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All Reasonable Effort (ARE)

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Foreword

Management practices and operational procedures for mine action are constantly evolving. Improvements are made, and changes are required, to enhance safety and productivity. Changes may come from the introduction of new technology, in response to a new mine or ERW threat, and from field experience and lessons learned in other mine action projects and programmes. This experience and lessons learned should be shared in a timely manner.

Technical Notes for Mine Action (TNMAs) provide a forum to share experience and lessons learned by collecting, collating and publishing technical information on important, topical themes, particularly those relating to safety and productivity. TNMAs complement the broader issues and principles addressed in International Mine Action Standards (IMAS).

The preparation of TNMAs follows a rapid production and approval process. They draw on practical experience and publicly-available information. Over time, some TNMAs may be 'promoted' to become full IMAS standards, while others may be withdrawn if no longer relevant or if superseded by more up-to-date information.

TNMAs are neither legal documents nor IMAS. There is no legal requirement to accept the advice provided in a TNMA. They are purely advisory and are designed solely to supplement technical knowledge or to provide further guidance on the application of IMAS.

TNMAs are compiled by the Geneva International Centre for Humanitarian Demining (GICHD) at the request of the United Nations Mine Action Service (UNMAS) in support of the international mine action community. They are published on the IMAS website at www.mineactionstandards.org.

Introduction

The global effort to address contamination from Explosive Ordnance (EO) has invested significant resources in locating and destroying EO and ensuring that previously contaminated land and infrastructure can be released for the benefit of communities. To ensure that these considerable resources are used wisely on the one hand, and that populations can use land safely on the other, the concept of "All Reasonable Effort" (ARE) has been developed within the IMAS framework.

The concept of ARE therefore identifies the need for efforts guided by a reasoned approach to be taken by states affected by EO, which is based on evidence. Such an approach ensures that contamination is identified and cleared without wasting time and precious resources. For States Parties to the Anti-Personnel Mine Ban Convention, the Convention on Cluster Munitions or the Convention on Certain Conventional Weapons, using the concept of ARE does not modify in any way the obligations under those conventions[1], but provides technical guidance that may assist states in the application of those obligations. ARE highlights the fact that there is a required investment of time and resources to reach the necessary level of confidence that EO has been identified and removed, which is defined as the "minimum acceptable level of effort" in IMAS 04.10[2]. The challenge faced by National Mine Action Authorities (NMAAs) is to practically define the acceptable level of effort that must be made, according to their local context, through their National Mine Action Standards (NMAS) and in compliance with any international obligations that may apply.

In keeping with IMAS guidance, NMAS should establish the evidence-based process that frames ARE and ensures that an area, a defined portion of the country, and eventually the country, no longer contains known EO contamination. The NMAS should lay out the criteria and parameters that constitute ARE for each aspect of Land Release (LR), including what should be done in order to achieve the desired level of confidence that cancelled, reduced and cleared land is free of EO contamination within specified limits. For example, when looking at the steps involved in the Non-Technical Survey (NTS) and Technical Survey (TS), the criteria for cancelling or reducing land should be specifically and clearly described. Similarly, the NMAS chapter that describes `clearance` should determine a minimum clearance depth and minimum target size. These criteria should be developed by NMAAs and agreed upon, in a consultative manner, with mine action operators, local authorities, communities and other relevant stakeholders.

The LR process and its management, as described within the IMAS[3], is therefore the roadmap for ensuring that ARE is applied within each component of operations, NTS, TS and clearance. This road map must be based on the foundations of good practice in mine action programmes, including established risk management, Information Management (IM), and Quality Management Systems (QMS). These various components of mine action programmes must be integrated into NMAS in order to achieve ARE.

It is important to remember, however, that even when EO-affected states invest appropriate resources and apply ARE to eliminate their EO problems, there is always a residual risk that EO remains[4]. The fact that information is not always accurate means that residual contamination will often persist after proactive efforts to find and eliminate all hazards are completed. For this reason, a long-term risk management strategy and framework is also essential to the concept of ARE.

The following TNMA will review the key elements that are necessary to ensuring that ARE is being applied (including a checklist that summarises these elements). The concept of ARE can be considered as the application of the sum of the guidance available in the IMAS, therefore this TNMA aims to point the reader towards those elements within the many IMAS chapters that are the most important concepts and key elements for mine action managers to consider when developing and reviewing their NMAS to achieve ARE.

[1] Art. 5(1) and (2), Anti-Personnel Mine Ban Convention (APMBC). Art. 4(1)(a) and (2)(a) and (d), Convention on Cluster Munitions (CCM). Protocol V Art.3(2) and (3), Convention on Certain Conventional Weapons (CCW).

[2] Refer to the definition on All Reasonable Effort (3.10. page.7 IMAS 04.10, Glossary of mine action terms, definitions, and abbreviations

[3] Refer to IMAS 07.10, the Guide for the management of Land Release and Residual Contamination Operations, and IMAS 07.11 on Land Release for guidance on these concepts, found at https://www.mineactionstandards.org/en/standards/

[4] Refer to IMAS 07.14 and TNMA 07.14/01 on Residual Risk Management for more information on this subject.

