

# THE JOURNAL

OF ERW AND MINE ACTION

Issue 18.3 | Fall 2014

## Pacific Islands

# Islands

ERW Contamination & Clearance

FEATURE: Program Management \* Notes from the Field \* Research & Development





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Conventional weapons and explosive remnants of war from World War II continue to litter the Pacific Islands. The misty overgrowth often camouflages explosive remnants of war.

*Photo courtesy of Len Austin/Golden West Humanitarian Foundation.*

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*The Journal of ERW and Mine Action* is a professional trade journal for the humanitarian mine action and explosive remnants of war (ERW) community. It is a forum for landmine and ERW clearance best practices and methodologies, strategic planning, mine risk education and survivor assistance.

*The Journal* Editorial Board reviews all articles for content and readability, and it reserves the right to edit accepted articles for readability and space, and reject articles at will.

The views expressed in *The Journal* are those of the authors and do not necessarily reflect the views of the Center for International Stabilization and Recovery, James Madison University, the U.S. Department of State or the U.S. Army Humanitarian Demining Program.

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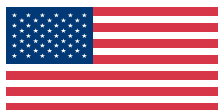
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## Director's Message

We would like to heartily thank the U.S. Department of Defense Humanitarian Demining Program (HD R&D) for its support of *The Journal* over the past seven years. This sponsorship allowed us to continue to publish the peer-reviewed Research and Development section when our previous sponsor could no longer fund it.

This issue of *The Journal* includes a Focus on the Pacific Islands, an area of the world that continues to be plagued by legacy explosive remnants of war (ERW) from various armed conflicts since World War II. President Obama's rebalance of resources toward the region is designed to make this part of the world safer by clearing the ERW and allowing prosperity to spread.

The Center for International Stabilization and Recovery (CISR) at James Madison University (JMU) has also focused its talents and resources in this region. Currently, CISR is implementing a project for disabled people's organizations in central Vietnam with our local partner the Association for the Empowerment of People with Disabilities. The project centers on a new public relations campaign to persuade the Vietnamese public that the rights of people with disabilities should be respected.

This issue's Editorial section includes our annual Reader's Survey. We encourage you to give us your feedback about the publication to help us improve and provide content that you think is important. The survey will take you about 10 minutes to complete. Please answer the survey questions and mail the questionnaire to us, or simply take the survey online at <http://tinyurl.com/kkbo339>.

Our Feature section in this edition highlights program management issues. JMU's College of Business Professor Dr. Paula S. Daly discusses "10 Best Practices for Effective Program Management" and CISR's Nicole Neitzey of offers "Best Practices in Managing Government Grants."

Notes From the Field articles cover a wide range of topics, from the impact of anti-vehicle landmines by Pascal Rapillard and Maryam Walton of the Geneva International Centre for Humanitarian Demining to FSD's Artyom Harutyunyan discussing, "Demining in the Remote Areas of Northern Afghanistan."

The peer-reviewed Research and Development section carries an evaluation of the Mini MineWolf by Phil Straw of the U.S. HD R&D. This issue also features an article by APOPO's Amanda Mahoney, et. al., about testing landmine clearance rats in operational settings.

While *The Journal* is a U.S. publication, we encourage and welcome articles from the global mine action/ERW community concerning new and innovative trends, topics, case studies and research of interest to those in the field. As always, we hope to hear from you about your work and any important topics you would like *The Journal* to cover.

Ken Rutherford  
CISR Director



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# The Journal of ERW and Mine Action 2014 Reader Survey

The staff of *The Journal of ERW and Mine Action* is very interested in what you think about our publication. Your feedback will help us improve the quality of information we provide to our readers. Please complete the survey by 1 February 2015 so we may include your feedback in the published results in our next issue of *The Journal*. You may answer the questionnaire anonymously; no personal information is needed to complete the survey. We encourage you to take this 10-minute survey online at <http://tinyurl.com/kkbo339> or email/mail it to us:

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1. What organization do you work for?

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2. Are you male or female?

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3. What is your age?

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- 26–40
- 41–54
- 55 or older

4. Where do you conduct the majority of your work?

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- Sub-Saharan Africa
- East Asia or Pacific Islands
- Central Asia
- Australia
- Central/South America
- Europe
- North America

5. How is your work related to conventional weapons destruction(CWD), explosive remnants of war (ERW), and/or unexploded ordnance (UXO)?

Please check all that apply.

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- Advocacy
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- Donor/sponsor
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- Government ministry or agency
- Grants/resource management
- Humanitarian assistance
- Information/data management
- Land survey
- Mine risk education
- Operations management
- Orthotist/prosthetist
- Program management
- Public engagement/public relations
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- Survivor/victim assistance services
- Training/education
- Other, please specify:



6. Which of these *Journal* topics interest you?

Please check all that apply.

- Mine action/ERW, for example:
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  - Mine/munitions risk education
  - Surveys/land release
  - Training
  - UXO/ERW
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  - Post-blast cleanup
  - Small arms/light weapons
  - Physical security and stockpile management
- Chemical, biological or nuclear weapons
- Improvised explosive devices (IED)/counter-IEDs
- Social issues, for example:
  - Environmental considerations
  - Gender issues
  - Health issues
  - Survivor assistance
- Legal and policy issues, for example:
  - Conventions and instruments of law
  - Disability rights and laws
  - Insurance
  - Land tenure/ownership
  - Public policy issues
- Management issues, for example:
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  - Monitoring and evaluation
  - Negotiation techniques
  - Personnel management
  - Project planning and resource management
  - Strategic planning
  - Other, please specify: \_\_\_\_\_
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  - Industry news
  - Obituaries
  - People in the field
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  - Clearance technologies or new techniques
  - Environmental effects of ERW
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  - Information technology
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  - Personal protection equipment
  - Robotics
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- Director's Letter (overview and news from CISR's director)
- Editorial/Letters to the Editor (opinions or feedback on previous articles)
- Focus (focus on a special region or country)
- Feature (special theme of the issue)
- Notes From the Field (topics outside the theme of the current issue)
- Profiles (people, countries, organizations)
- Special Report (in-depth review of a mine action trends or topics)
- Research and Development (R&D) (peer-reviewed articles with test results or analysis)
- News briefs (short articles on current events in mine action)
- Endnotes (documentation and further information)

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Topic:

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Organization:

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Occupation:

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Area of Expertise:

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Include a variety of lengths of articles (short, medium, long)

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to fill out the survey.***

***We appreciate your feedback!***

***For your convenience, you can also take this survey online at  
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## ERW Contamination in the Pacific Islands

The legacy of explosive remnants of war (ERW) has affected the daily lives of Pacific Islanders for more than 70 years. ERW contamination in the Pacific stems from conflict between the Allied forces and Japanese forces during World War II. Survey, clearance and information-management programs are helping to manage the continued risks to the impacted populations.

by Justin Smith [ GICHD ]



ERW clearance in the Marshall Islands.  
*Photo courtesy of Golden West Humanitarian Foundation.*

From the beginning of World War II (WWII) until the war's end in 1945, Japan established military bases and logistics hubs throughout Asia and the Pacific. The Island Hopping campaign used by Allied Forces to counter Japanese actions and attack mainland Japan resulted in fierce battles. Several islands were impacted by major battles or abandoned military ordnance depots, among them: The Federated States of Micronesia, Guam, Kiribati, the Marshall Islands, Nauru, the Northern Mariana Islands, Palau, Papua New Guinea, the Solomon Islands, Tuvalu and Vanuatu.

Pacific Island nations were predominately bystanders in the war; after clashes took place, islands were often abandoned by the fighting forces as they moved onto the next stage in the campaign. With the end of the war, Japanese forces were

repatriated and large numbers of U.S. forces were demobilized to return home. Although a few key military bases were maintained in the region (Guam, Japan, Korea, Philippines), remnants of war, both explosive and otherwise, were left scattered throughout the Pacific Islands. Sunken ships, wrecked aircraft, derelict tanks and gun emplacements, along with large quantities of explosive remnants of war (ERW), were simply left behind. Communities continue to live among these increasingly unstable and dangerous relics, such as those containing picric acid-based explosives, and other ERW that have begun breaking apart and polluting the soil and coastal bays.

In the years immediately following WWII, reconstruction efforts focused primarily on economic recovery in Europe and throughout Asia. For example, the U.S. Marshall Plan

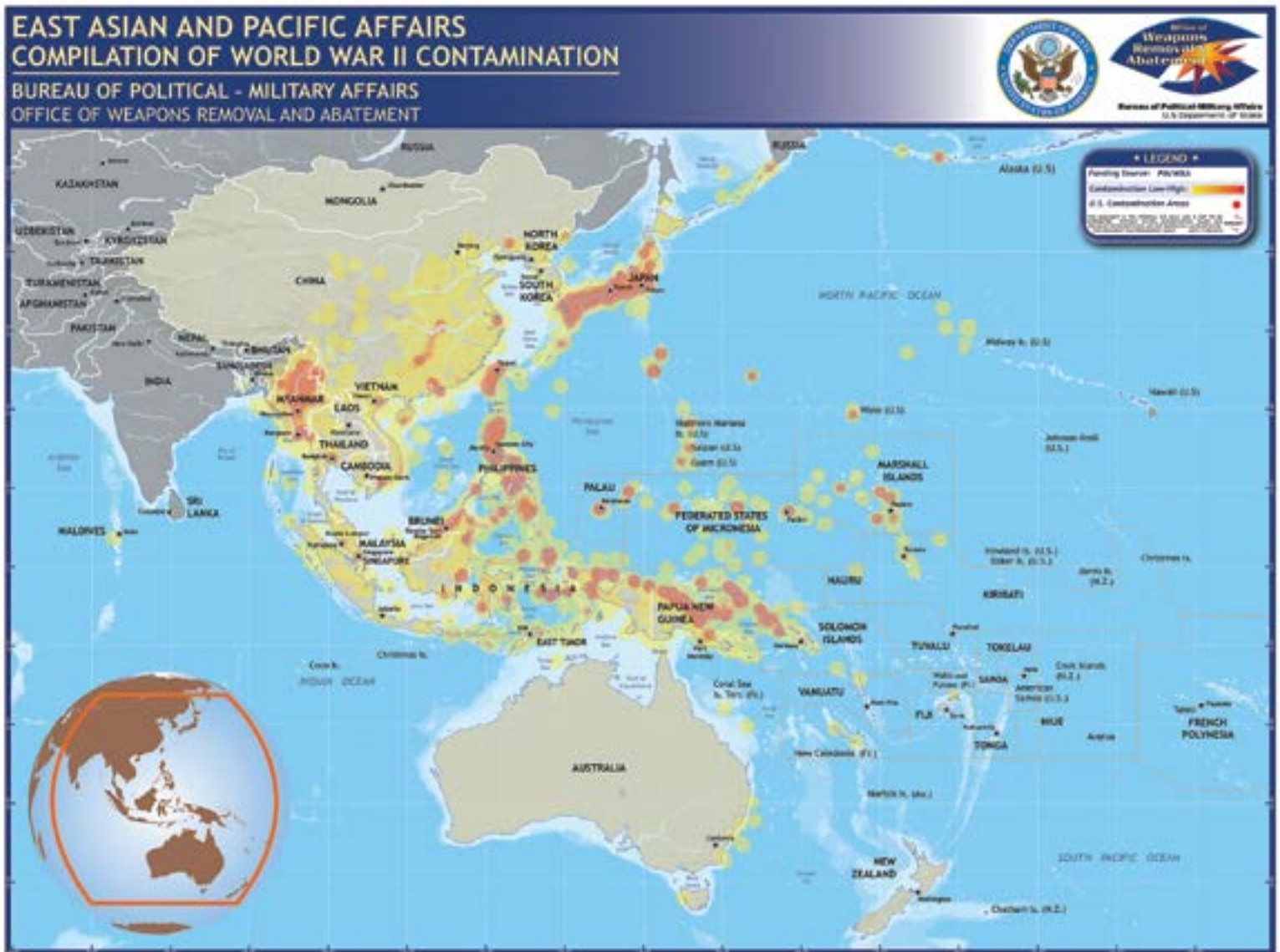


Figure 1. A map depicting contamination in East Asia and the Pacific.  
 Map courtesy of the Office of Weapons Removal and Abatement in the U.S. Department of State's Bureau of Political-Military Affairs.

indirectly enabled ERW clearance through infrastructure development in Europe, and investment in industrialization throughout Asia enabled similar clearance to take place. Japan's recovery began immediately after WWII with assistance from occupying U.S. forces until 1952. Likewise, nations known as the **Asian Tigers**, such as Hong Kong, Singapore, South Korea and Taiwan, began industrialization in the 1960s. Pacific Island nations, however, were largely left to suffer from ERW contamination. Sporadic ad hoc military engagements and clearance by nongovernmental organizations (NGO) has occurred over the years. However, to date, sustained and coordinated efforts have not cleared ERW contamination from the Pacific. The Pacific Islands need a planned and coordinated survey and clearance approach supported by the international

community. Such an effort would not only manage risk, but also help the islands' future development and recovery.

**Survey and Clearance Activities in the Pacific**

Recent ERW survey and clearance activities in the Pacific have included the military, commercial organizations and NGOs, with Australia routinely coordinating a multinational military operation in the Pacific entitled **Render Safe**. In 2013, Australia, Canada, New Zealand and the United States participated in the operation to remove ERW from the Solomon Islands.<sup>1</sup> In 2014, the operation is clearing parts of Papua New Guinea and Bougainville. In addition, Milsearch Proprietary Limited, an Australian commercial company, conducted survey and clearance activities in Kiribati, Papua





Japanese depth charges from the Palau Helmet Wreck.  
*Photo courtesy of the author.*

New Guinea and the Solomon Islands. NGOs, including the Japanese Mine Action Service, Cleared Ground Demining and Golden West Humanitarian Foundation (Golden West), have been active in the Marshall Islands, Palau and the Solomon Islands.

International and regional coordination efforts have only just started to take place in the Pacific. In 2011, the Pacific Island Forum Secretariat (PIFS) released a study of ERW in the Pacific, discussing contamination in four Pacific Island nations: Kiribati, Palau, Papua New Guinea and the Solomon Islands. The study found a number of commonalities among these island nations contributing to limitations on unexploded ordnance (UXO) clearance attempts. Domestic agencies were restricted in their ability to complete successful clearance due to geographical challenges, insufficient resources, capacity limitations and lack of data management in the region.<sup>2</sup>

In 2012, PIFS completed a Pacific Region Unexploded Ordnance Strategy, providing a base plan for regional survey

and clearance efforts, with the Geneva International Centre for Humanitarian Demining (GICHD) advising on information management and standards development. Although progress is being made, the Pacific is a long way from developing a comprehensive and coordinated approach to clearance of ERW.

#### **ERW Challenges in the Pacific**

With more than 20,000 islands covering an area of over 155 million sq km (60 sq mi), ERW clearance in the Pacific can appear daunting.<sup>3</sup> Yet, as with any clearance effort, understanding the problem's true extent is important. The Information Management and Mine Action Programs, Inc. (iMMAP) is conducting a study to identify the extent of ERW contamination in the Pacific Islands.<sup>4,5</sup> The study's results, due in early 2015, are expected to narrow the focus from thousands of islands to a few dozen islands which are significantly affected by ERW. Once traditional mine-action methodologies such as non-technical and technical surveys have been carried out, the problem will be further reduced.

Even as the scope of the problem narrows, other challenges remain. The accessibility of many Pacific Islands is problematic. Airfields and logistics support in the Pacific are widely dispersed, meaning that getting equipment and supplies to a Pacific port can take months, with additional time and effort required to transport it to those islands contaminated with ERW. Golden West developed an innovative Island Hopper approach of working in the Marshall Islands, whereby it deployed a small team to the islands of Taroa and Mili using light, mobile and low-cost clearance systems.<sup>6</sup> A military-style landing craft dropped off the team and equipment, and retrieved them two weeks later. During this time, the team safely disposed of more than 16,000 pounds (7,258 kg) of ordnance. Utilizing innovative approaches such as the Island Hopper method of clearance is essential for organizations working in the Pacific.

In addition, underwater ERW poses another prominent problem in the Pacific. Few countries have the capability to mitigate underwater ERW; Pacific Island nations are no different. Underwater ERW jeopardizes local communities by impeding development and contaminating the environment. In Palau, for example, a WWII Japanese ship sank in the waters of Koror harbor; this shipwreck is known as the **Helmet Wreck**. The wreck, a popular tourist attraction, contains approximately 164 Japanese depth charges leaking picric acid into surrounding waters. Although scientific testing has not occurred at this site, visual indications of environmental impact are obvious. Picric acid severely endangers health and safety. The explosive is extremely sensitive, and exposure of the chemical to skin or eyes will cause a serious reaction.<sup>7</sup> ERW littering harbors, potential anchorages and navigation channels in other areas impedes

port-development projects and efforts to support economic development.

#### A Way Forward

Effective clearance in the Pacific starts with an efficient regional information management to document and map ERW contamination and clearance efforts. Furthermore, regional coordination of NGOs, military and commercial activities would assist national authorities in managing operations. An accurate picture of the extent of ERW contamination and an understanding of past clearance would focus the scope of effort and assist in prioritizing clearance. These preliminary steps of data management, coordination, and research will go a long way to improving ERW survey and clearance activities in the Pacific.

Clearing the Pacific of all ERW is an unrealistic expectation. Experiences in Western Europe and Japan have demonstrated that it is appropriate to adopt a risk-management approach to mitigate the ERW which is not an immediate public health or safety concern. A current GICHD study, the Management of Residual ERW (MORE) project should prove useful by analyzing best practices for management of residual ERW.<sup>6</sup> This study is scheduled for completion in June 2015. The MORE findings will be relevant to Pacific Island nations' developing policy and instituting practices to minimize disruptions from ERW within their communities. Assisting the Pacific in moving beyond their WWII history will enable safer communities and limit socioeconomic impact. Regional coordination, information management and analysis of best practices will be an important step in the right direction. ©

*See endnotes page 65*



Justin Smith joined GICHD in February 2014 as advisor for Underwater Explosive Ordnance Disposal (EOD) Operations. Prior to joining GICHD, he spent 23 years in the U.S. Navy conducting EOD operations throughout Asia-Pacific, the Middle East and Europe. He holds a master's in security studies (with a regional focus on Asia-Pacific) from the Naval Postgraduate School in Monterey, California (U.S.).

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# Harnessing Geospatial Data to Enhance ERW Clearance in Pacific Islands

Since World War II, the prevalence of explosive remnants of war has persisted in the Pacific Island nations. Supported by the Office of Weapons Removal and Abatement in the U.S. Department of State's Bureau of Political-Military Affairs (PM/WRA) and partnered with the Pacific Islands Forum Secretariat, iMMAP seeks to improve the region's safety through lōōm, a geospatial information management system.

by Jessica Dell [ iMMAP ]

In what former U.S. Secretary of State Hillary Rodham Clinton termed “America’s Pacific Century,” security and economic stability in the Pacific Islands are rapidly becoming U.S. foreign policy priorities.<sup>1</sup> Battles between U.S. and Japanese forces in the Pacific Islands during World War II (WWII) left the islands contaminated with explosive remnants of war (ERW) and the continued threat hinders safety, security and economic development. Accordingly, the Office of Weapons Removal and Abatement in the U.S. Department of State’s Bureau of Political-Military Affairs (PM/WRA) has prioritized the safe removal of these hazards in the East Asia and Pacific region. To ensure ERW hazard removal activities are guided by comprehensive and up-to-date information, PM/WRA collaborated with the Pacific Islands Forum Secretariat (PIFS) to fund iMMAP (Information Management and Mine Action Programs, Inc.) and establish a regional information management support mechanism to enhance the Pacific Islands Regional ERW strategy.

