarian Demining.


7. An inter-ministerial working group was up for this purpose in 2006. The Cabinet of Ministers Decree No. 131 of 18 February 2009 adopted the State Programme for Demining by the Ministry of Emergency Situations for 2009–2014, foreseeing clearance of 15 km2 over five years with the destruction of 500,000 items of ERW. In 2010, relevant ministries were tasked to forward proposals by to establish of a national body for demining and a presidential decree established a NMMA in 2013. Landmine Monitor, Ukraine 2014, http://www.the-monitor.org/en-gb/reports/2014/ukraine/mine-action.aspx.


Saving Lives in Eastern Ukraine: Alternative EORE Approaches by Olena Kryanova [from page 43]

Explosive Ordnance Risk Education in Ukraine during the COVID-19 Pandemic by Andro Mathewson and Asya Bolotova [from page 49]
6. The official definition of EORE is "activities which seek to reduce the risk of injury from EO by raising awareness of women, girls, boys, and men in accordance with their different vulnerabilities, roles, and needs, and promoting behavioral change. Core activities include public information dissemination, education, and training."
8. UNICEF has been providing laptops to schools and children across Ukraine during the COVID-19 pandemic to help minimize the negative effects of the pandemic on education.

Landmine Clearance and Socio-economic Development: A Study in Colombia by Oliver Ford, Amasia Zargarian, and Eric Keefer [from page 53]
1. A department is the Colombian equivalent of a state in the United States.
4. A vereda is an administrative division within a municipality. It represents an important geographical demarcation for humanitarian mine action in Colombia.

Impact Caused by the COVID-19 Pandemic on Humanitarian Demining in Colombia by Salomé Valencia Aguirre, Angela De Santis, Ph.D., and Sebastián Tovar Jaramillo [from page 60]
8. Three international organizations (The HALO Trust, Humanity & Inclusion, Danish Demining Group), plus two national organizations.

Moving the Story Forward: Utilizing Deminer Narratives to Increase Women’s Empowerment in Mine Action and Beyond by Brenna Matlock [from page 64]
1. The study utilized the definition provided by John Creswell in Research Design: Qualitative, Quantitative, and Mixed Methods Approaches, "Phenomenological research is a design of inquiry…in which the researcher describes the lived experiences of individuals about a phenomenon as described by participants. This description culminates in the essence of the experiences for several individuals who have all experienced the phenomenon." In this case, the lived experience of women who are deminers is examined in the study.
2. According to The SAFE Encyclopedia of Communication Research Methods, "Rhetorical theory is fundamentally concerned with composition, forms, functions, means, venues, producers, audiences, effects, and criticism of discourse." Rhetorical strategies and theories are utilized to examine the texts of both the public-facing documents and the women's survey responses.
3. The exception being South/Central America due to 1) the lesser number of demining operations in the region and the newness of the current demining programs such as those in Colombia.
4. Handling of all surveys and responses followed James Madison University Internal Review Board approved protocols to protect respondents' data and anonymity.
Digital Rehabilitation Technologies Deliver Hope for Survivors by Abder Banoune [from page 68]

6. As it is shown by the Landmine and Cluster Munition Reports 2020, over the previous year casualties from cluster munition attacks were reported in Syria and Libya, while casualties due to cluster munition remnants were recorded in ten countries and other areas: Afghanistan, Iraq, Lao PDR, Lebanon, Serbia, South Sudan, Syria, and Yemen, as well as Nagorno-Karabakh and Western Sahara. Similarly, mine casualties in 2019 were identified in fifty-five states and other areas, of which thirty-six are States Parties to the Mine Ban Treaty. Action 38 of the OAP. Available here: https://bit.ly/36TzNMk.

Mental Health: Taking a Proactive Approach to Support Staff in Mine Action by Laura Biscaglia, Abigail Jones, and Robert White [from page 75]