## A Need for Information

When PM/WRA began providing support for conventional weapons destruction assistance in the Pacific Islands in 2009, it discovered that ERW clearance efforts in the region suffered from a lack of sufficient information. Reliable geospatial data on the location of ERW is a critical component in coordinating effective ERW clearance activities and making critical resource allocation decisions. However, limited information exists on lingering ERW contamination in most

of the Pacific Island region, making the task of properly prioritizing and implementing clearance projects in this expansive area challenging. The Pacific Islands’ regional geography renders traditional technical and non-technical ERW surveys impractical for developing a comprehensive picture of contamination. Since the islands are small and widespread, it is difficult to deliver people, equipment and supplies to them to conduct surveys.

While several ongoing efforts focus on reconstructing the historical ordnance use records in the Pacific during WWII, they are uncoordinated and relatively incomplete; time and resource constraints demand a more effective approach to identify the scope and nature of ERW contamination.

In 2012, PM/WRA began supporting iMMAP’s collaboration with the Pacific Islands Forum (PIF)—an intergovernmental organization consisting of 16 independent and self-governing states created to strengthen regional cooperation—in a geospatial information-management project that aims to produce a comprehensive picture of WWII ERW contamination and clearance activities in the Pacific Islands.<sup>2</sup> The project focuses on enhancing ERW data sharing and coordination, provides actionable and visualized information, and enhances collaboration between ERW designated implementing partners and PIF member states. This project provides PM/WRA, PIF and other stakeholders with a better understanding of how ERW contamination affects the Pacific Island nations and of how all implementing partners can better leverage resources to address this complex challenge.





Figure 1. Map showing contamination of the Solomon Islands.  
 Map courtesy of the Office of Weapons Removal and Abatement in the U.S. Department of State's Bureau of Political-Military Affairs (PM/WRA).

**Information Management Tools**

By employing a three-phased approach of assessment, collection and analysis, iMMAP engages in critical research to identify ERW contamination areas, clearance activities, and actors and organizations in the Pacific Islands. Concurrently, iMMAP manages a comprehensive spatial database to house and organize all relevant ERW contamination and clearance data, as well as a web-based information management tool called *lōōm*, which transforms this spatial data into actionable information. Through *lōōm*, the information gathered through iMMAP's research can be delivered in an easily consumable format that provides ERW clearance stakeholders with a comprehensive overview of the ERW contamination problem, facilitating the development of more effective strategies for prioritizing and coordinating ERW cleanup activities.

Built on the information management framework Twine, *lōōm* is a web-based tool comprised of three primary

applications: **Tools, Work, and Explore**. The Tools feature provides data-collection capabilities through the use of forms (online or offline) and reports specific to the user's preferred mobile, desktop or hardcopy device. For ERW clearance in the Pacific Islands, forms capture all the information necessary to accurately encapsulate critical information such as ERW hazard areas, past and current clearance activities and implementing partners. Through Work, users receive reports, notifications and to-do lists pertinent to their information of interest; these are triggered by data-collection activity in Tools and ongoing maintenance requirements. Users may then interact with collected data in Explore by selecting indicators of interest in the map view or by analyzing information and generating custom reports. This feature also allows users to interact simultaneously with collected data and information pertaining to other critical components of ERW

clearance coordination such as socioeconomic indicators and the location of key infrastructure. With these capabilities, national authorities, funders and implementing partners can use lōōm as the central repository and tool for data sharing, analysis and visualization.

### Information Gathered in Phases

In Phase One, iMMAP worked with PM/WRA, PIFS and implementing partners, including Cleared Ground Demining and Golden West Humanitarian Foundation, to assess existing Pacific Island ERW information, identify gaps in critical information, determine database requirements and develop lōōm capabilities to best support the management of this information. The process began by identifying key actors and organizations performing ERW clearance in the Pacific Islands, and governmental bodies charged with overseeing remediation activities. iMMAP attempted to contact and conduct interviews with past and current clearance operators to gather data on the location and nature of remediation and humanitarian mine action (HMA) work, and to identify other existing ERW hazard location data sources. In Phase One, representatives from six of the nine Pacific Island nations contacted either contributed information or collaborated in the acquisition of information. iMMAP also contacted 80 of the 109 individuals identified as having information to share for the project. iMMAP compiled existing data from identified data sources such as the U.S. National Archives and Records Administration (National Archives), the U.S. Air Force Theater History of Operations database, as well as maps and reports provided by both mine action and non-mine action organizations.

Information gathered through the assessment was then used to guide data-collection activities in Phase Two and effectively identify the location of confirmed and suspected ERW contamination. Data-collection activities heavily leveraged historical military research as a means for identifying areas that were known to contain hazards or had a likelihood of contamination based on activity records (e.g., bombing campaigns or ammunition storage and handling). While much of the information existed in National Archive records, the information came in a variety of formats, making it incompatible and unsuitable for analysis. Through the tools available in lōōm, iMMAP translated the disaggregated information into a uniform, location-based dataset that created a comprehensive picture of ERW and other contamination-related features.

The availability of information gathered in Phases One and Two in lōōm facilitated direct interaction and analysis in Phase Three. iMMAP employed proven spatial multi-criteria



Figure 2. Photograph of Palikulo Airstrip, Espiritu Santo, Vanuatu (September 1945).

*Photo courtesy of Whites Aviation Ltd: Photographs.*

*Ref: WA-01031-G. Alexander Turnbull Library, Wellington, New Zealand. <http://natlib.govt.nz/records/30632365>.*

analysis methods to illustrate how information available in lōōm could prioritize ERW clearance activities based on the unique needs of the host nation's government while incorporating considerations such as ERW proximity to schools, critical infrastructure, agricultural land, natural resources and tourist attractions.<sup>3</sup> iMMAP also provided maps that clearly labeled sites of WWII-era battles, a valuable visual tool for understanding where ERW may still exist, what types of ERW are likely to be present and which PM/WRA-funded clearance projects are currently underway in the region. This information supports efficient land release practices, which the Geneva International Centre for Humanitarian Demining describes as, "reli[ant] on solid information, risk management and maintaining a clear record of past achievements and outstanding tasks."<sup>4</sup> Through Phase Three, iMMAP demonstrated how effective information management empowers funders and implementing partners to better understand the problems they seek to address, and more importantly, to adequately address them by better utilizing resources according to location-specific priorities.

### Conclusions

Effective ERW information management must be implemented with the flexibility to adequately accommodate the long-term requirements of the host nation. The expansive area of the Pacific Islands is not conducive to traditional approaches to ERW clearance coordination due to its geographical size and lack of logistical coordination, rendering

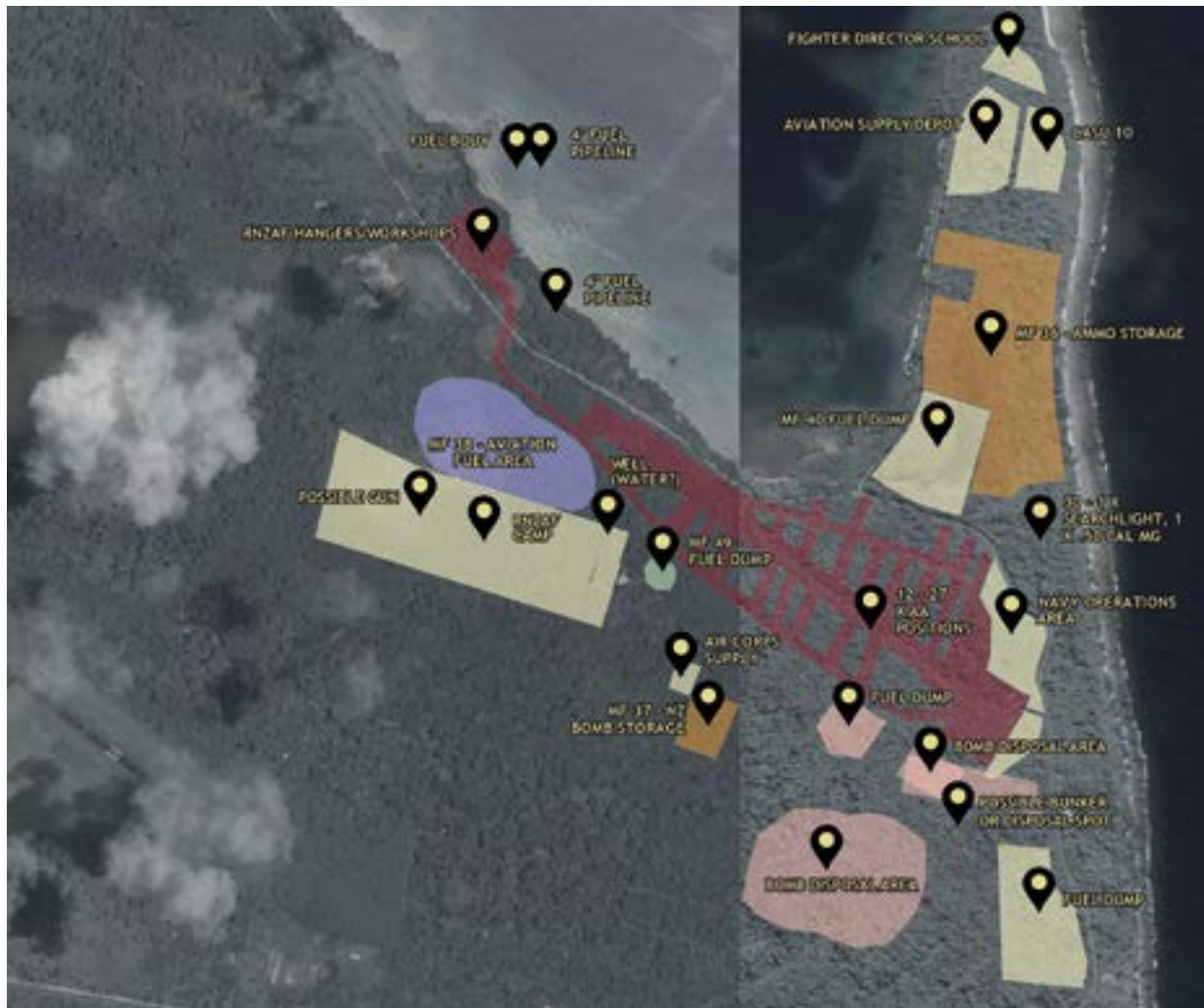


Figure 3. Palikulo Field, associated and subsidiary areas.  
Figure courtesy of iMMAP.

traditional information management systems insufficient. The implementation of systems that focus on capturing data through traditional technical and non-technical surveys would be inefficient for the incorporation of alternative ERW location methods such as historical military research. Additionally, the state of national mine action authorities for many Pacific Islands nations indicates that country-level ERW information management systems could not be supported or sustained. The lōōm system provides a fully customizable and scalable solution that works efficiently across all major browsers in the desktop and mobile environment, utilizing existing infrastructure and resources to seamlessly facilitate information sharing across a community of users.

The information management capabilities of the lōōm system allow PM/WRA to bolster its decision-making abilities and enhance the monitoring and evaluation of projects it funds through a customized web-based tool. The implementation of lōōm translated vast amounts of data into actionable information, boosting PM/WRA's capacity to address policy issues, improve internal planning efforts, enhance advocacy messages and effectively allocate resources, ultimately contributing to greater safety, security and economic development for the Pacific Islands. ©

See endnotes page 65



Jessica Dell joined iMMAP in May 2014 as an Information Management Officer supporting the Office of Weapons Removal and Abatement in the U.S. Department of State's Bureau of Political-Military Affairs (PM/WRA). She holds a master's degree in geography with a focus on geographic information systems for humanitarian response from George Washington University (Washington, D.C.).

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# Clearance Operations in the Pacific Islands

Golden West Humanitarian Foundation's mine- and explosive-remnants-of-war clearance operations in the Marshall Islands reduced remaining World War II munitions contamination. Humanitarian efforts helped Mili Island and Taroa Island inhabitants recover land with nonexplosive technology during the four-month initiative.

by Len Austin [ Golden West Humanitarian Foundation ]



An all-terrain vehicle is unloaded from a boat.  
*All photos courtesy of Len Austin/Golden West.*

In early 2013, the Office of Weapons Removal and Abatement in the U.S. Department of State's Bureau of Political-Military Affairs (PM/WRA) tasked Golden West Humanitarian Foundation (Golden West) with explosive remnants of war (ERW) hazard-reduction operations on Taroa Island and Mili Island.

Taroa and Mili are two inhabited remote atolls in the Marshall Islands. The islands are comprised of 29 coral atolls

and five individual islands, totaling 1,225 islands and 870 reef systems spread over 750,000 sq mi (1,942,491 sq km) of the Central Pacific Ocean.<sup>1</sup> Marshallese officials selected Taroa and Mili for the operation, as both islands had large quantities of U.S. and Japanese World War II (WWII)-era munitions. The hazard-reduction operations were unique due to the application of nonexplosive destruction procedures on recovered unexploded ordnance (UXO).



A crater left by a blast on Taroo Island.

### History

Prior to WWII, the Japanese military established Taroo as a seaplane base, constructing an airfield on the island in 1939. From February 1942 to August 1945, more than 3,543 tons of bombs and 453 tons of projectiles hit the island, which measures only 1,480 m (1,619 yd) wide and 1,679 m (1,837 yd) long. The Japanese military had extensive defenses, including a mixture of British and Japanese 6-in and 12-cm coastal defense guns, 6-in howitzers, and 127-mm dual-purpose guns.<sup>2</sup>

Mili measures 1,500 m (1,641 yd) wide by 2,100 m (2,297 yd) long. Before WWII, infrastructure included an airfield with three runways, a radio-direction beacon, weather station and seaplane base. The island had a fortified defense similar to Taroo (6-in and 14-cm coastal defense guns, 127-mm dual-purpose guns and 10-cm mortars).

### Organizations

The U.S. Embassy in Majuro, Marshall Islands, organized the project with assistance from the Marshall Islands Ministry of Internal Affairs and the Ministry of Foreign Affairs, and Golden West explosive ordnance disposal (EOD)

personnel conducted the initial site survey. Marshall Islands representatives escorted Golden West personnel to the site and assisted in the survey organized by representatives of the Republic of the Marshall Islands Historic Preservation Office (RMIHPO). The Environmental Protection Agency (EPA) also provided guidance to personnel working on various UXO-contaminated sites, and during the operation acted as a liaison to police and inhabitants of Mili and Taroo Islands. As air transport was unavailable during the survey, personnel traveled from Majuro Island to Mili and Taroo by fishing boats. Civilians from both islands helped identify UXO sites and indicated possible living and working areas to personnel. In addition, locals identified a burn-out site and an area where personnel could perform munitions cutting; EPA and RMIHPO representatives approved these locations.

### Operations

Golden West personnel consisted of a team leader, three workers and a medic (two Golden West Khmer staff and two Solomon Island personnel trained by Golden West), along with two representatives from RMIHPO. Equipment was





Burned out bombs and projectiles.

limited to a remotely operated Mobile Bomb Cutting System, hoist system, generator, all-terrain vehicle with a trailer and EOD field tools. A landing-craft utility transported all fuel (diesel) to the islands along with food and hand-held, water-filtration systems, which were loaded into a container. On both islands, staff established the base camp and introductions were made with representatives from Mili and Taroa. Primary subsurface clearance zones were established with priority given to areas closest to inhabited locations. The islands' mayors and police chiefs approved burn-out sites and designated burn-out times.

Golden West's remotely-operated Mobile Bomb Cutting System cut UXO to expose the explosive filler. Once cut, the munitions were placed in burn sites with dunnage and allowed to burn overnight. All hazardous materials (i.e., explosive filler, fuzes and incendiaries) were effectively burned out, leaving the remaining materials explosive-free. The metal parts were returned to RMIHPO.

**Results**

On Taroa, Golden West processed 77 pieces of UXO (consisting of projectiles and bombs) from 27 June to 7 July 2013 with a total combined weight of 3,577 kg (7,886 lb). On Mili, Golden West processed 104 pieces of UXO (consisting of projectiles and bombs) from 8 to 20 July 2013 with a total combined weight of 3,726 kg (8,215 lb).

**Recommendations**

Taroa will require further subsurface clearance operations, which will involve heavy brush clearing and excavation work. Formerly an ammunition supply point (ASP), the area was destroyed, leaving behind a water-filled crater the size of a football field. Large quantities of munitions were found inside the crater, including large Japanese Type No. 25 and Type 3 No. 25 Mk8 bombs as well as various Japanese projectiles. The area is overgrown with low lying foliage, covering chunks of concrete from the destroyed ASP. Currently, the area is marked off-limits to inhabitants.

Item	Qty
Japanese Type 91 AP 15.5cm Projo	3
Japanese 7cm (75mm) Type 94 HE Projo	2
Japanese Type 98 No7 Mk6 Bomb Model 2	1
Japanese No.25 Ordinary Bomb Model 2	1
Japanese Type 3 No.25 Mk8 Bomb Model 1	1
Japanese Type 97 No.6 Bomb	4
U.S. 8 inch Mk25 Model 1 HC Projo	2
<b>Total</b>	<b>14</b>

Table 1. Taroa Island UXO destroyed.

Item	Qty
Japanese Type 91 AP 15.5cm Projo	32
Japanese 7cm (75mm) Type 94 HE Projo	61
Japanese 7 cm (75mm) Type 94 AP Projo	2
Japanese 12 cm Ordinary Model 1 HE Projo	3
Japanese Type 3 No.25 Mk8 Bomb Model 1	5
U.S. 6 inch Mk34 Model Series HC	1
<b>Total</b>	<b>104</b>

Table 2. Mili Island UXO destroyed.

However, islanders practice a slash-and-burn method of farming, causing dry, dead brush to catch sparks and spread fires, which is very dangerous when UXO is nearby.

Golden West personnel on Mili relocated two Japanese Type 95 Depth Charges from an inhabited area to





Golden West's Mobile Bomb Cutting System.

the southwest handle of the island. Due to the toxic explosive filler, these could not be cut and burned. The Marshallese government approved a plan to float the depth charges on an improvised platform on the seaward side of the island and detonate charges using Golden West's Binary Liquid Explosive System, which uses organic nitroparaffins with a dye indicator and mechanical sensitizer. Additional areas located in the reefs' surf zone will also need munitions clearance, which can only be safely conducted at low tide, and is expected to take five days to complete.

### Conclusion

Starting from the initial survey in March 2013 to completion in July 2013, the operation's planning and mobilization took approximately four months. By disposing of the islands' UXO with nonexplosive technology, the Marshall Islands government, U.S. Embassy, PM/WRA and Golden West were able to cooperate closely and achieve completion within the time frame. By using

nonexplosive methods, the Marshall Islands government convinced island officials to agree to clearance operations, as the land was left intact, which rendered compensation for damages unnecessary. The land owners were happy to have their land recovered.

Future UXO-destruction operations in the Pacific Islands will need to incorporate nonexplosive methods of destruction. Subject to funding, Golden West is prepared to conduct future clearance operations on Taroa and surveys on Ebey, Janot and Mejit Islands. Land is a valuable commodity on these islands, and detonating munitions brings hardships to inhabitants. Using Golden West's Mobile Bomb Cutting System and burning methods on the cut munitions is an innovative and acceptable way of eliminating hazards that have threatened island inhabitants for the past 70 years. ©

*See endnotes page 65*



Len Austin is a retired U.S. Marine EOD technician and has worked for Golden West Humanitarian Foundation since 2005. He serves as deputy director of field operations and EOD operations chief.

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# 10 Best Practices for Effective Program Management

James Madison University College of Business Professor, Paula Daly, reflects on her experiences teaching the Center for International Stabilization and Recovery's Senior Managers' Course in ERW and Mine Action and provides a list of best practices for senior mine action managers.

by Paula S. Daly [ James Madison University ]

Over the past 10 years, I have had the privilege of teaching in several management training courses for senior managers working in mine action/explosive remnants of war (ERW) programs around the world. These programs, developed and conducted by the Center for International Stabilization and Recovery (CISR) at James Madison University (JMU), provide training in transferrable management and leadership skills. Since 2004, CISR has trained more than 270 mine action/ERW managers representing 47 countries. The Senior Managers' Course (SMC) covers many different management-related topics, and most participants report that the training adds something new and useful to their management skills toolbox. One of the most interesting and beneficial aspects of the training is the opportunity for participants to engage in thoughtful discussions, in which colleagues who understand the unique challenges of working in the mine action/ERW field can share ideas and best practices with peers.

I have found these discussions interesting and enlightening, and have incorporated many of the insights and examples that were shared by participants into subsequent courses. Drawing on these discussions, I compiled a list of 10 best management practices that can significantly improve the effectiveness of mine action/ERW programs or organizations:

1. **Create organizational goals and objectives that derive from, and align with, the strategic plan.** Implementing an organization's strategy effectively is the key determinant of organizational performance. Goals and objectives in every area (e.g., clearance, mine risk education, victim assistance) and at every level of the organization should be clearly linked to the strategic plan. Additionally, every employee should understand how his or her job supports the successful execution of that plan. The long-range strategic plan provides the basis for mid-range tactical plan-



Participants from CISR's Senior Managers' Course in ERW and Mine Action in Dushanbe, Tajikistan, visit the Tajikistan Mine Action Centre.  
*All photos courtesy of CISR.*

ning at the divisional level and specific short-term action plans within functional areas of the organization.

2. **Share the vision.** Senior level managers are responsible for translating the organization's vision and mission into explicit goals and objectives that inspire and motivate. Those in leadership positions must develop and maintain credibility and trust and model the behaviors that are expected of employees throughout the organization. When communicating with stakeholders (internal and external), leaders should clearly identify program goals and expectations, and should recognize and/or reward achievement of, or progress toward, stated goals.

3. **Devote resources to developing and nurturing relationships.** Managers must understand and convey how various stakeholders impact, and are impacted by, organizational decision-making. The diverse wants, needs and expectations of stakeholder groups such as donors, government entities (e.g., ministries), implementing partners and internal employees must be taken into account when setting and prioritizing organizational goals and objectives and when allocating resources for implementation.
4. **Design a structure that facilitates achievement of organizational goals and objectives.** The managerial hierarchy should be clear and evident, and consist of the minimum number of hierarchical levels needed to execute the organizational strategy. The structural design should enhance coordination and communication between units and individuals and foster strong working relationships among employees in functional areas. Clearly-specified job roles are essential to prevent role conflict and ambiguity for employees. Management should develop and maintain an organizational chart and detailed job descriptions that are readily available to all employees.
5. **Consistently monitor and evaluate performance.** Organizations need to develop and maintain a performance measurement system or framework (e.g., Balanced Scorecard) in order to accurately gauge their progress toward stated goals. A framework allows for systematic collection, analysis, utilization and reporting of objective performance data, which can support and improve decision-making within the organization. A performance measurement system provides timely information on the relevance, success and cost-effectiveness of people, processes, programs and activities throughout the organization.
6. **Invest in human capital development.** Human capital is the combined intelligence, skills and expertise of organizational employees. Management of human capital focuses on how to employ, deploy and evaluate the organization's workforce and successfully use people as assets. Effective organizations invest in employee training and development, and utilize human resource management practices that attract, retain and motivate qualified and high-performing individuals. Benefits of investing in human capital development can include improved motivation and morale, increased productivity and quality of work, greater job satisfaction and organizational commitment, and reduced absenteeism and turnover.



Paula Daly lectures about capacity building at CISR's 2014 Regional SMC in Dushanbe, Tajikistan.

7. **Create a culture of transparency and accountability.** Transparency and accountability start with top management. Successful programs depend on managers to demonstrate desired values and behaviors (honesty, integrity and responsibility) in daily interactions with employees. Managers must develop internal control systems throughout the organization, such as sound financial management policies and practices. For example, compliance with recognized accounting standards and regularly scheduled budget reviews helps to ensure honesty and transparency in transactions and record keeping. Clarification of individual behavioral expectations can be achieved through managerial tools such as value statements, detailed job descriptions, performance feedback and ethics training. When managers assign responsibility for outcomes to specific individuals or groups, and track measureable results, accountability increases. Additionally, providing access to information and empowering employees to make decisions fosters an environment of trust and increases employee confidence and commitment.
8. **Develop, implement and maintain an information-management system.** Access to accurate and relevant information is critical to effective decision-making. Information is a source of power and influence. One way to empower employees is to ensure that they have the information necessary to successfully complete job tasks and responsibilities, and to encourage participation in organizational decision-making. Identifying, acquiring, organizing, analyzing/evaluating, securing, maintaining and disseminating information are important components of information management. The proliferation of information technology





Participants, faculty and staff from the SMC in Dushanbe, Tajikistan.

has vastly improved the ways in which information can be accessed, stored, transmitted and utilized, but it also requires ongoing investment in hardware, software and employee training.

9. **Allocate resources to build organizational capacity.** Building capacity requires systematically investing resources in internal systems and external relationships to create or enhance organizational abilities. Developing capacity starts with assessing and prioritizing program or organizational needs and then developing support among stakeholder groups for those priorities. Capacity building goals and objectives should be evident in the organization's strategic plan and annual action (or activity) plans. Typically, capacity building focuses on one or more of the following areas: internal management systems (e.g., information system), external relationships (e.g., donors or implementing partners), leadership (e.g., management training/development), and internal structures (e.g., employee training for new job tasks/responsibilities). Any capacity building initiative should be subject to a basic cost/benefit analysis to ensure that the

anticipated benefits outweigh the costs (both financial and nonfinancial) that will be incurred.

10. **Encourage flexibility, adaptability and agility.** The most effective organizations routinely monitor and adjust to changes in the external and internal environments. Instability (e.g., social, political, economic) often creates situations that are unprecedented and for which the organization has no existing plan of action. An organization where employees can deal positively and constructively with uncertainty and rapid change will be more responsive to shifting conditions, expectations or needs, and will adapt more successfully. Situational analysis, rapid decision-making and reallocation of resources are often necessary in changing conditions. Managerial tools, such as contingency planning and organizational slack, can increase an organization's ability to respond successfully to unanticipated disruptions in the environment.

Every organization is unique, and I encourage you to evaluate your mine action program or organization considering the best practices identified above. A good place to start for any program looking to increase effectiveness is with

a basic assessment of organizational strengths and weaknesses. Incorporating one or more of the best practices discussed previously may enable your organization to reduce errors, improve resource utilization, increase stakeholder satisfaction and enhance organizational performance. ©

*The SMC was originally sponsored by the U.N. Development Programme and since 2010 is funded by the Office of Weapons Removal and Abatement in the U.S. Department of State's Bureau of Political-Military Affairs (PM/WRA).*



Paula S. Daly, Ph.D. is a professor of management at James Madison University's College of Business. She earned her doctorate in business administration from the University of Texas at Arlington (U.S.). Daly's research has been published in national and international journals such as the *Journal of Organizational Behavior*, *International Journal of Cross Cultural Management*, *Entrepreneurship, Theory and Practice*, and *International Journal of Technology Management*. Her current research focuses on management issues in cross-cultural settings. Daly has taught in CISR's Senior Managers' Courses since 2004, when she assisted in developing the curriculum for the first course. She continues to serve as lead instructor, and to advise and assist CISR on course content and structure.

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# CISR's Senior Managers' Course: Now Regional Training

After delivering nine global Senior Managers' Courses (SMC) in ERW and Mine Action on the campus of James Madison University (JMU), the Center for International Stabilization and Recovery (CISR) launched its first regional SMC in Tajikistan in 2014. The regional focus will continue in 2015 when senior managers working in the field of explosive remnants of war (ERW) and mine action in Southeast Asia will participate in a course in Vietnam.

CISR and the Tajikistan National Mine Action Centre collaborated to implement the first regional course in Dushanbe, Tajikistan, in May 2014. The course was sponsored by the Office of Weapons Removal and Abatement in the U.S. Department of State's Bureau of Political-Military Affairs (PM/WRA) and brought 24 participants from five countries together for three weeks of classroom and field-based instruction.

SMC applicants must meet four eligibility requirements. Individuals must be senior managers in ERW and mine action organizations, have a signed letter from their organization's director acknowledging and endorsing their participation in the SMC, be proficient in English, and be able to cover transportation and visa costs. A panel of reviewers selects participants, with emphasis on hosting a diverse group of learners representative of countries and organizations within the region, covering multiple areas of ERW and mine action.

The regionally focused model accommodates different curricular requirements and technical needs of national ERW/mine action programs while taking advantage of shared experiences and cultures within regions. This



CISR's Suzanne Fiederlein and Ken Rutherford talk with TMAC Director Muhabbat Ibrohimov at the Regional Senior Managers' Course in Tajikistan.

*Photo courtesy of CISR.*

flexibility to tailor course content allows the instruction to be responsive to the particular context of the countries participating in the course and better meet their capacity-building needs. It also makes the course more accessible, with less time, money and effort spent on travel for the participants. The regional model provides the opportunity for CISR/JMU to partner with national programs to implement a course that draws upon the expertise of national ERW/mine action personnel and further develops local capacity.

The courses build upon the decade of experience CISR gained through implementing its global SMCs on the JMU campus since 2004. The first five SMCs were sponsored by the United Nations Development Programme. In 2010, PM/WRA took over sponsorship of the SMC, and under its guidance the course focus has expanded to include conventional weapons destruction, small arms/light weapons and other emerging topics in the post-conflict recovery field. In addition to the SMCs, CISR and its

JMU faculty instructors provided management training through the Explosive Remnants of War Training Courses in Jordan (2009–2011) and at the Peru-Ecuador Binational Workshop for Management in Humanitarian Demining in Lima, Peru (2011), thus gaining valuable experience in delivering instruction at locations distant from JMU.

In developing the course content, CISR works closely with its experienced faculty partners from the JMU College of Business (COB), draws upon evaluations from past courses, and solicits input from subject-matter experts and national program directors to identify the topics most relevant for the next course iteration. CISR looks forward to working with its instructional partners to refine and implement this new phase of management training with a regional focus.

For more information about the regional SMCs, including plans for additional regional courses, see <http://bit.ly/1DxylKz> or email CISR at [cisr@jmu.edu](mailto:cisr@jmu.edu). ©

~ Suzanne Fiederlein, CISR staff

# Capacity Building: Lessons Learned

Norwegian People's Aid believes that to deliver results in mine action programs, it must empower and support national governments to take ownership of the contamination problem. Successful capacity-building efforts require support and buy-in from national authorities and mutual respect between parties involved.

by Vanessa Finson [ Norwegian People's Aid ]

Since 1992, Norwegian People's Aid (NPA) has implemented mine action programs in more than 40 states and territories globally. Over the last decade, NPA has increasingly been involved in capacity-building efforts of national authorities and implements 15 formalized capacity-building projects in addition to large-scale operational (survey and clearance) efforts worldwide.

Despite significant progress in the wider mine action sector, including a substantial reduction in landmine victims and millions of square meters of land released for safe use, full implementation of the *Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on Their Destruction* (Anti-personnel Mine Ban Convention or APMBBC) obligations, in particular Article 5, remains a challenge for most States Parties.<sup>1</sup>

NPA believes the ultimate responsibility for mine action lies with national governments, and that only by empowering and supporting national governments to take ownership of their contamination can the problem be effectively and efficiently resolved. National ownership, in turn, requires the national authority's buy-in and financial support, a strong focus on efficient land release in operations, and sufficient and relevant information management and reporting structures. Equally and just as important, it requires useful and relevant capacity building of national authorities' management and staff.

## The Importance of Agreement

The mine action industry's tradition of establishing, funding and supporting national mine action centers (NMAC) has proven to be of questionable value and in many cases counterproductive to the end result. In NPA's experience, the most important question to ask when looking at supporting national mine action structures is the anticipated size of the problem, most relevantly measured as square meters of suspected



Female NPA deminer in South Sudan.  
Photo courtesy of Werner Anderson.





NPA has implemented mine action programs in over 40 countries, such as South Sudan.  
*Photo courtesy of CISR.*

or confirmed contamination. When contamination is limited, an NMAC is unnecessary and long-term capacity-building programs have proven neither needed nor desirable, which has been NPA's experience from several countries. For example, in Guinea-Bissau and Zambia, two countries with only limited contamination, focused efforts and limited capacity-building support on selected subjects such as information management was key to success and eventual declaration of compliance with convention obligations.

In Malawi, NPA provided very limited implementation and database management support to national authorities through capacity-building efforts. Database management is critical to the good management and understanding of mine action, and it proved crucial to the ultimately successful completion of Malawi's Article 5 obligations. Moreover, in the case of Malawi, NPA introduced and operationalized the concept of combined non-technical and technical survey (though limited), which quickly populated the database and was vital to the national authorities' understanding of Malawi's contamination.

#### Different Needs for Different Countries

NPA believes that scaling capacity-building activities according to size of the problem is the only effective and efficient way to support a country in dealing with its mine and explosive remnants of war (ERW) contamination. Assessment and analysis of the country's mine action needs should occur before capacity building begins. When a need is defined, the capacity-building plan is specially tailored to the needs of the country. No "blueprint" for national capacity building exists; each plan should be designed to fit a country's specific needs.

NPA's approach to capacity building has varied from country to country and changed over time. NPA has had

many successes but has also identified opportunities for improvement. Some efforts have been less successful, mainly because the program setup was not tailored to the country's actual needs. For instance, several actors, including NPA and the U.N., have attempted to build capacity for years in South Sudan. Even though the national mine action authorities undoubtedly have improved capacities, there is still a long way to go before authorities have an overview of contamination, and can plan and prioritize mine action effectively. Many reasons account for this, but the baseline capacity surely plays a role. Also important is the fact that South Sudan, as the world's newest country, needs skilled and trained individuals at all government levels, and trained people are hard to keep when new job opportunities arise. Perhaps most importantly—and this is something the mine action community faces in several countries and needs to take seriously—is the fact that among the many priorities that South Sudan has, mine action may not be at the top of the list. Moreover, the importance put on mine action by national authorities themselves affects the ability to deliver capacity building.

In Vietnam, NPA was asked to assist in setting up and training staff in the use of a database. As one of the most contaminated countries in the world, the Vietnam government clears huge amounts of land every year without international



NPA worked with partners to build capacity in South Sudan.  
*Photo courtesy of CISR.*



NPA deminers in Zimbabwe.  
*Photo courtesy of Werner Anderson.*

assistance. In this case Vietnam wanted the database but ultimately did not want to use it as the international actors expected. As a result, the capacity-building project was seen as a failure. More recently, Vietnam is again asking the international community for assistance with its database, and the project from 2011 could constructively be seen as a warm-up exercise rather than a failure.

Although NPA bases its approach on respectful partnership and close collaboration with national authorities, human and financial resources must be spent on efforts of highest priority or those that bring added value. In Senegal for example, NPA chose to cease its operational and capacity-building efforts due to the perceived lack of political will, or real national interest in dealing with the country's landmine/ERW contamination. This focus on a respectful partnership approach—undoubtedly influenced by NPA's philosophy and background as a larger developmental organization—requires a given country to ultimately set the parameters for NPA's work there.

### Specific Experience Aids Training

Depending on the country context, national authorities are responsible for all or some of the mine action pillars.<sup>2</sup> NPA's strengths as a capacity-building actor come from its experience as an operator, and this experience has naturally been brought into its capacity-building efforts. These efforts generally focus on operations, planning, quality management and information management rather than the full myriad of areas that may require support.

Increasingly, this focus on national responsibility is growing with actors and stakeholders, including donors. In the recent U.K. Department for International Development tender, the inclusion of the Cluster Munition Remnants Survey (normally an activity that would be considered in an operational tender) in the capacity-building tender validates that a greater understanding of the problem, coupled with the ability to analyze the information collected, is invaluable as a stand-alone

capacity-building effort and a prerequisite to any capacity-building efforts that potentially follow.

Large capacity-building projects developed as blueprints instead of reflecting evidence-based needs (with expensive and overarching coordination) have often proved unsuccessful in design and implementation. Project planning should include a proper needs assessment. Unfortunately, in many cases, seemingly unnecessary efforts are undertaken, or focus is placed on capacities that require additional prerequisite skills. A proper appraisal of existing skills within a national authority, along with the corresponding required abilities, is indispensable for any solid planning and effective capacity building to occur.

### Collaboration and Avoiding Conflicts of Interest

NPA's experience has shown that capacity-building efforts are ideally done in collaboration with other stakeholders, ensuring that all areas that require support receive the attention and specialized training needed. Several examples indicate where one actor was chosen to provide all the training and follow-up needed for establishing and maintaining an NMAC; for example in South Sudan and the Democratic Republic of the Congo (DRC), the U.N. worked alone in trying to set up and build capacity of the national authorities. This, in NPA's experience, has often failed, as conflict of interests may arise and the skill level required to fulfill all needs of an NMAC are often lacking in any one actor. Moreover, when more actors are involved, additional value can be found in the checks-and-balances system this interaction provides. If an actor is the only operator in a country, the actor does not have the voice needed to question the country's Article 5 completion declaration.



NPA offices in South Sudan.  
*Photo courtesy of CISR.*

South Sudan and DRC are only two examples; many more can be found in Jordan, Kosovo, Lebanon and Libya.

Willingness to review and assess the objectives, plans and activities, i.e., the basics of a monitoring and evaluation system, is also critical to any project's success. A capacity-building plan must be included as part of the implementation of the national mine action strategy, and this plan should be dynamic and changeable to adapt to the successes, or lack thereof, during implementation. The only means of measuring and evaluating the effect of the capacity-building efforts is at the individual and organizational performance level. Evaluation of efforts has, in NPA's experience, often been absent in the planning and development of capacity-building efforts.