1. This article uses the term “staff” to refer to full-time, part-time, national, international, paid, voluntary, professional, technical, non-professional, and clerical staff.
2. Semi-structured interviews were carried out with stakeholders from the mine action sector and experts on occupational health, mental health, and well-being in aid work.
3. Working Well? Aid worker well-being and how to improve it, CHS Alliance, January 2020
4. Mental Health: Strengthening Our Response, World Health Organization, 30 March 2018
5. The authors recognize that the above definition of mental health frames gender identity in binary terms, which suggests the need for an update.
6. Mental Disorders, World Health Organizations, 28 November 2019
7. Factors associated with common mental health problems of humanitarian workers in South Sudan, H. Strohmeier et al., 2018; The Mental Health of Expatriate and Kosovar Albanian Humanitarian Aid Workers, B.L. Cardozo et al., 2005; Factors Associated With Adverse Mental Health Outcomes in Recently Recruited Aid Workers Assisting Iraqi Refugees in Jordan, C.B. Eriksson et al., 2013.
9. Men’s Mental Health: Beyond Victim-Blaming, Rob Whitley, 2018
10. UNHCR’s Mental Health and Psychosocial Support for Staff, Courtney E. Welton et al., 2013
11. Ibid.
21. Gender-Based Differences in Burnout: Issues Faced by Women Physicians, Kim Templeton et al., 2019
22. Mental Health and Substance Use: Gender and Women’s Mental Health, World Health Organization, 2015
27. A survey conducted by Mines Action Canada in 2019 concluding that approximately 80% of field operations or national staff are men and 19% are women. https://www.minesactioncanada.org/bythenumbers.
31. IMAS 07.14, Risk Management in Mine Action
32. IMAS 10.10 Safety & occupational health - General requirements
33. Ibid.
34. Humanitarian Aid Workers Mental Health and Duty of Care, Liza Jachens, 2019.


Data Driven Decision Making in Southeast Asia by Mikael Bold and David Avenell [from page 85]


Key Performance Indicators (KPIs) for Land Release and Stockpile Destruction Operations – Notes on a New Technical Note for Mine Action by Roly Evans and David Hewitson [from page 91]

3. Danish Church Aid (DCA), Danish Demining Group (DDG), Swiss Foundation for Mine Action (FSD), The HALO Trust, Mines Advisory Group (MAG), Mine Action Review, Norwegian People's Aid (NPA), Handicap and Inclusion (HI), United Nations Mine Action Service (UNMAS).
Mohammed Al-Husseini, Ph.D., Ali El-Hajj, Ph.D., Mohammed Baydoun, Ph.D., and Hassan Ghaziri, Ph.D. [from page 97]


15. UNGA (2017), Countering the threat posed by improvised explosive devices, UN Doc. A/RES/72/36, pp. 1-2


20. UNGA (2017), Countering the threat posed by improvised explosive devices, UN Doc. A/RES/72/36, pp. 1-2


Alternatives to Open Burning and Open Detonation: The Disparity Between HMA and Commercial Best Practices by Linsey Cottrell and Kendra Dupuy [from page 107]

First Steps to Limiting Conflict Pollution in Central Vietnam by Allan Vosburgh [from page 112]


8. Although it is understood that the data study alone cannot fully predict explosive weapons contamination as a variety of conditions are needed for the formation of this such as firing conditions, weather, ground type and age of munitions (to name some).

9. These weapon types are general such as air launched, ground launched shellings, rather than specific weapons manufacturers. It is also understood that a variety of factors contribute to the formation of explosive weapons contamination, not just where high levels of bombardments have occurred.

10. The advantage of the study being that the distribution of explosive munitions is focused on rather than the exact number of items in it.

11. Given that it takes considerable time and effort to verify or confirm an event or munition use.

12. For example, the data from the project could identify and establish suspected hazardous areas (SHA) polygons which could then later be entered in IMSMA and followed up by non-technical surveys.

13. As the project helps: 1) assist in raising awareness and prioritization of potential high risk areas of UXO contamination in Syria for risk education, 2) assist with prioritizing areas for on the risk mitigation activities and ground surveys as part of the initial stage of mine action, 3) support advocacy efforts in the de-mining sector and donor levels, 4) bring together key decision makers from all sides of a conflict, 5) highlight the need for an effective long term policy response and 6) contribute to reducing the threat posed by explosive munitions and the lasting impact it has to people living in affected areas.


18. Such as with the limited accuracy and trust of open source data, and the method likely under-counting the number of explosive munitions in a given conflict event, especially if no exact number of munitions was given.

19. This is as detailed as the study goes. It does not specify the exact weapon type used or manufacturer. For more information please see the aforementioned Carter Center reports.

20. The study was presented to members of the UNMAS Humanitarian Mine Action Syria Working Group in Amman on 15 September 2019 after being invited to do so. This built on a proof of concept study focused on Eastern Ghouta and in Yemen in 2018 conducted by one of the authors. In addition, at least 8 HMA actors focused on Syria have expressed interest in using the findings and method of the project for their work in Syria. Two HMA actors are currently testing the validity of the findings in their activities on the ground, while one has built in the method outlined in this project to enhance their own desk assessment process.

21. The advantage of the study being that the distribution of explosive munitions is focused on rather than the exact number of items in it.


24. With this count likely much higher given the limitations of the data, methodology and way UXO is formed.

25. Partially available from open sources.

26. This is in addition to various issues such as lack of international appetite for funding in government areas of Syria, sanctions and terrorism laws applied to Syria, and limited access into the country and within for entities that conduct de-mining. Such as Ukraine, Libya or in Yemen, where one of the authors conducted a pilot version of the explosive munitions project with Halo Trust in late 2018.