Lastly but critically, NPA has found that national authorities' involvement has often been lacking, i.e., efforts were designed, activities planned and resources secured for activities that were not discussed with and agreed upon by national authorities. The foundation for long-lasting capacity building can only come from inclusion and leadership from those requesting support, along with the determined political will of national authorities to deliver on assessed problems. ©

*See endnotes page 65*



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## News Brief

### Tracense Develops New Explosive Detector

Scientists at Tracense, a technology company in Tel Aviv, Israel, created a new nanotechnology explosive detector. Tracense CEO Richard Osiroff says the apparatus can detect even the smallest explosive material.<sup>1</sup> According to the *Counter IED Report*, the new device has an electronic chip that detects airborne traces of explosives at concentrations as low as several molecules per quadrillion.<sup>2</sup>

A team of researchers, directed by Professor Fernando Patolsky of the chemistry department at Tel Aviv University and its Center for Nanoscience and Nanotechnology, helped develop the nanosensing technology.<sup>3</sup> Capable of detecting specific smells, the detector is built with a system of receptors that detect explosive chemicals by observing how molecules bind to each receptor.<sup>1</sup>

With its high level of accuracy and sensitivity, this laptop-size portable detector can instantly pick up chemical traces of explosives in devices that stronger chemicals would otherwise hide.<sup>3</sup> Patolsky says his team is working on making the technology the size of a mobile phone.<sup>4</sup> Current methods of detection can be bulky, tedious to prepare and may only detect a few types of explosives.<sup>5</sup>

Since its creation, the detector found TNT, cyclonite and octogen, as well as peroxide-based explosives such as acetone peroxide and hexamethylene triperoxide diamine, illustrating its ability to detect military and commercial explosives as well as homemade devices.<sup>2</sup>

Tracense is working to develop more sensors to meet growing needs of public safety, security and threat detection. ©

*See endnotes page 65*

*~ Julie Hirschhorn, CISR staff*



# Best Practices in Managing Government Grants

Dwindling funds have steadily created more competition for organizations in mine action and conventional weapons destruction. Given the current funding landscape in these fields, it is increasingly imperative for organizations to employ sound program-management practices to prove themselves worthy for continued funding. This article was adapted from several of the author's presentations on securing funding, managing grant funds and project risk management.

by Nicole Neitzey [ Center for International Stabilization and Recovery ]

Government entities remain one of the largest sources of funding for mine action and conventional weapons destruction programs. These funds typically come with strict rules on how they can and cannot be used, and organizations can face stiff penalties for mismanaging them. Additionally, as is often the case in the professional world, past performance is a strong indicator of future success. Thus, proper management of funds ensures the organization not only complies with required regulations but also has the best chance of continuing its work well into the future.

## Before the Project Begins

Successful project management starts with an in-depth project plan. Typically, the process of applying for U.S. government funding begins with a detailed written proposal. Organizations that put a lot of thought into their proposals and provide specifics on project activities and costs will find initiating project implementation easier than those with proposals lacking in these details. In fact, project proposals without such information will likely not be funded in the first place. Government funders scrutinize submission materials to ensure enough thought was given to planning the project. Thus, elements that make up a winning proposal often make for a successful project when the time comes for implementation of activities. A few such components of the proposal submission include

- A clear statement of the project's goals and objectives (via SMART [specific, measurable, achievable, relevant and time-bound] language)

- A list of detailed activities and outputs (quantifying wherever possible, e.g., number of beneficiaries)
- A statement of broader outcomes and long-term, visionary effects of the project (e.g., revitalized communities no longer threatened by the presence of landmines)
- A plan for monitoring and evaluating project outcomes and impacts to compare them to projected benchmarks
- A line-item budget and detailed budget narrative explaining how funds will be spent

## Getting Started

Once funding is in place, it is important to ensure the essential roles of the project are assigned to appropriate staff who understand their responsibilities. Often the proposal solicitation requires identifying key personnel roles, responsibilities and qualifications, in which case this step will be easy. In addition to in-house staff, the organization may need to designate partners or consultants to work on certain aspects of the project. Having a written agreement or contract containing specific requirements of these entities is essential for ensuring expectations are made clear and recourse is available if the necessary duties are not performed.

**Best practice.** Meet at the project's start with all team members to ensure everyone knows what is expected within the given time frame and what the budgetary constraints are.

U.S. government contracts and grants come with sponsor-stipulated terms and conditions. Everyone working on the project needs to know these requirements and what the

## Project Risk Management<sup>1</sup>

Every project has three main dimensions: time, scope and cost. These elements are interconnected, and there are constraints to each for any given project. Therefore, the team should prioritize these three dimensions to determine which takes precedence over the others. Here are a few questions to ask:

- Can you ask for more time to achieve your objectives?
- Is additional funding available if needed to complete the project?
- Would it be possible to scale back anticipated outcomes instead of spending more time or money?

In addition to thinking about what compromises you and your sponsor are willing to make related to the dimensions above, it is important to consider possible risks to completing planned objectives. A few questions to consider in this regard include

- Would these risks impact one or more of the project dimensions of time, scope and cost?
- How likely are these risks and how severe would the impact be? (See Figure 1.)
- What can you do to mitigate or prevent a risk or respond to its effects if it happens?

For each item identified as high risk, the team should identify who is responsible for taking action to prevent or respond to the issue. Additionally, these scenarios should be revisited regularly throughout the project's life to see if their probability or degree of impact has changed or if any new potential threats endanger the project.

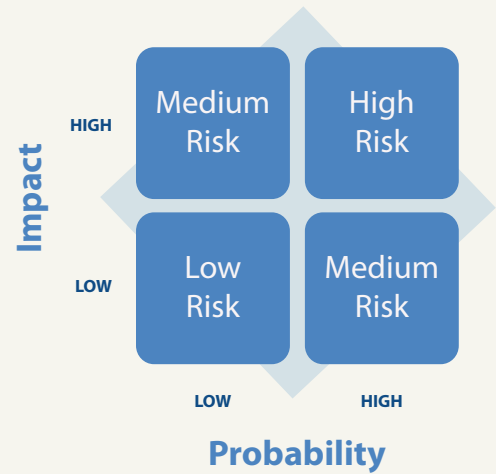


Figure 1. A matrix that assesses the level of risk in a given scenario, based on the high or low probability of a risk occurring and whether its impact on the project will be high or low.

Figure adapted from Business Continuity and Risk Management: Essentials of Organizational Resilience (Kurt J. Engemann and Douglas M. Henderson).<sup>2</sup>

sponsor does or does not allow. If the funder requires certain procedures or record keeping, the organization should develop policies or checklists for everyone to follow so that compliance is simple.

At the outset of a project, scheduling future activities, milestones and deliverables is also important. The schedule should contain some slack in case certain aspects take longer than originally anticipated. Additionally, the project's start is a good time to assess what issues could come up during implementation that might derail or delay the project. See the accompanying text box above on risk-management tips for projects.

## Project Implementation<sup>1</sup>

As the project progresses, it is important to monitor the activities, budget and timeline to ensure things are going according to plan. The sponsor will likely require regular reports, which should be a formal recording of activities conducted and progress made toward completing objectives. Deadlines and report formatting requirements ensure that organizations maintain compliance. Report submissions are usually tied to release of funds, so it is important to be timely and thorough with this process. Additionally, informal communication with a designated point of contact within the sponsoring agency should be maintained on an ongoing basis.

Inviting the donor to visit the project while activities are ongoing is customary, especially for important milestones. Also, if donors require their logo or branding on material and event notices, it is best to ensure that these requirements are followed to avoid violations of the terms and conditions.

**Best practice.** Set up a schedule with milestones at the beginning of the project, and meet with the team periodically to make sure it is on track.

Regarding funds, anyone responsible for purchases or allocating funds for the project needs to know what is acceptable and what is not in terms of how funds are spent. As before, this is an instance when being familiar with applicable terms and conditions is vitally important. The organization could owe money back to the sponsor and jeopardize future funding if grant money is used for unallowable costs. Additionally, the budget narrative included with the submission will be very helpful and ideally specific enough that anyone can understand how costs were determined and how funds should be spent, eliminating ambiguities. The project's spending should be tracked and actual expenses compared to budgeted amounts in order to ensure it will not exceed or fall below budget by the end.

**Best practice.** Think: Will this purchase be used to support the work of this grant specifically? If the answer is "no," do not use project money for that expense.

Any major project changes, such as additional costs, significant budget revisions, an extension to the period of performance, changes to project objectives or activities, deviations to planned international travel, and changes in key personnel require sponsor preapproval. Sponsors are generally open to making reasonable modifications to a project if they have enough notice and good justification for the changes. Additionally, it is typically easier to ask for help with big changes when the organization has maintained close contact and a positive working relationship with the sponsor. Be sure to allow adequate time before the end of a project's period of performance for the sponsor to review and process the request. Sponsors are often more amenable to major changes if these concerns are brought to their attention earlier in the process.

### Project Completion

When the project is complete, documentation of its success will be important. It is okay to admit if anything fell short of expectations, especially if there is context given as to why this happened. Additionally, the organization should treat these instances as lessons learned for how future projects can be

improved. The final report to the sponsor should document the outcomes of the project as specifically as possible. Other funders will likely be interested in past organizational experience and particularly meaningful outcomes of such projects. As mentioned above, successful projects often lead to more funding; thus the promotion of project results (upon approval by sponsors) through press releases and social media is important as well.

### Conclusion

Remembering that successfully managed projects do not happen by accident is important; they are carefully thought out, well-planned and faithfully executed. Organizations that make an effort to systematically approach the program-management process and think through elements of program management early in development of a project idea will be well-positioned to harness success in this arena. This article was written with U.S. government grants in mind, but most government funders will have similar guidelines to follow in projects they fund. Many of these tips apply to project management more broadly as well. ©

See endnotes page 65



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<http://www.jmu.edu/cisr/journal/past-issues.shtml>



# Gender and Disability Equality in Mine Action Program Management

Women and persons with disabilities endure multiple challenges in mine action work. Thongvone Sosamphan and Mikael Bold provide insight into how such issues have been addressed in the professional sphere, what legislation frames them and how the mine action community can further respond to their inclusion in mine action.

by William Hankey [ Gender and Mine Action Programme ]

**W**omen and persons with disabilities (PWDs) face numerous barriers when trying to access employment in the mine action sector. These challenges include

- Poor or inaccessible basic services such as health care and education, which hamper employment opportunities
- Social stigmatization, which can result in exclusion
- Insufficient disability- and gender-friendly structures and provisions in the workplace
- Limited knowledge of gender and disability rights<sup>1</sup>

In order to determine the best means of solving gender- and disability-equality issues regarding program management and hiring practices, the Gender and Mine Action Programme interviewed two individuals with different but equally valuable experiences in mine action: Thongvone Sosamphan and Mikael Bold. As part of the National Regulatory Authority's (NRA) gender focal point, Sosamphan and her team formally oversee recruitment and hiring procedures. Formerly a program technician and gender focal point for the NRA on unexploded ordnance and mine action in Laos, Sosamphan currently works for the Geneva International Centre for Humanitarian Demining (GICHD) in Switzerland. Bold has worked in mine action for more than 11 years in Africa and the Middle East in nongovernmental and commercial organizations including Norwegian People's Aid (NPA), MineTech International, U.N. Office for Project Services and MAG (Mines Advisory Group); he currently works for GICHD.



Ensuring staff maintain respectful relations is key to creating a healthy work environment. A mixed team deployed by the Swedish Civil Contingencies Agency in Southern Lebanon enjoys a few moments of relaxation.  
*Photo courtesy of Johan Eklund.*



Procedures can always be adapted to local contexts. In Somaliland, The HALO Trust was able to deploy female deminers by segregating teams.

*Photo courtesy of Pascal Bongard/Geneva Call.*

**Q** How have organization(s) you have worked for addressed employment barriers for women and PWDs?

**Sosamphan (S):** Although NRA does not yet have any policies that focus specifically on gender and disability, management understands the importance of having a diverse staff, which includes PWD. NRA encourages women, PWDs and ethnic minorities to apply for job vacancies.

**Bold (B):** My previous employer, NPA, had a global policy that set the norms for gender policy at the program level by positively influencing the gender balance and gender relations within its own programs and operational areas. Each NPA mine action program strived for a minimum of 20 percent female employees and to have at least one female team operational by the end of 2014.

**Q** How did you use your position to address gender and diversity issues?

**S:** As the gender focal point for NRA, my team and I ensured that applicants were recruited based on their ability to fulfill the necessary tasks. Although not responsible for recruitment, my team and I ensured that NRA recruited applicants based on his or her ability to fulfill the necessary tasks.

**B:** NPA made it easy; I followed the policy and tried to exceed it. Furthermore, in line with the gender policy, all programs reported on their gender indicators on a monthly and annual basis.

**Q** Were your [respective programs'] internal policies and procedures adapted to reflect gender and disability concerns?

**S:** Human resources (HR) took some practical action and made vacancy announcements gender- and disability-sensitive.

**B:** From the beginning, MAG and NPA established procedures that haven't needed adapting. Of course, in mine action more generally, female staff has been employed in support and administrative roles for a long time. But if you look at Southeast Asia, many PWDs are employed as deminers and in peer-to-peer support programs. Since each group brings its own benefits to a program, you can always adapt and overcome obstacles to their employment.

**Q** How important is it to make staff aware of gender- and disability-related provisions in the organization?

**S:** If all staff members are aware of these issues, the working environment will become progressively friendlier. This is especially true for males and nondisabled staff who do not always understand that certain practices and attitudes can be discriminatory or offensive.

**B:** Trying to change these issues at a local level can be difficult and must be done by senior management to ensure that the policy is strong.

**Q** How can programs raise staff awareness of gender and disability concerns effectively?

**S:** In my experience, workshops, expert advice and evaluation are the best methods for increasing staff awareness. Managers also play an important role by providing an example for other employees.

**B:** Programs can raise staff awareness in three ways: (1) HR policy that applies to expats and national staff can effectively raise gender and disability awareness by informing local staff of their rights as well as the organization's expectations. (2) An effective monitoring system obligates staff to remain accountable to the HR policies that they agreed to in their contract. (3) Train people on the organization's work ethics and policies.

**Q** What particular considerations need to be taken into account for women and PWDs in mine action programs?

**S:** One cannot forget that women and men are physically different and have specific needs such as segregated



A female Swedish Civil Contingencies Agency deminer receives training in Southern Lebanon.  
 Photo courtesy of Johan Eklund.

facilities and accommodation. The same applies to PWDs, though additional factors such as accessibility need to be taken into account. These issues must be considered when developing policies and operating procedures.

**B:** The organizations I have worked for (U.N., NPA, MAG) included maternity/paternity leave details in the staff contract. Considerations are related to donors as well as the HR policy and contract agreements that are signed when taking the job. The question is, are donors willing to pay for extra staff, maternity leave and additional facilities to keep women and PWDs in mine action programs?

**Q** Why should organizations ensure women know their rights involving pregnancy and parental leave?

**S:** There are limitations on the kind of physical work a pregnant woman can do that affect the quality of the work she carries out and her safety. If women are aware of their rights, they will know that they cannot be fired when they become pregnant and will not risk themselves, and their baby, by continuing work they should not be doing.

**B:** While some organizations make no effort to accommodate pregnant women in operational roles, others have maternity-leave provisions and a system that provides alternative positions during pregnancy, and child care arrangements thereafter. If a woman knows she has rights, she will be able to claim them and not risk losing her job. But this means that operators need to be aware of legislation surrounding women's employment and pregnancy.

**Q** How can organizations make the work environment friendlier for women and PWDs?

**S:** HR can minimize social stigmatization at work by developing policy that includes women and men of diverse backgrounds and abilities. Providing adequate facilities is also fundamental to meeting employees' needs. This is particularly true for PWDs who need certain material conditions to work—accessibility, facilities, and if needed, accommodation. But these costs are more than recuperated by women's and PWD's lower absenteeism rates, and a wider pool of skills and experiences from which to draw.



B: Organizations can review the existing labor law put into effect by the national government. By building upon existing legislation that has already been accepted, organizations will more easily earn people's approval and achieve positive results.

Q Did the organization you worked for keep disaggregated statistics on candidate applications and staff composition, and why was this important?

S: Yes, we collected this information in mine-risk education, victim assistance and clearance. Disaggregated data on staff provides a clearer picture of what assets an organization can deploy and what their different needs will be. By comparing the current situation to past data, we could measure whether progress had been made in terms of balancing staff composition. This data can then be used to develop more effective gender- and disability-sensitive policies.

B: No, they didn't [take this into account] when I was working with them, because we only used gender-sensitive indicators for activity outputs and outcomes.

Q What measures could be developed to improve retention of female and disabled staff?

S: Policies concerning equal opportunities and prohibiting favoritism are essential. These need to be supported by a strong HR department that can enforce the rules; policies mean nothing otherwise.

B: The retention of female and disabled staff will depend on the donors' willingness to invest [in its employees]. Increasing the duration of parental leave may be hard, as the demining program may not

last more than a year. Similarly, creating alternate positions may not be necessary. However, if organizations communicate with each other, there may be synergies from which all may profit. For example, if one organization cannot employ a woman as an operator in the field due to pregnancy and does not have an alternate position—perhaps another organization would have a job she can fill and her current employer can help her find and secure that job.

Q Were there any mechanisms in place to evaluate your organizations' abilities to respond to gender- and disability-related concerns in its programming?

S: Not explicitly, however, our reporting system does collect and store sex- and age-disaggregated data for reporting to donors and progress comparisons.

B: Yes, HR policies are evaluated every six to 12 months. Because NPA, MAG and the U.N. already include gender and disability in the core of their approach, there are few concerns with these issues as a result.

### Conclusion

By making conscious efforts to employ people from underrepresented groups such as women and PWDs, organizations ensure that these groups are included in relevant activities.<sup>2</sup> Sosamphan and Bold highlighted how gender and disability equality-sensitive hiring and management practices need sound gender and equal opportunity policies, a solid administrative department that can implement them, and strong management support. Once aware of these issues—the policies in place and the rights they hold—staff may employ them fully. More pragmatic considerations such as accessible

buildings, segregated facilities, accommodation, and child-care facilities will also ensure that men's and women's different needs are met. By providing employment opportunities in this manner, the impact of mine action programs plays a strong normative role in enabling affected communities to access their rights and empowering underrepresented groups.<sup>3</sup> ©

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William Hankey graduated with a bachelor's degree in politics and international relations from the University of Exeter (U.K.) in 2013 and is completing a master's degree in activism and social change at the University of Leeds (U.K.). He worked as program assistant at the Gender and Mine Action Programme in Geneva, Switzerland, from January to August 2014.

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25 August 2021

This article has been temporarily removed. We apologize for any inconvenience.

Sincerely,  
The Journal of CWD

# Mine Risk Education in Mindanao, Philippines

Since 1968, the Bangsamoro region of central and southwestern Mindanao in the Philippines has experienced fighting between Muslim separatists and autonomists and the Philippines government. The conflict, including recent fighting initiated by breakaway insurgent groups, continues to leave unexploded ordnance (UXO) contamination around Bangsamoro. UXO threaten the safety, livelihoods and security of communities in the region. Since 1999, more than 500 landmine/UXO casualties have been identified.<sup>1</sup>

by Harshi Gunawardana [ FSD ]



An FSD team member uses magic to draw the attention of children to MRE.  
*All photos courtesy of Harshi Gunawardana/FSD.*

Following the signature of the Framework Agreement in Bangsamoro between the government of the Philippines and the Moro Islamic Liberation Front in October 2012, the *Fondation Suisse de Déminage* (Swiss Foundation for Mine Action, or FSD) and its national partner, the Philippine Campaign to Ban Landmines, began work to reduce the threat from landmines and UXO in conflict-affected areas. The program expanded to cover mine- and unexploded ordnance (UXO)-risk education (MRE) and develop local capacities in UXO clearance, and explosives and weapons stockpile management.

In September 2013, two weeks of intense fighting between Philippine security forces and the Mindanao National

Liberation Front left parts of the Philippines' sixth largest city, Zamboanga, littered with UXO. In a three-week clearance operation, Philippine explosive ordnance disposal (EOD) teams removed more than 700 pieces of UXO.<sup>2</sup> Hazardous items, however, continue to remain under multiple layers of rubble and debris. As residents and repair teams return to the area, they will undoubtedly uncover UXO.

## Non-technical Surveys

In FSD's Mindanao Program, an important aspect of the work is non-technical survey (NTS), which has been carried out since 2008. This activity involves collecting and analyzing new and existing information about hazardous objects and areas.





A community MRE session.

The survey teams map types and locations of UXO and report these to police or army EOD teams. In addition to NTS, FSD conducts MRE and gives community-safety briefings.

#### Train-the-Trainer

FSD Mindanao Programme Manager Tony Fish asserts, “In response to the Zamboanga crisis in 2013, FSD recognized the paramount need for an emergency MRE to the internally displaced persons (IDPs) in camps. To assist the community while minimizing the level of funding required for the MRE program, FSD trained local volunteers including police officers, criminology students from Western State Mindanao University, Save the Children, and members of the local nongovernmental organizations D’ALERT and CAPIN. The United Nations High Commissioner for Refugees provided assistance in conducting the training and in making initial contact with IDP camp managers in the Evacuation Centers.”<sup>3</sup>

Filipino, British, and Sri Lankan instructors trained MRE providers and visited evacuation centers to inform evacuees of what UXO can look like, where it might be found, the risks it poses, safe/unsafe behaviors to adopt/avoid, and who to call for assistance. MRE participant groups also received MRE kits to use in future sessions. Aid agencies, local volunteers and workers who carry out resettlement and development projects in these affected areas will also receive MRE.

The program aims to reduce the risk to local communities and strengthen the peace process by facilitating cooperation in UXO reporting and clearance between all stakeholders in the Mindanao peace process.

#### Community-based MRE

In 2014, FSD’s MRE program shifted from an emergency mode to a long-term, community-based approach. In Mindanao, UXO presents a significant risk to local communities.<sup>4</sup> MRE involves trainers visiting schools or community centers to warn people, particularly children, of the dangers involved in tampering with UXO. Participants are advised to report dangerous objects and mine/UXO accidents in their areas to *barangay* officials and the police.<sup>5</sup>

MRE consists of various educational activities aimed to raise awareness and promote behavioral change through campaigns and community liaison. FSD continued providing MRE and training courses for community volunteers who will work in Zamboanga and the Sulu Archipelago—areas where FSD has little or no access.<sup>6</sup> The program encourages these volunteers to educate beneficiaries to take responsibility for their safety in UXO-affected areas by discussing risks and sharing any recent changes with their communities.



A volunteer provides MRE to children.



An MRE volunteer delivers a puppet show to children.

### MRE Volunteers

The current community-based MRE program consists of volunteers from

- Zamboanga
- Sulu Archipelago
- UNICEF's Child Protection Workgroup in Mindanao
- Nonviolent Peaceforce's local partner agencies in Datu Piang in Maguindanao province

MRE providers often have unique strategies for delivering messages to people of different ages. By working together as a team, providers share their preferred ways of teaching. Moreover, they sometimes field test new methods to convey standardized MRE messages.

FSD MRE teams conduct knowledge, attitude and practice (KAP) surveys to assess MRE's impact on affected communities as well as returnees. The teams gather responses using a mobile data-collection platform, i.e., tablets. KAP surveys highlight target areas for future MRE programming. The survey results indicate specific target groups for MRE, e.g., schoolchildren who can be reached through child-friendly MRE materials such as games, stickers, masks, billboards and lunchboxes, or via women through house-to-house MRE sessions with female teams, flyer distribution or large billboards in each village after conducting MRE sessions.

MRE training materials include seven posters, each presenting key messages in local languages: *Tagalog*, *Tausūg* and *Yakan*. Pictures also feature true-to-scale mines and UXO. In addition to regularly programmed messages, FSD developed MRE materials specific to the mines and improvised explosive devices (IED) used by the New People's Army in Eastern Mindanao. To reach the general public and provide MRE messages in remote or inaccessible areas, FSD broadcasts MRE messages through the ABS-CBN network. The beneficiaries find it convenient to download and learn about MRE using a mobile app, and become familiar with shapes of common UXO and various safety messages. They can take a picture of the item and directly report it to the proper contact through the app. The first release of the FSD MRE app is available on the Android and Apple app websites. This is the first version available and tailored for the Philippines and will soon be accessible for other countries in different languages. To install the MRE app, visit: <http://bit.ly/1Ejivmj>.

FSD hosts regular technical working groups (TWG) to unite MRE providers, volunteers, partners and other entities including the Department of Social Welfare to extend MRE's reach using standard key messages and by reviewing material development. TWGs also provide a venue for MRE partners to discuss strategic planning and methodologies to ensure MRE





An FSD worker provides house-to-house MRE.

is delivered in a timely and effective manner to those in need. FSD's MRE teams and volunteers created Facebook pages where they post updates on activities, locations and photos of their MRE sessions.

By September 2014, the following milestones were achieved:

- 275 surveys completed
- 98 UXO locations mapped and recorded
- 113 victim reports completed (60 items of UXO, five landmines, 37 shellings or bombardments, nine IEDs, and two unidentified causes)
- 61 MRE providers trained
- More than 1,000 MRE sessions conducted by FSD MRE teams and volunteers
- More than 35,000 beneficiaries received MRE

**Looking Forward**

FSD will assist Zamboanga City authorities to incorporate MRE services

into the Zamboanga City Disaster Risk Reduction and Management Plan. FSD is also integrating MRE into university and school curricula. MRE lessons will appear in textbooks, which will be printed and distributed in local languages to target schools in Mindanao. MRE training will be integrated into universities' National Service Training Programs. Based on increased demand for MRE as well as part of its commitment to strengthen local capacity, FSD will conduct further MRE provider trainings in Mindanao in 2015. FSD also plans to train Bangsamoro Islamic Armed Forces personnel in UXO clearance and ammunition-safety management in the near future. ©

*See endnotes page 65*



Harshi Gunawardana is a mine-risk education technical advisor with FSD. She has nearly 10 years of experience in the mine action sector, particularly in training, managing, coordinating and supporting mine action projects. Her interest in MRE grew while working in Myanmar and the Philippines, training people to conduct risk education in their communities. Gunawardana has a master's degree in public management from the Sri Lanka Institute of Development Administration. She has worked at the Geneva International Centre for Humanitarian Demining in Switzerland and with Norwegian People's Aid. She is reading for her Doctor of Philosophy in management at the University of Sri Jayewardenepura (Sri Lanka).

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# Humanitarian and Developmental Impact of Anti-vehicle Mines

Anti-vehicle mines negatively impact humanitarian efforts and developmental progress. Key findings from a South Sudan case study show that mine contamination impacts humanitarian efforts directly through casualties, while dangers of agricultural development and hindrance to foreign investment are also primary developmental concerns for the South Sudanese.

by Pascal Rapillard and Maryam Walton [ GICHD ]

As the international community continues to explore the possible need for further legal regulation of anti-vehicle (AV) mines, a need exists for more rigorous analysis of the impact of AV mines on civilians and developing societies either presently suffering or recovering from conflict.<sup>1</sup> To bridge this gap, the Geneva International Centre for Humanitarian Demining (GICHD) and the Stockholm International Peace Research Institute (SIPRI), funded by Ireland and the U.S., undertook a study to document the humanitarian and developmental impact of AV mines.<sup>2</sup>

The study found that AV mines negatively impact humanitarian, post-conflict recovery and developmental efforts. AV mines laid on roads, roadsides or in fields result in numerous civilian casualties. In addition, the presence of these mines continues to prevent populations from productively using land, effectively using transport and safely building infrastructure.

The study's methodology was based on existing literature and information from mine action centers and operators on the ground in the form of documentation, expert advice, fieldwork, interviews, basic impact surveys and national baseline surveys. The full study

features case studies from Afghanistan, Cambodia and South Sudan.

## Background

Whereas anti-personnel (AP) mines yield smaller detonations designed to injure or kill human beings, AV mines rely on larger explosive charges to damage or destroy armored vehicles and tanks. Similarly, AV mines use fuzes that require greater amounts of pressure to trigger a detonation in order to compensate for the weight difference between a human and a vehicle. Some AV mines are also manufactured with additional fuzing systems, giving users the option of fitting anti-disturbance and anti-handling devices. Countermeasures (or when someone tampers with the mine or tries to remove it from the ground) trigger AV mines fitted with these devices. AV mines are designed to damage or destroy hardware, and to injure and kill vehicle crews and passengers.

While the technical design of AV mines has changed over time, the underlying concept remains the same: Most are simple, adaptable and can be mass-produced at relatively low cost. First used to combat locomotives, Confederate forces in the U.S. Civil War deployed pressure-activated, AV mine equivalents along railroads. From World War I onward, AV mines

were further developed and became more sophisticated in design and function. Their use also became more widespread. To this day, new mines are still actively laid.

Typically, AV mines are placed directly on roads or nearby to prevent road use or access to particular areas. In situations where the terrain may be unsuitable for laying mines, off-road mines can be used to direct explosions into a vehicle's side instead of detonating from underneath. Heavy rain may displace AV mines, causing uncertainty of location and thus increasing the hazard.

Specific treaty provisions and International Humanitarian Law (IHL) rules and principles regulate AV mine use. Rules of customary international law stem from general practice, accepted as law, and are independent of other provisions established in international treaties. They may be applicable in international or non-international armed conflicts, or both, and are binding on states and non-state actors. The most significant principles of customary IHL applicable to AV mines are distinction and proportionality.

Second, the International Committee of the Red Cross recognizes three specific, customary rules that directly address AP and AV mines:<sup>3</sup>



A truck damaged by the blast of an anti-vehicle mine in Angola.  
Photo courtesy of The HALO Trust.

- Care must be taken to minimize indiscriminate effects of landmines.
- Parties to the conflict are required, as far as possible, to record placement of landmines.
- At the end of active hostilities, parties to the conflict that used landmines must remove or otherwise render them harmless to civilians, or facilitate their removal.
- AV mine accidents are not always reported.
- AV mine accidents are sometimes inaccurately recorded as being the result of another weapon.
- In some situations, no data is recorded, or collected data does not differentiate between AV and AP mines.

Finally, AV mines are subject to specific rules in Amended Protocol II (APII) to the *Convention on Certain Conventional Weapons* (CCW). APII regulates use of mines, booby-traps and other devices including “mines other than anti-personnel landmines.” It states in particular that “It is prohibited to use remotely-delivered mines other than anti-personnel mines, unless, to the extent feasible, they are equipped with an effective self-destruction or self-neutralization mechanism and have a back-up self-deactivation feature, which is designed so that the mine will no longer function as a mine when the mine no longer serves the military purpose for which it was placed in position.”<sup>3</sup>

#### Humanitarian and Developmental Impact

The humanitarian impact of AV mines is best summarized in two parts: number of casualties and hindrance to relief aid.<sup>4</sup>

Data collected through the basic impact survey gives estimates of casualties in some countries (see Figure 1, next page). Moreover, states noted that the actual level of contamination is likely higher for the following reasons:

Data collected from media sources gives an idea of the type of casualties caused by AV mines (Figure 2, page 50).<sup>5</sup> Research of news items revealed 190 incidents and 725 casualties since 2009.<sup>2</sup> Again, actual number of casualties is expected to be much higher for reasons cited previously.

AV mines also affect the work of humanitarian organizations and delivery of humanitarian assistance. AV mines on or alongside roads endanger all users. Humanitarian personnel attempting to reach areas only accessible through contaminated roads risk their lives to do so. In many cases, AV mines force humanitarian agencies to abandon tasks until roads are cleared. In other cases, organizations seek alternative means, such as air travel, to reach said locations. However, alternative methods can be costly and are often not at the disposal of most humanitarian groups.

#### Developmental Impact

AV mine contamination negatively impacts development in four main ways. First, following a conflict, communities will attempt to rebuild and develop their towns and villages, which involves building infrastructure such as houses, schools, hospitals, roads and bridges. Presence of AV mines

will hamper these efforts to build and rebuild infrastructure for two reasons. Areas must be cleared before construction. Moreover, heavy machinery used in construction will likely detonate AV mines. As such, individuals will either risk their lives attempting to rebuild their communities or they will abandon construction projects until clearance can be carried out, which can take several years.

As societies progress through development, modes of transportation evolve, and use of vehicles increases to move goods as well as people. Increased vehicular use may unveil previously unknown AV mines.

In addition, national and international investors may seek potential business ventures in developing societies. Whereas this is a positive step for development in theory, presence of AV mines has on several occasions discouraged investors from particular areas. Given the high cost of clearance, investors hesitate to bear the cost of land clearance and may consequently abandon the project to search for alternate locations.

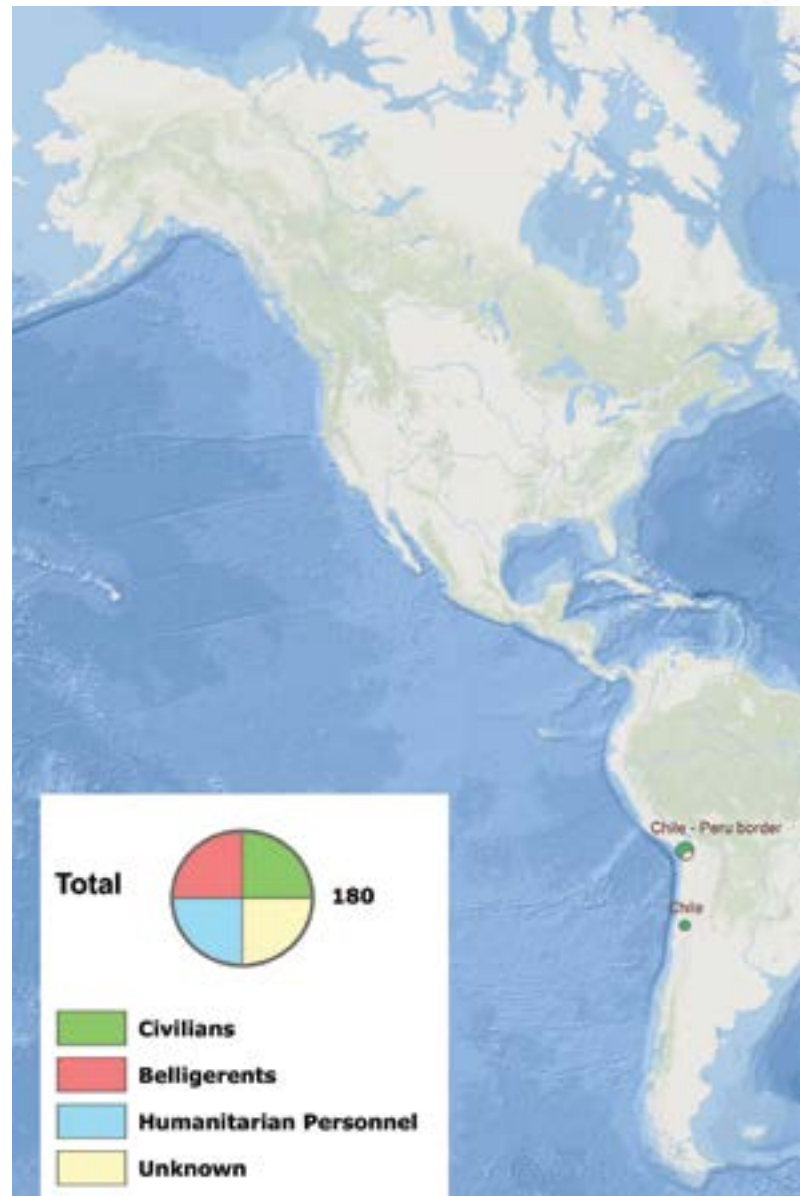
Advancement in farming technology generally results in heavy machinery replacing outdated equipment. Whereas using farm machinery is certainly a positive step for development, its use in contaminated areas poses problems. The weight of the machinery is sufficient to trigger these devices, so communities have two detrimental options: risk their lives in order to cultivate land or await clearance.

These factors suggest that the impact of AV mines increases as states progress in post-conflict recovery and development efforts.

#### Case Study: South Sudan

South Sudan gained independence from Sudan on 9 July 2011 after a civil war that lasted decades and, according to multiple sources, claimed the lives of approximately two million people. Since then, peace in South Sudan has remained fragile, and the situation has recently declined. The economy depends on oil revenues and has suffered from conflicts over use of Sudan's pipelines and facilities for oil exports. In parts of South Sudan, up to 90 percent of households rely primarily on agriculture and livestock for subsistence. Although not the only cause of instability and underdevelopment in South Sudan, landmine contamination adds further challenges to state-building and development efforts.

Contamination from AP and AV mines is widespread in South Sudan. AV mines contaminate all 10 states to various degrees.<sup>6</sup> The United Nations Mine Action Service (UNMAS) is responsible for coordinating demining in South Sudan and regularly finds new tasks to clear. In 2012, the majority of new tasks were AV mines. So far, 22,000 km (13,670 mi) of roads



were cleared from landmines, including most major roads. However, smaller roads are still contaminated, and many rural communities remain isolated as a consequence.<sup>7</sup>

Mine Technologies International identified the most likely locations of AV mines to be on or near roads, close to bridges and in landscapes suitable for defensive positions.<sup>8</sup> AV mines were also found at checkpoints and on old, overgrown roads.<sup>9</sup> Demining operators commonly report that mines were seemingly laid arbitrarily and without pattern or records.

#### Humanitarian Impact

Casualties remain the most direct humanitarian impact of AV mines. As demonstrated in Figure 2 (page 50), 482 civilian casualties from AV mines were recorded between 1999



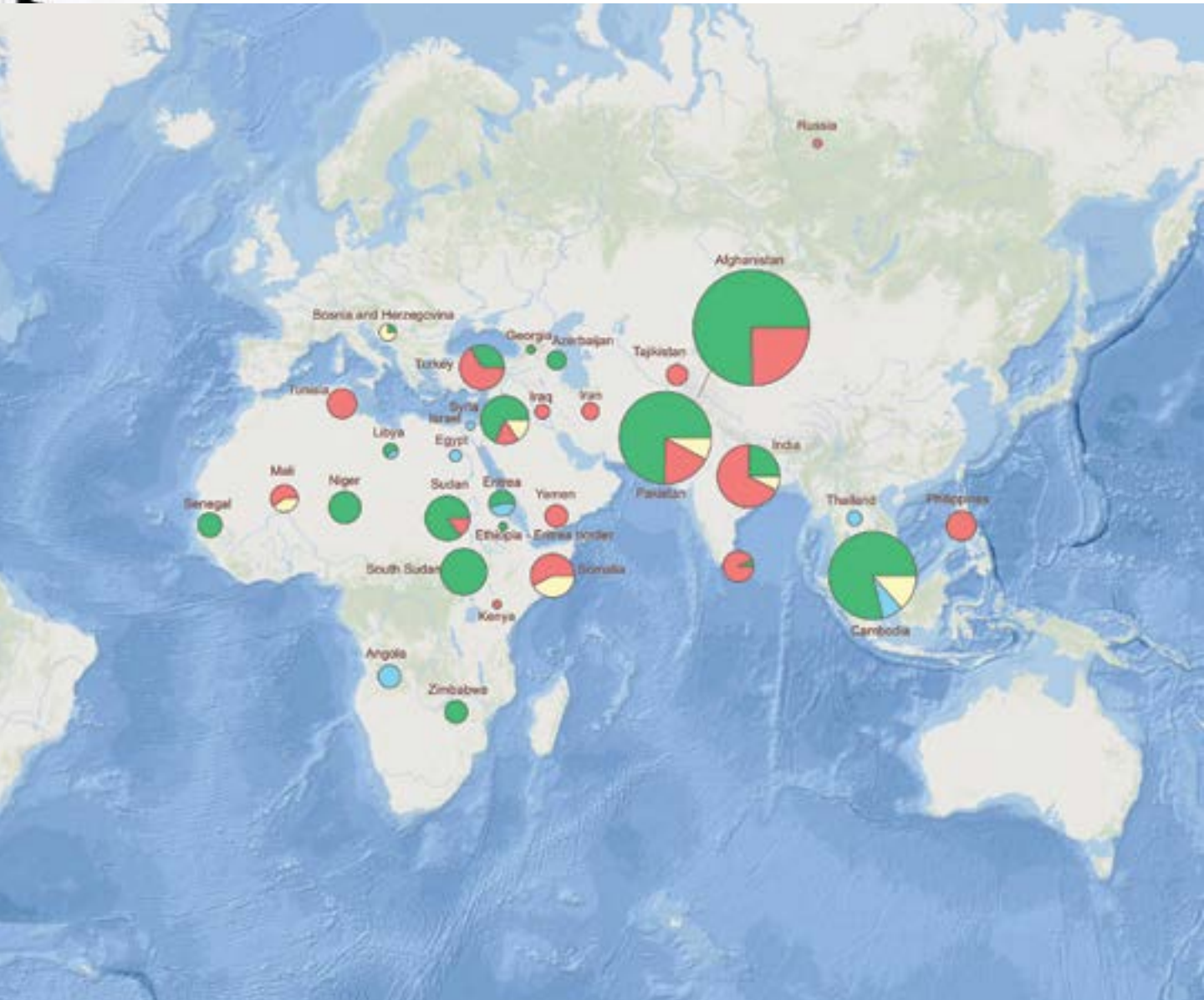


Figure 1. Anti-vehicle mine casualties reported by states and operators in the Basic Impact Survey.  
 All figures courtesy of GICHD.

and 2011 in South Sudan, which is likely an underestimate of the actual amount of AV mine casualties.<sup>10</sup> Prior to the 2011 independence referendum, the number of reported casualties from AV mines was relatively low in South Sudan when compared to other states with similar contamination levels.<sup>2</sup> The casualty increase in 2011 is due in part to increased migrations across South Sudan after increased tensions from the referendum.