28. This often underutilized field was developed in the early 2000s from contexts in the 1990s, before being further enhanced in the mid 2010s. Two key reports on this topic that contains numerous examples of HMA being used in peacebuilding are 1) Geneva International Center for Humanitarian De-mining (GICHD), Mine Action and Mediation (Oct 2016). Accessed from https://bit.ly/3ht2s0m 2) International Peace Research Institute (PIRO), Preparing the Ground for Peace – Mine Action in Support of Peace Building (Feb 2004). Accessed from https://bit.ly/3kFUAb.

29. The completed project will span five reports and visualize and analyze a dataset of hundreds of thousands of explosive munitions uses extrapolated from tens of thousands of conflict events. This will cover thousands of communities in the 14 governorates of Syria from July 2013 until the present day. This data will be freely available from The Carter Center Syria Program on request. The Carter Center is expected to regularly update the dataset in the future as part of a routine maintenance of the project to keep it relevant.

30. They are currently seeking to develop a pilot project in Ukraine, develop other information layers to be used in the project as well as its wider use in the peacebuilding sector.

Management in Iraq by Mark Wilkinson, Ph.D. [ from page 120 ]


3. UNMAS data current as of June 7, 2021.


Managing Risk Through Transparency and Cooperation: Improving Lebanon's PSSM Capacity by Jamie McGhee [from page 125]

4. A term “compatibility group” refers to a grouping identified by a letter which, when referenced to a compatibility table, shows those explosives which may be stored or transported together without significantly increasing the probability of an accident or, for a given quantity, the magnitude of the effects of such an accident. Codes are used to indicate which natures may be safely stored together.
7. The term “hazard class” refers to the UN recommended system of nine classes for identifying dangerous goods. Class 1 identifies explosives.
8. The term “hazard division” refers to the UN classification system that identifies hazardous substances.
11. A PES is any stock of explosives, however or wherever stored (building, stack, vehicle, railway wagon, berth, transit shed etc), the explosion of which will affect an exposed site. "Quantity Distances and Licensing Criteria, JSP 482 Edition 4, Chapter 10," https://bit.ly/3gReXb.

Assisting Landmine Survivors in Yemen by Elise Becker and Tamara Klinghsheim [from page 129]


Remote Sensing and Artificial Intelligence in the Mine Action Sector by Martin Jebens and Rob White [from page 134]

6. Big data is a concept in computer science that broadly covers the collection, storage, analysis, processing and interpretation of enormous amounts of different data (in MA context this could be data collected during NTS; satellite images, remote sensing data, white papers, positions of different objects) The data-sets are too large or complex to be dealt with by traditional data processing software.

How to Implement Drones and Machine Learning to Reduce Time, Costs, and Dangers Associated with Landmine Detection

By Jasper Baur, Gabriel Steinberg, Alex Nikulin, Ph.D., Kenneth Chiu, Ph.D., and Timothy S. de Smet, Ph.D.

[from page 137]

1. Deep learning is a subfield of machine learning based on the use of deep neural networks. Machine learning is a subfield of artificial intelligence wherein a computer uses algorithms to improve at a task on its own only through experience. Artificial intelligence describes any program designed to imitate human perception.
7. UAV refers solely to the aerial platform (drone), whereas UAS refers to the drone along with the attached sensors, the ground control station, and the remote pilot controlling the autonomous flight.
13. EMI occurs when a current applied to a coil induces a magnetic field. This magnetic field will then induce electrical eddy currents when exposed to a metallic object, which then results in the induction of its own magnetic field towards the coils, generating an opposite current in the coil. This current from the metallic object is then detected by the instrument.
27. Ren, S., He, K., Girshick, R., Sun,J. (2015). Faster r-cnn: Towards real-time object detection with region proposal networks. Adv. Neural Inf. Process. Syst, 39, 39-91. (or negative templates) are images collected with no objects of interest present (PFM-1 mines or KSF casings in this case). Including them in the training data can often decrease the number of false positives by allowing the computer to clearly distinguish between background and objects of interest.
35. de Smet, Timothy; Nikulin, Alex; and Baur, Jasper, “Scatterable Landmine Detection Project Dataset 1-7” (2020). Geological Sciences and Environmental Studies Faculty Scholarship. 1-7. https://orb.binghamton.edu/geology_fac/4
36. Steinberg, Gabriel; Baur, Jasper; Nikulin, Alex; and de Smet, Timothy, “Scatterable Landmine Detection Project Dataset 8-9” (2020). Geological Sciences and Environmental Studies Faculty Scholarship. 8-9. https://orb.binghamton.edu/geology_fac/11.