**Developmental Impact**

AV mines in South Sudan impact its development in a number of ways. First, AV-mine contamination hampers agricultural development. Agriculture is the backbone of the South

Sudanese economy. Around 80 percent of the population lives in rural areas where agriculture, forestry and fisheries provide the primary source of income for most households.<sup>2</sup>

In cases where access to mechanical farming machinery is available, presence of AV mines impedes agricultural production. In Eastern Equatoria, AV mines hampered the development of tea plantations and impeded expansion of the timber sector in South Sudan. In addition, former sugarcane plantations were not put back to use due to contamination from AP and AV mines.<sup>10</sup>

In addition to vehicles and farming equipment, heavy cattle can also detonate AV mines. Cattle herders in the north,

Country	Total number of recorded civilian casualties due to anti-vehicle mines	Time period of records
Afghanistan	1,233	1979-2013
Bosnia-Herzegovina	158	1992-2013
Cambodia	968	1979-2013
Croatia	184	1991-2013
Lebanon	332	1948-2013
South Central Somalia	46	1991-2013
South Sudan	482	1999-2011
Sudan	147	1966-2012

Figure 2. Media coverage of AV mine casualties.

many of whom rely on livestock for income, repeatedly voiced their concerns over AV mines in the area.<sup>11</sup>

Second, the presence of AV mines deters foreign direct investment. Investors need verification from the national mine action authority that an area of interest is landmine-free before project planning begins. Known contamination affects building of roads and power lines as well as the extractive industry.

AV mines deter smaller foreign investment projects from being carried out, due to budgets that cannot sustain clearance costs. For example, an Indian company expressed an interest in developing a sugar field together with a refinery in the border area of Eastern Equatoria and Jonglei; however, the investors pulled out due to landmine contamination that included AV mines.<sup>12</sup>

Third, the presence of AV mines affects rebuilding of infrastructure. In the early years of clearance, emergency humanitarian demining standards called for all main roads connecting major towns in the emergency phase to be cleared to an 8-m (9-yd) width only. In 2004–2005, UNMAS clearance standards changed to a 20- to 25-m (22- to 27-yd) width in order to support increased development.<sup>13</sup> A number of accidents near roads cleared to an 8-m (9-yd) width were recorded. Furthermore, demining operators frequently find more AV mines next to cleared roads. For example, Norwegian People’s Aid responded to a clearance

request when a road construction company’s bulldozer detonated an AV mine when paving a new road.<sup>14</sup> In addition, Denel Mechem staff witnessed an AV mine detonate a bus in Unity in August 2011. The main road had many smaller side roads leading to villages. Local communities were aware of the contamination but had no choice except to use the road, as alternate routes were not an option.

As a country with limited public infrastructure and a great deal of subsistence farming conducted by hand, South Sudan has not yet experienced the full impact of its AV-mine contamination. Remaining contamination will likely obstruct future infrastructure development projects and agricultural expansion.

**Conclusion**

Findings from this study’s basic impact-survey process and case-study investigation show that the negative humanitarian and development impact of AV mines have the potential to increase in the aftermath of a conflict as a state attempts to recover. AV mines inhibit the return and resettlement of populations, gradual introduction of a greater number of civilian vehicles for transportation and farming, and new state infrastructure projects that use heavy equipment.

The significance of the negative impact of AV mines on stability and development should not be understated. While



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AV mines are not the biggest impediment to humanitarian and development efforts, they contribute to problems associated with fragile post-conflict societies. ©

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# News Brief

## Using Plants to Detect Landmines

Researchers from Virginia Commonwealth University (VCU) in Richmond, Virginia (U.S.) are investigating how plants can be used to detect buried explosives, such as landmines, in areas of dense vegetation, where traditional demining methods are difficult.<sup>1</sup> Using an experimental minefield developed by the National Explosives Waste Technology and Evaluation Center, VCU researchers determined that toxins like TNT and research department explosive leak into the ground and make plants sick.<sup>1, 2</sup> Donald Young, Ph.D., chairman and professor of biology in the VCU College of Humanities and Sciences, and Julie Zinnert, Ph.D., a biology and research scientist with the U.S. Army Corps of Engineers, are leading a team of VCU graduate students in the research.<sup>3</sup>

Studies show that toxins from explosives leak into the surrounding environment, affecting plant health, especially herbaceous plants more than woody plants.<sup>3</sup> Thus, researchers are considering creating an “Explosive Specific Index” that will record how explosives affect various vegetation types. The index can quickly analyze the health of an area of vegetation where landmines may be visually obscured.<sup>2</sup> A key to this yet-to-be-developed method of detection involves quick and cost-effective



scanning of large contaminated areas. Airborne infrared imaging appears to be the most promising method.<sup>1</sup> VCU researchers “observed a notable change in the infrared portion of the spectral signature in plants that had been exposed to contaminated soil.”<sup>3</sup> The VCU team seeks to develop a cost-effective method for detecting plant damage from sensors on airplanes or cellphones.<sup>2</sup> ©

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~ Patrick Shea, CISR staff



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# GICHD Linguistic Outreach Programs

The Geneva International Centre for Humanitarian Demining (GICHD) introduced linguistic outreach programs (LOP) to provide mine action training and information in multiple languages. The LOP also promote communication between countries and organize regional workshops and meetings. By providing non-English training and information exchange opportunities, GICHD improved outreach and broadened potential beneficiaries, as well as strengthened mine action centers and organizations worldwide.

by Faiz Paktian [ Geneva International Centre for Humanitarian Demining ]



Arabic linguistic outreach programs environmental impact workshop in Kuwait.  
All photos courtesy of GICHD.

**T**he importance of languages for international organizations in today's business climate is indisputable. As an international organization, GICHD's objectives are to improve global clarity on explosive hazards and to enhance the capacities and performance of national authorities in states affected by landmines and explosive remnants of war (ERW). Can this be accomplished by using only English as a communication medium whereas a majority of mine- and ERW-affected states communicate in other languages?

To effectively reach out to different segments of the mine action community, the GICHD, in partnership with national authorities, regional and international organizations, initiated the linguistic outreach programs (LOP) in Arabic, French, Persian (Farsi/Dari) and Russian. The program began in 2006 with the French-language outreach program, followed by programs in Arabic (2012), Persian (2013) and Russian (2014). In 2011, French LOP coordination and management was handed over to the *Centre de Perfectionnement aux Actions post-confliktuelles de Déminage et de Dépollution* (CPADD) in Benin.

## Goals

LOP goals vary and encompass what stakeholders in the respective language identify as their priorities. The overall goal is to promote best practices in the major languages spoken within the mine action community. Another goal is to enhance regional cooperation among affected states by sharing information and exchanging experiences. Moreover, the provision of advisory services and specialized training in a respective language permits different national mine action authorities and their national and international partners to learn from training sessions and develop capacity in all aspects of mine action, including strategic, operational, quality and information management.

## Approach

The LOPs plan and implement activities in close consultation and partnership with mine-affected states as well as regional and international organizations. As a facilitator, GICHD designs and executes these activities in a gender-sensitive manner to help

states meet operational and capacity-development objectives. GICHD also works closely with donors, national governments and regional institutions to provide required resources in order to meet these needs. After three to five years, GICHD entrusts the program to a well-established regional mine action entity. Existing GICHD-staff manage and implement LOPs, taking into account GICHD staff's linguistic competencies. When programs require more resources, GICHD recruits additional personnel. Where possible, GICHD engages with potential donors in their respective languages to seek funding or in-kind contributions for the relevant linguistic program.

### Achievements

The following are a few examples of achievements in linguistic outreach initiatives:

- **Bibliomines.** As a result of the collective effort by all stakeholders in the French-speaking community, the French LOP established an impressive online mine action library. In this digital library, one can find all necessary documents for mine action, including translation of the International Mine Action Standards (IMAS) and the associated Technical Notes.<sup>1</sup> The Arabic-speaking community also emphasized the need for an online platform to share information, which resulted in the establishment of an Arabic website for mine action.<sup>2</sup> The Egyptian Mine Action Centre established the Arabic LOP website, while Arabic LOP partners contribute materials. GICHD manages the process.
- **Workshop on national standards in Tajikistan.** Another achievement in the linguistic approach was the organization of the first regional workshop in Farsi/Dari, the language of Persians, in Dushanbe, Tajikistan, in February 2013. GICHD organized the workshop in partnership with the Mine Action Coordination Centre of Afghanistan (MACCA), Islamic Republic of Iran Mine Action Center and Tajikistan Mine Action Centre, with the support of the U.N. Development Programme (UNDP) and the Organization for Security and Co-operation in Europe. The workshop gathered experts, operators, national authorities and other key mine action actors from three mine-affected countries that share the same language. The aim was to exchange information, review and suggest changes to the national mine action standards of Tajikistan, and to discuss future regional cooperation. The event offered the management of the three mine action programs an opportunity to learn from each other's experiences. Participants discussed joint activities such as regional training, exchange visits, cross-border risk reduction operations and information sharing. An interesting outcome of this workshop was the revision of the Tajik Mine Action Standards with support from MACCA.
- **Workshop on the environmental impact of mine action in Kuwait.** In December 2013, GICHD, the Kuwait Institute for Scientific Research and the Kuwait National Focal Point organized a three-day workshop in Kuwait. The event gathered more than 80 participants from a dozen Arabic-speaking countries, along with experts from international organizations, donor countries, nongovernmental organizations, research centers, militaries and commercial operators to discuss the environmental impact of landmine/ERW contamination and mine-clearance operations. The workshop marked a significant step toward broadening participants' understanding and awareness of the mine/ERW impact on ecosystems and human health. Moreover, the event facilitated discussion on environmentally safe demining operations and reversal of environmental damage. A report of the event is available in Arabic and English on the GICHD and Arabic LOP websites. Although the workshop's focus was regional, conclusions and recommendations are highly relevant to the global mine action community.
- **Mine action terminology in Arabic.** Stakeholders in the Arabic LOP highlighted the need for a standard terminology of mine action terms and definitions in Arabic. As a result, GICHD partnered with the Lebanon Mine Action Centre and UNDP Lebanon to organize a regional workshop with participants from 10 Arabic-speaking countries and from relevant stakeholders held in Beirut, Lebanon, in February 2014. This three-day workshop debated the meaning of previously disputed terms and definitions that had hindered the translation of documents and standards among the Arabic speaking community, and came up with an agreed-upon list of terms and definitions usable for mine action. Since then, many of the national and international documents were translated or updated, including IMAS. Another workshop outcome was the establishment of a regional board consisting of representatives from each country that will review and revise Arabic translations as needed.

### Recommendations

It is essential for mine action organizations to promote their services and products in local languages. Many quali-

fied individuals holding important roles in national programs are unable to participate in training courses conducted in English. Mine action training and advisory services conducted in local languages enable a greater number of individuals to benefit from educational and exchange opportunities.

Regional events in local languages have a greater effect on raising subject-matter awareness, particularly when events include case studies from programs in the region that are delivered in the local language by a representative of the respective program. Beneficiaries of such events extend beyond mine action personnel within the affected states to military personnel and other humanitarian practitioners in non-affected states who engage in peacekeeping or humanitarian assistance operations.

Mine action is an increasingly demanding process, involving evidence-based decision-making; proper land classification and subsequent application of the land-release method; and quality, safety and environmental requirements. National authorities need to adopt improved policies and procedures to handle landmines/ERW safely and efficiently. Similarly, they need to build national capacity and keep their

staff up-to-date on mine action issues and topics to better satisfy their local and international partners and donors. In this context, linguistic approaches and regional cooperation prove very effective.

Regional activities save costs and deliver better quality results, as illustrated in the IMAS translation process. Most national programs invest in the translation of IMAS and make it available for their own program's use. When such documents are translated regionally in a consultative manner, quality of translation increases indisputably; when shared on a regional platform, they reduce costs and save time and effort at the national level.

Moreover, such initiatives boost regional cooperation and South-South cooperation.<sup>3</sup> These collaborations benefit individuals, programs and countries in the region by understanding each other's needs and strengths, and by sharing experiences and support. Good examples include training quality-assurance officers for the Egyptian demining teams by officers of the National Committee for Demining and Rehabilitation in Jordan, and the review and revision of the national standards for Tajikistan by MACCA colleagues. ©

*See endnotes page 66*



Faiz Paktian is assistant director and head of the Standards and Linguistic Outreach Programmes Division for GICHD. He has been involved in humanitarian mine action for the past 24 years in a variety of positions in the field and at the senior-management level. He has worked for nongovernmental organizations, international organizations and the U.N. in several war-affected countries. Paktian holds a bachelor's and master's degree in mechanical engineering and a master's degree in business and administration.

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Arabic linguistic outreach programs terminology workshop in Lebanon.





# RESEARCH & DEVELOPMENT

Research and Development Section Sponsored by



# Evaluating the Mini MineWolf

The U.S. Department of Defense Humanitarian Research and Development Program conducted operational field evaluation to assess the capabilities of Mini MineWolf technology.

by Phil Straw [ U.S. Department of Defense Humanitarian Demining Research and Development ]



The Mini MineWolf System.  
Photo courtesy of MineWolf Systems.

From 2010 to 2011, the U.S. Department of Defense (DoD) Humanitarian Demining Research and Development (HD R&D) Program conducted an operational field evaluation (OFE) of the Mini MineWolf tiller in Tajikistan. In early 2013, the evaluation expanded, and a second unit, operated by the Thailand Mine Action Centre (TMAC), deployed to Thailand.

The OFE assessed the following aspects of the Mini MineWolf:

- Performance, including ground-processing rates and fuel usage
- Limitations in operating across varying terrain, vegetation and weather
- Reliability of the unit, including field repairs, maintenance and modifications
- Clearance capacity, including ability to clear or render mines and unexploded ordnance (UXO) inoperative as well as ability to withstand detonations

Once operators and supporting deminers completed the training phase, the TMAC team conducted standard operating procedures in a low-threat area, integrating them into the OFE. This allowed the TMAC team to become proficient and confident with the Mini MineWolf operations prior to working in high-threat areas.

## Terrain

The area of operation is southeast Thailand, close to the Cambodian border, in Trat province—a wet, heavily vegetated region. Situated within semi-mountainous terrain, the mined areas presented challenging conditions. With a combination of minefields laid by Khmer Rouge and Vietnamese forces in Trat province, the range and types of mines encountered can be quite varied; the Khmer Rouge predominantly laid Chinese mines, while the Vietnamese used mostly Russian mines.

A 2012 *Anti-Persoonsmijnen Ontmijnende Product Ontwikkeling* (APOPO) survey of 39 confirmed hazardous areas in Trat and Buriram provinces yielded 18.47 sq km (7 sq mi) of mine-affected areas and identified an additional 15.96 sq km (6 sq mi) in need of further investigation.<sup>1</sup> The challenging ecological conditions and presence of varying types of mines presented an ideal opportunity to test the Mini MineWolf's performance.

## OFE Procedures

Gleaned from lessons learned during the Tajikistan OFE, the HD R&D team developed a set of operational deployment and OFE phases for the Mini MineWolf:

- Phase 1—Area survey by aerial drone
- Phase 2—Mini MineWolf technical survey
- Phase 3—Full mechanical clearance of mined areas
- Phase 4—Manual clearance (behind the machine) for data analysis and recording

**Phase 1.** With use of an inexpensive and commercially available quadcopter drone, operators collect detailed photographs of terrain prior to deploying mechanical units. Given the remote controllability of the Mini MineWolf and operators' limited vision (remote camera feed) relative to the machine's path, the ability to pre-plan lanes to avoid obstacles proved invaluable. The drone system used for this task was the DJI Phantom II, a global positioning system (GPS)-stabilized quadcopter with a high-definition camera capable of taking still imagery and videos. In addition to recording photographs, these drones can also record GPS data, thus allowing for photographs to be linked or overlaid with mapping data.



A quadcopter drone.  
Photo courtesy of HD R&D.

**Phase 2.** Directed remotely by an operator, the Mini MineWolf conducted a mechanical technical survey. Lanes were cut every 25 m (82 ft), perpendicular to each other. This formed a grid pattern across the lower threat areas and led into the higher threat zones. The technical survey lanes were closely monitored for any mine indicators.





In Phase 2, lanes are cut every 25 meters, perpendicular to each other to form a grid.  
 Photo courtesy of HD R&D.



The tiller of the Mini MineWolf is capable of detonating AP mines without sustaining any damage.  
 Photo courtesy of HD R&D.

When the machine located mined areas, clearance was conducted from the central area of the minefield outward. This technique has since surveyed 2 million meters (494 acres) of land. Although generally opposite of conventional clearance, this process proved more efficient.

**Phase 3.** Full mechanical clearance was conducted on the mined areas located during the technical survey phase. Tilling the soil to a depth of 25 cm (10 in), clearance pushed 75 m (246 ft) outward to a distance of a 75-m (246-ft) radius from the last known mine location, which could be adjusted if necessary after the manual data-collection phase. This ensured a 75-m (246-ft) buffer zone around the minefield and that the entire mined area was covered.

**Phase 4.** Collecting the clearance performance data was critical to the OFE's success. One of the major questions within the OFE was whether the Mini MineWolf could consistently destroy or otherwise render mines inoperative. To this end, the painstaking process of recovering every piece of the remaining mines left behind by the Mini MineWolf has been paramount. All items were photographed, recorded and inspected for functionality.

The search process involved three steps. Firstly, a deminer equipped with a Minelab F3 searched the area for all metallic components. Next, the soil was raked to locate any metallic components. Lastly, a deminer conducted a deep search with a Large Loop Detector (LLD) to locate any deeply buried UXO.

#### OFE to Date

Since the start of the OFE (April 2013), focus was placed on accurate data collection and analysis. While greater area clearance could have been achieved, this shift in focus would have detracted from the OFE's goal.

In terms of the Mini MineWolf's overall performance, the device proved highly effective as a mechanical clearance tool. The machine has yet to leave a single, functioning mine after





tilling an area. All of the mines encountered during inspection were detonated, initiated (but failed to function) or otherwise rendered inoperative.

#### Survivability

During the OFE from 2013 to 2014, the Mini MineWolf tiller detonated three TM46 anti-tank (AT) mines. These were rogue mines laid in conjunction with anti-personnel (AP) mines. On each occasion the tiller suffered considerable damage, which required comprehensive repair to return it to operation. Local staff conducted these repairs on site under the supervision of the HD R&D field officer. The Mini MineWolf was not designed for use against AT mines, which were not anticipated to be within the area of operation. The machine, however, detonated many AP mines without sustaining any damage.



#### Upgrades

One of the main tenets of the HD R&D Program is to improve demining systems wherever shortcomings may be, as it did with the Mini MineWolf. The team in Thailand put together an armored, mobile operator's platform, a new version of which is under construction at the HD R&D workshops in the U.S. This platform will deploy to support the Mini MineWolf before 2015.

Some issues experienced with the original camera and monitoring system on the Mini MineWolf needed addressing, and the HD R&D Program resolved these issues through the addition of a replacement system built in-house by the HD R&D technicians. The original camera system fitted to the machine by the manufacturer was a complex four-camera system. It was bulky and used analog cameras and electronics. HD R&D staff at Fort Belvoir, Virginia (U.S.) built a different camera system, using small wide-angled digital high-definition cameras. These were then coupled with a simple 900 Mhz WIFI transmission and receiving network. The use of the small wide-angle cameras enabled the team to cost-effectively switch from the four-camera system (three forward facing and one reverse facing) to a two-camera system (one forward/one reverse), while maintaining the same field of view. The new system lessened the weight of the technology, improving the quality of photo monitoring while maintaining its scope. This also allows for additional camera monitoring from the



Recovered items are photographed, recorded and inspected for their state of function.  
Photos courtesy of HD R&D.

Clearance Statistics – 04/2013 to 04/2014	
Total Area Tilled	122,890 sq m
AP Mines Encountered	397
AT Mines Encountered	3
UXO Encountered	53
Hours Operated	327

Table 1. OFE clearance figures.  
Table courtesy of HD R&D.

control point (via the same WIFI link), and it can allow hard drive recording.

#### Looking Ahead

The OFE, including data collection on the Mini MineWolf's performance in Thailand, will continue through 2015, as will the support for TMAC's clearance operations, to the benefit of both parties.<sup>2</sup>

See endnotes page 66



Phil Straw has worked in mine action since 1997 and began working with the U.S. DoD HD R&D Program in early 2004. Straw has extensive experience in field operations and mine action management, and is a qualified mechanical engineer.

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# Evaluating Landmine-detection Rats in Operational Conditions

Researchers evaluate the accuracy of pouched rats' ability to detect landmines under operational search conditions. Results indicate the ineffectiveness of one training method for maintaining quality operational performance and suggest further examination.

by Amanda Mahoney, Timothy L. Edwards, Kate Lalonde, Christophe Cox, Bart Weetjens, Tekimiti Gilbert, Tess Tewelde and Alan Poling [ APOPO and Western Michigan University ]

The uncertainty of specific landmine locations presents a unique challenge to using animals for landmine detection, preventing rewards from being arranged under operational search conditions. A common strategy is to create a training field near the operational site, so animals receive regular refresher training. However, the animals may discriminate between the operational condition and the training condition based upon contextual discrepancies.

## Overview

Phase 1 of the present experiment evaluated the accuracy of five rats' abilities to detect landmines in a **no-reward** condition followed by a **reward** condition on a training field (i.e., non-hoed ground). Phase 2 evaluated the same conditions when the no-reward condition was conducted in an area made to simulate an operational minefield (i.e., hoed ground). When the sites were identical, the rats' accuracy was similar across conditions. When the no-reward session ground was hoed in Phase 2, the rats' accuracy fell relative to their performance in the baseline condition and reward session.<sup>1</sup> These results indicate that conducting training with reinforcement in areas that differ substantially from operational search areas is an ineffective method for maintaining good operational performance. Alternative reinforcement methods, such as creating reinforcement opportunities within a minefield using TNT contamination, should be examined.

*Anti-Persoonsmijnen Ontmijnende Product Ontwikkeling* (APOPO) uses pouched rats trained with operant conditioning; the organization's operational experience and published data suggest these rats can detect landmines and other explosive remnants of war (ERW) successfully.<sup>1,2,3,4</sup> The rats work in extinction when they search for mines, because landmine locations are unknown. Therefore, whether an indication response is correct (i.e., near a mine or other ERW) or incorrect is unclear, and such responses are never reinforced (i.e., rewarded with food) in the field.<sup>5</sup> Studies have shown that operant behavior weakens and becomes more variable when extinction is arranged, and Mahoney et al. recently examined whether similar results would be obtained with pouched rats exposed to extinction on our training minefield.<sup>6</sup> Every day during the baseline condition, five rats separately searched one 100-sq-m box that contained a single mine under conditions where an indication response within 1 m of a mine was reinforced with food, while all other responses had no programmed consequences. Rats detected, on average, 97.8% of the mines and made very few errors. An extinction condition was then

implemented in which food was not presented. Each rat emitted fewer identification responses thereafter. While the rats' accuracy fell substantially, false alarms did not significantly increase. On average, the decline in accuracy was evident within three days of the onset of extinction. Furthermore, when the reinforcement condition was reinstated, rats took an average of four days to recover accuracy to baseline levels. These results show that mine-detection rats' performance deteriorates quickly when extinction is arranged.

Consistent with the International Mine Action Standards (IMAS) 94.01 (2008), APOPO's mine-detection rats are given opportunities for reinforcement at a training site located close to the actual minefield.<sup>6</sup> The training site contains inactive landmines planted at known locations and resembles the operational site as closely as possible. At the training site, rats receive differential reinforcement for correct indication responses, and groups of rats rotate between the operational and training sites so that there are no disruptions in landmine clearance. This arrangement provides differential, albeit intermittent, reinforcement for correct indication responses and should be sufficient for maintaining accurate detection so long as

- Training and operational sites closely resemble one another, preventing the rats from discriminating settings where reinforcement is and is not available
- Exposure to the former setting is limited in time so that the deleterious effects of extinction are not manifested.<sup>8,9</sup> Previous findings suggest the reinforcement for correct indication responses does sufficiently maintain accurate in the operational settings under which the rats' performance has been evaluated.<sup>3,4</sup>

However, if the training field does not sufficiently resemble the operational site, accurate operational performance will likely be unsustainable. Basic research shows that animals exposed to arrangements in which periods of extinction alternate with periods of reinforcer availability, each correlated with a salient exteroceptive stimulus, respond rarely during the **signaled** extinction period.<sup>10,11</sup> Since creating a training site that closely resembles a particular demining site is sometimes impossible, ascertaining whether a similar relation occurs under field conditions is important. The present study was intended to determine whether the reinforcement of correct identification responses in settings that did not closely resemble settings in which extinction was in effect was sufficient to maintain accurate landmine detection. For comparison, we also determined detection accuracy when the extinction





The rat's location is easily calculated in x and y coordinates.  
All photos courtesy of APOPO.

setting and reinforcement setting were the same. In some applications, APOPO's rats searched for landmines (and other explosives) in areas that had first been cleared of vegetation by a brush-cutting machine or rototilled by large armored machines that sometimes fail to detonate every piece of unexploded ordnance. Because training fields cannot be rototilled in ways that mimic minefields, grass-covered, pre-prepared boxes were hoed by hand to uncover raw soil and used as the two settings of interest.

#### Setting, Subjects and Materials

APOPO conducted the experiment in Morogoro, Tanzania, on the APOPO training field. There, mines were buried within permanent boxes ranging in size from 100 to 400 sq m. Some boxes received markings to indicate the location of the landmines while some did not; however, the locations of all landmines were recorded in a database. Boxes without markings were used (i.e., note takers knew the target locations but the trainers did not) to ensure that the trainers could not inadvertently cue the rats to the presence of the landmines. APOPO conducted the present experiment in 64 100-sq-m boxes.

Five fully trained, adult rats—two females (Brenda and Malindi) and three males (Bila, Ndimalo, and Evans)—served as subjects. Brenda died during Phase 1 and was thus not included in Phase 2. The rats were distributed between two trainer teams, each comprising two accredited rat trainers and one data recorder.

Materials included clickers that sounded before providing food (bananas served as the reinforcer), timers, data sheets and mine detection training box materials. Measuring tape stretched along the side of the box, and rope stretched across the box to guide the rat as it walked inside the box. The rats, attached to the rope via a harness and leash, walked back and forth inside the box along the rope. Two measuring tapes attached to the rat's harness at the zero mark, and each trainer held one measuring tape. Thus, the exact location of the rat's indications could be specified using x and y coordinates revealed by the measuring tape in one trainer's hand and the measuring tape value at the trainer's feet. After the rat traversed the rope in one direction, trainers took a 0.5-m step forward, and the rat traversed the box in the opposite direction.

Data were recorded on graph paper that depicted the box measurements, with each test box divided on the datasheet into 0.5-m by 0.5-m cells; cells corresponding to the location of the mines were shaded gray. The indication response was scratching the ground for any length of time within 1 m of the landmine location. When an indication response occurred, the trainer informed the note taker who resolved whether or not to click and deliver the food. Following signal detection terminology, indications occurring within 1 m of the landmine were considered hits and followed by the auditory click and food, whereas indications greater than 1 m from a landmine were considered false alarms. Note takers also recorded instances of grooming, biting, and turning around in the lane.



Interobserver agreement data were collected during 20.9% of sessions, in which a second observer recorded instances of scratching on an unmarked sheet out of the primary observer’s view range. Recorded instances of scratching within 0.5 m of each other were considered agreements, and instances greater than 0.5 m were considered disagreements. The overall interobserver agreement was 96.1%.

**Experimental Procedures**

APOPO used a multiple baseline across-subjects design.<sup>12</sup> Initially, the rats were randomly divided into two groups. Two rats in one group and three rats in the other group cleared two boxes daily, totaling four searched boxes per day. For example, on day 1, rats A, B and C might search boxes 1 and 2, and rats D and E search boxes 3 and 4. The order in which the rats in each group evaluated the boxes rotated daily. This rotation ensured that a particular rat’s accuracy was not consistently influenced by cues left from the previous rat. The trainers remained blind to the location of the landmines but, following reinforcement for the first rat, were presumably privy to the location of the relevant landmine. Rotating the order of the rats helped to ensure that trainer cueing did not influence rat performance. Staff selected the boxes randomly each day until all boxes were used, then the process repeated.

APOPO conducted sessions five days per week and excluded weekends, holidays or days with heavy rain. Food intake was controlled throughout the study to ensure that the rats were mildly food deprived during the experiment. This was arranged by feeding the rats two hours after each experimental session had ended. All rats were given two (2 g) rodent food pellets per day during the reinforcement and extinction conditions. Weights for all rats were taken each Monday and Friday immediately prior to training and sufficient additional food (fruit and vegetables) was given on weekends to ensure that relatively constant weights were maintained.

**Phase 1: Discrimination with consistent order of conditions.** This phase determined the rats’ hit and false alarm rates across two boxes when reinforcement for hits was not arranged in the first box searched (B1), but was arranged in the second box searched (B2); both boxes were similar. Twenty-four boxes were used in Phase 1. There were six boxes with no mines, five boxes with one mine, eight boxes with two mines, and five boxes with three mines.

**Baseline.** During baseline, all rats were exposed to a fixed-ratio 1 (FR 1) schedule of food reinforcement in both B1 and B2. That is, each hit was immediately followed by a click and food. Performance in the second box was always evaluated within one hour of the evaluation of the first box’s performance. All instances of scratching the ground were recorded by writing S on the datasheet at the coordinates that matched the location of the rat in the box and circling the S if a click was sounded and followed by food delivery. The click was sounded only when the response occurred within 1 m of a landmine.

**Extinction (B1) and FR 1 reinforcement (B2).** The purpose of this condition was to examine the rats’ performance under an extinction condition when followed by a reinforcement condition in an identical area. During B1 searches, hits had no programmed consequences (i.e., extinction was arranged). During B2 searches, rats were exposed to FR 1 reinforcement and sessions were conducted exactly as in baseline. If performance fell below a 33% hit rate in B1 but remained at baseline levels in B2 for three consecutive days, baseline conditions would be reinstated for that rat.

**Phase 2: Discrimination with consistent order of conditions and differential box preparation.** This phase replicated Phase 1 except that the boxes evaluated first (i.e., in the extinction condition) were prepared to mimic a brush-cutter prepared minefield. APOPO maintenance personnel

carried out ground preparation by manually digging into each box using a hoe until the vegetation was removed and the ground was evenly exposed across the entire box. Special care was taken around the area of the landmines by digging into those areas last to avoid contaminating other areas of the box with TNT. All landmines were left undisturbed at least 5 cm below the soil. Forty boxes not used in Phase 1 were used in Phase 2. These boxes differed in no systematic way from those used in Phase 1 except that no boxes contained three mines in Phase 2, which used 14 boxes (seven prepared) with zero mines, 18 boxes (nine prepared) with one mine, and eight boxes (four prepared) with two mines.

**Baseline.** Baseline was conducted as in Phase 1, except that B1 was always a prepared box (i.e., one with disturbed soil). An FR 1 schedule was in effect for both boxes.

**Extinction (B1) and FR 1 Reinforcement (B2).** Extinction in Phase 2 was conducted similarly to Phase 1, save that the extinction condition was always arranged in a prepared box and was always followed by reinforcement in an unprepared box. That is, B1 was always a prepared box and B2 was always an unprepared box. As in Phase 1, baseline was reinstated after three consecutive days of performance below a 33% hit rate in B1 with no corresponding drop in performance on B2.

**Results**

For each rat, the cumulative number of missed landmines across test sessions is displayed in Figures 1 and 2 (next page). False alarm rates were not graphed because they did not vary systematically throughout the course of the experiment (Table 1).

Mean False Alarm Rates		
	B1	B2
<b>Ndimalo</b>	0.5	0.4
<b>Bila</b>	0.9	0.6
<b>Evans</b>	1.1	1.1

Table 1. The mean false alarm rates for Ndimalo, Bila, and Evans.  
Table courtesy of CISR.

In Phase I (see Figure 1), there was no observed degradation of responses for four of five rats when an extinction condition immediately preceded a reinforcement condition within identical field conditions. Malindi was the only rat for whom extinction effects were observed, meaning that she missed the mine in the extinction condition (B1) across three consecutive days but did not miss the mines in the reinforcement condition (B2) on those days. The misses occurred after 48 days in the extinction condition. After the third consecutive miss in B1, the FR 1 reinforcement condition was reinstated and Malindi found six of seven mines in B1 (85.7%) after the first day. She found six of eight (75%) mines in B2.

One rat (Brenda) died during Phase 2; the corresponding data are not shown. Baseline performance during Phase 2 was at or near 100% accuracy for all rats. Unlike in Phase 1, extinction effects were observed for three of the four rats. For Evans, Ndimalo and Malindi, reduced accuracy in B1 was observed after 26, 21 and 18 test days respectively. Upon the reinstatement of reinforcement in B1, Evans’ and Ndimalo’s detection accuracy recovered to baseline levels within 1–2 test days, while Malindi’s detection accuracy recovered after 10 days. Bila was an exception in that extinction effects were not observed after 40 days, although detection accuracy in B1 was slightly lower than in B2 during the extinction condition. Bila hit 87% of mines in B1 and 96.2% mines in B2 during this condition.

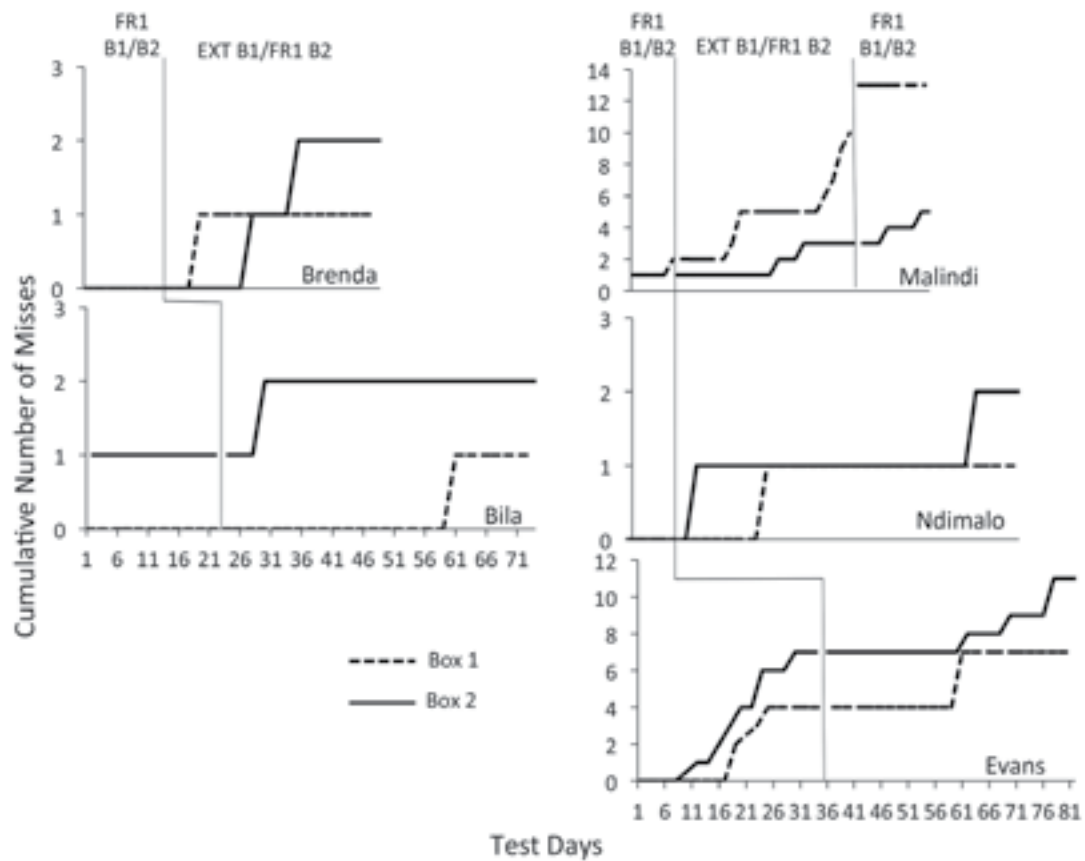


Figure 1. Experiment 1, Phase 1 results. Cumulative number of landmine misses for five individual rats during extinction (Box 1) and reinforcement (Box 2) with two normal training boxes. All figures courtesy of the authors.

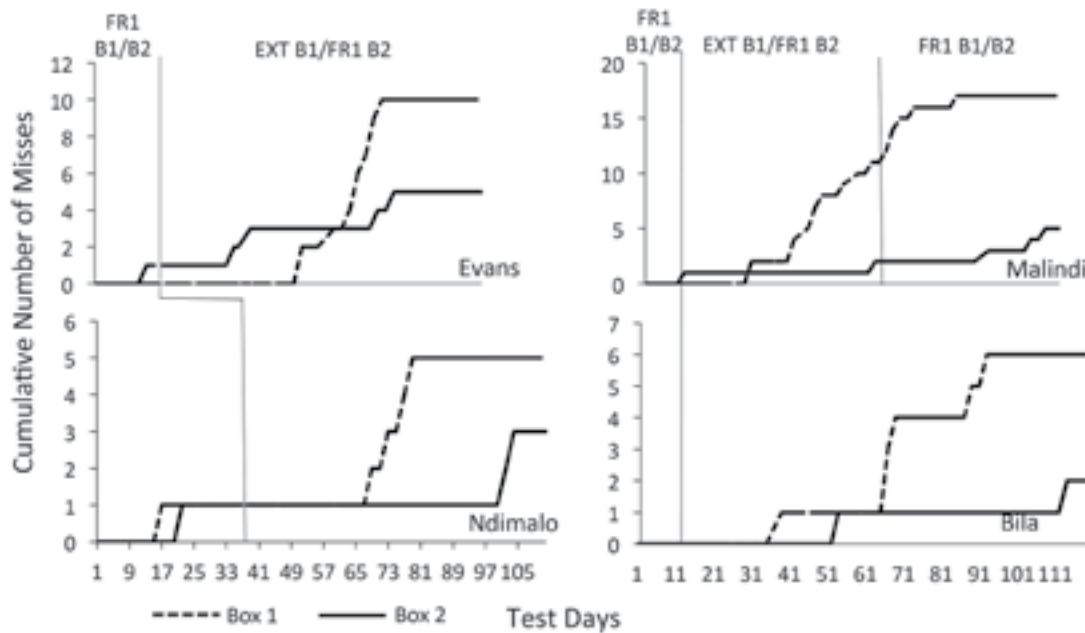


Figure 2. Experiment 1, Phase 2 results. Cumulative number of misses for four individual rats during extinction in ground-prepared boxes (Box 1) and reinforcement in normal training boxes (Box 2).

Sign tests were conducted on the hit rate in B1 and subtracted from the hit rate in B2 for each rat in each baseline and extinction trial in Phases 1 and 2. Trials in which one of the boxes contained no mines were excluded from this analysis. For Phase 1 baseline data, Phase 1 extinction data and Phase 2 baseline data, no statistically significant difference was found between performance in B1 and B2. A p-value approaching one was obtained from the sign test for each of these phases. For Phase 2 extinction data, a statistically significant difference was found between performance in B1 and B2 ( $p < .001$ ).

#### Discussion

Results of Experiment 1 strongly support the conclusion that conducting post-operational training in boxes that differ substantially from operational boxes is not an effective method for maintaining good operational performance by landmine-detection rats. Although unsurprising given the well documented effects of signaled extinction, it is highly significant with respect to APOPO's operational activities in which rats search for explosives under extinction conditions in

rototilled boxes while earning reinforcers in vegetated training boxes.<sup>10,11</sup> In such situations, it appears necessary to arrange reinforcement opportunities while the rats are engaged in actual mine-detection activities. Recent research suggests pouched rats can readily detect locations where plastic bags containing 2, 4 6-TNT, the active ingredient in most landmines, have been placed in contact with the ground for 16 hours, then removed, and can do so for several days following removal.<sup>13</sup> If the scent of TNT strongly generalizes to the scent of landmines, which contain TNT as well as other volatile materials, placing and removing bags containing TNT at known locations on a mine-field and reinforcing indication responses near those locations would be sufficient to maintain the rats' indication responses near actual landmine locations, even though such responses would not be reinforced. We are currently examining whether this occurs. ©

Watch APOPO rats in action:  
<http://bit.ly/YV979j>.

See endnotes page 66



Close-up photo of a pouched rat in training.



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**ERW Contamination in the Pacific Islands by Smith [ from page 10 ]**

1. "Landmine and Cluster Munition Monitor Factsheets: Humanitarian Mine Action." *Landmine & Cluster Munition Monitor*. Accessed 22 June 2014. <http://bit.ly/1paLYb8>.
2. Francis, Steven and Ioane Alama. "WWII Unexploded Ordnance: A Study of UXO in Four Pacific Island Countries." August 2011. Accessed 20 June 2014. <http://bit.ly/1rwuPvG>.
3. Central Intelligence Agency. *World Factbook*. Accessed 20 June 2014. Pacific Ocean. <http://1.usa.gov/1p38JuE>.
4. Ramsey, Catherine. "Saving Lives in the South Pacific: Harnessing Data to Address Lingering Threats from WWII-Vintage Munitions." *DipNote*, U.S. Department of State Official Blog. Accessed 13 June 2014. <http://1.usa.gov/1jS7xxN>.
5. Funded by the Office of Weapons Removal and Abatement in the U.S. Department of State's Bureau of Political-Military Affairs (PM/WRA),
6. Supported with funding by the United States, Switzerland and Germany.
7. "Occupational Health Guideline for Picric Acid." *Centers for Disease Control*, 1 September 1978. Accessed 23 June 2014. <http://1.usa.gov/Un-tjgN>.

**Harnessing Geospatial Data to Enhance ERW Clearance in Pacific Islands by Dell [from page 14]**

1. Clinton, Hillary. "America's Pacific Century." *Foreign Policy*. 11 October 2011. Accessed 7 August 2014. <http://atfp.co/M9rqjE>.
2. Pacific Island Forum Secretariat. Accessed 7 August 2014. <http://bit.ly/OORWRc>.
3. Survey Action Center. "Modified Level One Impact Survey: Kosovo." 31 March 2000.
4. "Land Release." *Geneva International Centre for Humanitarian Demining (GICHD)*. Accessed 7 August 2014. <http://bit.ly/V0FqkK>.

**Clearance Operations in the Pacific Islands by Austin [ from page 18 ]**

1. "Republic of the Marshall Islands." *One World Nations Online*. Accessed 8 August 2014. <http://bit.ly/1y2vfIY>.
2. William H. Adams. *The Japanese Airbase on Taroa Island, Republic of the Marshall Islands 1937-1945: An Evaluation of the World War II Remains*. San Francisco: U.S National Park Service (1997). Accessed 8 August 2014. <http://bit.ly/XB7wEw>.
3. Dirk H.H. Spennemann. "Mill Island, Mili Atoll A Brief Overview of its WWII Sites." *Digital Micronesia*. 2000. Accessed 8 August 2013. <http://bit.ly/UZgLG5>.

**Capacity Building: Lessons Learned by Finson [ from page 26 ]**

1. Article 5 details the destruction of anti-personnel mines in mined areas. "Article 5." Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on Their Destruction (18 September 1997). Accessed 15 October 2014. <http://bit.ly/1w99Ek7>.
2. The five pillars of mine action describe different areas of work encompassing mine action. These include clearance (removing and destroying mines), stockpile destruction, mine-risk education (helping people understand the risk mines pose), victim assistance (including medical and rehabilitative assistance) and advocacy (advocating for a ban on future mine use).

**Tracense Develops New Explosive Detector by Hirschhorn [ from page 29 ]**

1. Shamah, David. "Israeli nano-tech innovation can 'smell' bombs." *The Times of Israel*, 27 June 2014. <http://bit.ly/1IWbHpM>.
2. "Israeli scientists develop nano-tech explosive detector." *Counter-IED Report*. 25 June 2014. <http://bit.ly/1xJW49X>.
3. "Nanotech 'Nose' Sniffs Out Bombs From Five Metres Away." *International Business Times*. 2 July 2014. <http://yhoo.it/1qFkdcC>.
4. "TAU nano-sensor could identify explosives 3,000 times more accurately than a dog's nose." *Jerusalem Post*. 30 June 2014. <http://bit.ly/1AzmOWH>.

5. "New chip uses nano-sensor to detect even smallest traces of explosives." *Tech Times*. 25 June 2014. <http://bit.ly/1rIi5xi>.

**Best Practices in Managing Government Grants by Neitzey [ from page 30]**

1. Portions of this section are adapted from project-management tools available from FranklinCovey. <http://bit.ly/1nyIUmX>. Accessed 3 September 2014.
2. Engemann, Kurt J. and Douglas M. Henderson. *Business Continuity and Risk Management: Essentials of Organizational Resilience*. Brookfield, CT: Rothstein Associates, Inc., 2011.

**Gender and Disability Equality in Mine Action Program Management by Hankey [ from page 33 ]**

1. Calza Bini, Arianna and Massleberg, Åsa. "Gender-Sensitive Victim Assistance." *The Journal of ERW and Mine Action*. 15.2 (Summer 2011). Accessed 15 August 2014. <http://bit.ly/1uBiqbi>.
2. GICHD. "Gender and Priority-Setting in Mine Action." *GICHD Policy Brief 5*. Last Modified December 2012. Accessed 15 August 2014. <http://bit.ly/1yEYhP5>.
3. Mills, Marie. "Getting a Piece of the Pie: Lebanese Women Become Deminers." *The Journal of ERW and Mine Action*. 11.2 (April 2008). Accessed 15 August 2014. <http://bit.ly/1ph14wJ>.

**References:**

1. Hilde Wallacher, Gender Mainstreaming in Mine Action – A Critical Background Analysis, PRIO (November 2007), accessed at <http://prio.org/Publications/Publication/?x=7245>.
2. Jo Durham, "Gender Issues: An Example from Lao PDR," *The Journal of ERW and Mine Action*, 12.2 (Winter 2008/2009). Accessed 7 November 2014. <http://bit.ly/1xgVXAe>.
3. IFC. "Non-Discrimination and Equal Opportunity." *World Bank Group*. Last Modified January 2006. Accessed 15 August 2014. <http://bit.ly/1rdp9Yp>.
4. Australia Disability Network. "Business Benefits of Hiring People with a Disability." Accessed 15 August 2014. <http://bit.ly/1i8CRJL>.

**Demining in Remote Areas of Northern Afghanistan by Harutyunyan [ from page 37 ]**

1. Darwaz refers to the area encompassing the northeast region of Afghanistan and the adjacent Darvoz district of Tajikistan.

**Mine Risk Education in Mindanao, Philippines by Gunawardana [ from page 42 ]**

1. "Mine Action in support of the Peace Process in Mindanao." *Swiss Foundation for Mine Action*. Accessed 30 October 2014. <http://bit.ly/1FZ0R9a>.
2. "Emergency UXO Risk Education in Zamboanga." *Swiss Foundation for Mine Action*. Accessed 9 October 2014. <http://bit.ly/1qpdU8y>.
3. Stated by Tony Fish, program manager, FSD Mindanao.
4. "Projects." *FSD France*. Accessed 24 November 2014. <http://bit.ly/1FZ0R9a>.
5. Barangay - In the Philippine Islands, the community which, under the Spanish government, formed the constituent element of the pueblo. Wordnik. Barangay definition. Accessed 9 October 2014. <http://bit.ly/1yQat4V>.
6. The Sulu Archipelago consists of several islands in the Basilan, Sulu and Tawi-Tawi provinces. "Autonomous Region of Muslim Mindanao, Philippines." 11 October 2013. <http://bit.ly/1rZHdm4>.

**References**

1. "Davao, Eastern Mindanao - Destruction of Command Wire IED stockpiles on International Mine Action Day." Mine Action. Swiss Foundation for Mine Action. Accessed 9 October 2014. <http://bit.ly/1pUZHRO>.
2. Gunawardana, Harshi. "Mine / UXO Risk Education Documentary

- Mindanao Philippines.” FSD Mindanao Film. Accessed 9 October 2014. <http://bit.ly/1shMQP2>.

3. ABS-CBN News, TV Patrol. FSD UXO Risk Education in Sarangani. Accessed 9 October 2014. <http://bit.ly/1sfXg0p>.
4. Schindler, Markus. “Thoughts of International Security Issues. Explosive Remnants of War in Mindanao - The Threat and the Solution.” *ISI*. 21 May 2014. <http://bit.ly/1ybFLSD>.

Humanitarian and Developmental Impact of Anti-vehicle Mines by Rapillard and Walton [ from page 46 ]

1. Also commonly known as anti-tank mines and referred to as mines other than anti-personnel mines in the *Convention on Conventional Weapons* context.
2. “The Humanitarian and Developmental Impact of Anti-Vehicle Mines,” *GICHD* - SIPRI, Geneva, September 2014. <http://bit.ly/1t2IEUa>
3. ICRC, *Rules of International Humanitarian Law* applicable to AVM. CCW/MSP/2012/WP.1, 2012.
4. Casualties include deaths and injuries.
5. Unlike data from the basic impact survey, media coverage is not restricted to civilian casualties.
6. “South Sudan.” *Landmine Monitor Report* 2013 (November 2013). Accessed 8 October 2014. <http://bit.ly/1t2BHTE>.
7. Interview with South Sudan National Mine Action Authority, Juba, South Sudan, 4 November 2013.
8. Interview with Mining Technologies International, Juba, South Sudan, 5 November 2013.
9. Interview with G4S, Juba, South Sudan, 5 November 2013.
10. Interview with United Nations Mine Action Service, Juba, South Sudan, 4 November 2013.
11. Interview with G4S Juba, South Sudan, 5 November 2013.
12. Interview with United Nations Mine Action Service, Juba, South Sudan, 4 November 2013.
13. Interview with Denel Mechem, Juba, South Sudan, 5 November 2013.
14. Interview with Norwegian People’s Aid, 4 November 2013.

Using Plants to Detect Landmines by Shea [ from page 51 ]

1. Zhang, Sarah. “The Newest Weapon in the Fight Against Land Mines Could Be... Plants.” *Gizmodo*. 15 August 2014. Accessed 2 October 2014. <http://bit.ly/1oH3Exk>.
2. Jewell, Nicole. “How Sick Plants Can Pinpoint the Location of Deadly Hidden Landmines.” *Inhabitant*. 18 August 2014. Accessed 2 October 2014. <http://bit.ly/1v4UyuA>.
3. Abraham, Sathya Achia. “VCU Researchers Examine Spectral Signatures of Plants.” *Across the Spectrum*. 26 March 2014. Accessed 2 October 2014. <http://bit.ly/1qpYQaw>.

GICHD Linguistic Outreach Programs by Paktian [ from page 52 ]

1. “Bibliomines.” *Bibliomines*. Accessed 15 July 2014. <http://bit.ly/1reiexl>.
2. “Home.” *The Arab Program for Mine Action*. Accessed 15 July 2014. <http://bit.ly/W7DIP7>.
3. “South-South cooperation is a broad framework for collaboration among countries of the South in the political, economic, social, cultural, environmental and technical domains.” United Nations Office for South-South Cooperation. Accessed 29 October 2014. <http://bit.ly/1tDtIUJ>

Using Plants to Detect Landmines by Shea [ from page ## ]

1. Zhang, Sarah. “The Newest Weapon in the Fight Against Land Mines Could Be... Plants.” *Gizmodo*. 15 August 2014. Accessed 2 October 2014. <http://bit.ly/1oH3Exk>.
2. Jewell, Nicole. “How Sick Plants Can Pinpoint the Location of Deadly Hidden Landmines.” *Inhabitant*. 18 August 2014. Accessed 2 October 2014. <http://bit.ly/1v4UyuA>.
3. Abraham, Sathya Achia. “VCU Researchers Examine Spectral Signatures of Plants.” *Across the Spectrum*. 26 March 2014. Accessed 2 October 2014.

<http://bit.ly/1qpYQaw>.

Evaluating the Mini MineWolf by Straw [ from page 56 ]

1. “Thailand.” *Landmine and Cluster Munition Monitor*. Last updated 28 November 2013. <http://bit.ly/1okg7Ww>.
2. More information on this and other ongoing OFEs can be found on the U.S. Humanitarian Demining website <http://humanitarian-demining.org>.

Evaluating Landmine-detection Rats in Operational Conditions

by Mahoney, Edwards, Lalonde, Cox, Weetjens, Gilbert, Tewelde and Poling [ from page 59 ]

1. Baseline is information that is used as a starting point by which to compare other information. “Baseline.” *Merriam Webster Dictionary*. Accessed 23 September 2014. <http://bit.ly/1v5xT16>.
2. Poling, Alan, Bart J. Weetjens, Christophe Cox, Negussie W. Beyene, and Andrew Sully. “Using Giant African Pouched Rats (*Cricetomys gambianus*) to detect landmines.” *The Psychological Record*, 60, (2010): 715–727. Accessed 20 October 2014. <http://bit.ly/1vDt4Ok>.
3. Poling, Alan, Bart J. Weetjens, Christophe Cox, Negussie W. Beyene, and Andrew Sully. “Using trained pouched rats (*Cricetomys gambianus*) to detect landmines: Another victory for operant conditioning.” *The Journal of Applied Behavior Analysis*, 44, (2011): 351–355. Accessed 20 October 2014. <http://1.usa.gov/1puE6j4>.
4. Verhagen, Ron, Frank Weetjens, Christophe Cox, Bart J. Weetjens, and Mic Billet. “Rats to the rescue: Results of the first test on a real minefield.” *The Journal of ERW and Mine Action*, 9,2, (2006): 96–100. Accessed 20 October 2014. <http://bit.ly/1rnNx3x>.
5. **In extinction** is the weakening of a conditioned association in the absence of a reinforcer or unconditioned stimulus. “Extinction.” *American Psychological Association Glossary of Psychological Terms*. Accessed 23 September 2014. <http://bit.ly/ORoACn>.
6. Mahoney, Amanda, Christophe Cox, Bart J. Weetjens, Tess Tewelde, TeKimiti Gilbert, Amy Durgin, and Alan Poling. “Mine detection rats: Effects of extinction on detection rates.” *The Journal of ERW and Mine Action*, 16,3, (2012): 61–64. Accessed 20 October 2014. <http://bit.ly/1Fs8G78>.
7. International mine action standards 09.41. (2013). *Operational procedures for mine detection dogs*. New York: United Nations Mine Action Service. Accessed 20 October 2014. <http://bit.ly/1rYK3Eu>.
8. Lerman, Dorothea C., Brian Iwata, Bridget Shore, and SungWoo Kahng. “Responding maintained by intermittent reinforcement: Implications for the use of extinction with problem behavior in clinical settings.” *The Journal of Applied Behavior Analysis*, 29, (1996): 153–171. <http://1.usa.gov/1uv9tLU>
9. Nevin, John A. “Behavioral momentum and the partial reinforcement effect.” *Psychological Bulletin*, 103, (1988): 44–56. <http://bit.ly/11YGidn>
10. Schlinger, Henry, and Alan Poling. “Use of a multiple schedule to evaluate long-acting drugs: Results with mephenytoin.” *The Psychological Record*, 38, (1988): 415–420. <http://bit.ly/1p1iWOT>
11. Weiss, Stanley J., David Kearns, Scott Chon, Charles Schindler, and Leigh Panlilio. “Stimulus control of cocaine self-administration.” *The Journal of the Experimental Analysis of Behavior*, 79, (2003): 111–135. <http://1.usa.gov/1zidprp>.
12. In this design, a single variable is measured concurrently across subjects. The change in condition from baseline to test occurs at different points in time for each subject in order to control for extraneous influences on behavior such as the weather. Experimental control is demonstrated if each the behavior of each subject shows similar changes upon introduction of the test variable. David L. Gast and Jennifer R. Ledford, eds., *Single subject research methodology in behavioral sciences*. Routledge: 2009. Accessed 20 October 2014. <http://bit.ly/ZDa0CW>.
13. Mahoney, Amanda, Christophe Cox, Bart J. Weetjens, Tess Tewelde, TeKimiti Gilbert, Amy Durgin, and Alan Poling. “Reinforcement for Operational Mine Detection Rats.” *The Journal of ERW and Mine Action*, 17,2 (2013): 58–62. Accessed 20 October 2014. <http://bit.ly/ZDa31n>.



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