1. Scope

This TNMA is intended to provide additional guidance on how ARE is achieved through sound management of mine action programmes[5], and the full implementation of the principles of LR[6]. The TNMA will expand on each of these two areas in order to illustrate how the various relevant IMAS chapters fit together to guide NMAAs[7] in their planning and oversight of LR activities, and that serve as the requirements for mine action operators who implement those LR activities. This note will not address the inputs required for ARE (such as funding, equipment, or other resources), and will not seek to address mine action pillars beyond clearance (such as Explosive Ordnance Risk Education, Victim Assistance or Stockpile Destruction).

The combined efforts of mine action stakeholders in the implementation of national mine action strategies and completion/work plans, in compliance with IMAS and NMAS, should provide confidence that ARE has been achieved. This level of confidence is required for the population in an EO-affected state to feel secure using land that has been suspected of EO contamination and has been subject to LR. It is equally important that there is overarching confidence in the evidence-based baseline information that identified contaminated areas at the outset of the NMAA's response, so that the population feels confident using land where no LR has taken place. This TNMA will expand upon the concept of ARE and describe how to ensure that the "minimum acceptable level of effort" to remove the presence or suspicion of contaminated areas has been achieved.

2. References

A list of normative and informative references is included in Annex B. These references complement the information provided in this TNMA and are referenced within its text. The IMAS chapters cited provide a normative foundation for this TNMA and their contents provide a fuller understanding of the material presented in this document.

3. Terms, definitions, and abbreviations

In general, this TNMA uses common mine action terms, and as such can be found in IMAS 04.10 Second Edition, Amendment 10 (Glossary of mine action terms, definitions, and abbreviations).[8]

Some of the key definitions found in IMAS 04.10 that are relevant to the scope of this TNMA include:

All Reasonable Effort
"describes what is considered a minimum acceptable level of effort to identify and document contaminated areas or to remove the presence or suspicion of explosive ordnance. All reasonable effort has been applied when the commitment of additional resources is considered to be unreasonable in relation to the results expected."

Land Release

[5] Within this TNMA, particular emphasis in terms of sound management of mine action programmes, should be placed on guidance provided within the following IMAS documents: IMAS 02.10 on the establishment of a mine action programme; IMAS 07.14 on managing risks appropriately; IMAS 05.10 on ensuring the availability of accurate and timely information; and 07.12 on establishing a sound quality management system.

[6] These principles are described in IMAS 07.10 and 07.11 respectively.

[7] This note also makes use of, and complements, guidance within the discussion paper prepared by Norway "Applying all available methods to achieve the full, efficient and expedient implementation of Article 5", APLC/MSP.9/2008/WP.2, 30 May 2008, found at: https://www.apminebanconvention.org/fileadmin/APMBC/MSP/9MSP/9MSP-NorwPaper-Landrelease-2Oct2008-en.pdf as well as the paper submitted by the Committee on Article 5 mine clearance obligations, at MSP.17 in October 2018 titled: "Reflections and understandings on the implementation and completion of Article 5 mine clearance obligations", APLC/MSP.17/2018/10, found at: https://www.apminebanconvention.org/fileadmin/APMBC/MSP/17MSP/Reflections-Art.5-en.pdf

[8] All updated International Mine Action Standards are found at the IMAS website: https://www.mineactionstandards.org/

"in the context of mine action, the term describes the process of applying "all reasonable effort" to identify, define, and remove all presence and suspicion of Explosive Ordnance through non-technical survey, technical survey and/or clearance. The criteria for "all reasonable effort" shall be defined by the NMAA."

National Mine Action Authority (NMAA)
"the government entity, often an inter-ministerial committee, in a mine-affected country charged with the responsibility for the regulation, management and coordination of mine action". Note: In the absence of a NMAA, it may be necessary and appropriate for the UN, or some other recognised international body, to assume some or all of the responsibilities, and fulfil some or all the functions, of a Mine Action Centre or, less frequently, an NMAA.

Residual Risk
"is the risk remaining following the application of all reasonable effort to identify, define, and remove all presence and suspicion of explosive ordnance through non-technical survey, technical survey and/or clearance".

Residual Contamination
"refers to contamination which gives rise to residual risk"

Explosive Ordnance
"interpreted as encompassing mine action's response to the following munitions:

- Mines
- Cluster Munitions
- Unexploded Ordnance
- Abandoned Ordnance
- Booby traps
- Other devices (as defined by CCW APII)
- Improvised Explosive Devices*

* *Note: Improvised Explosive Devices (IEDs) meeting the definition of mines, booby-traps or other devices fall under the scope of mine action, when their clearance is undertaken for humanitarian purposes and in areas where active hostilities have ceased".*

Suspected Hazardous Area
"an area where there is reasonable suspicion of explosive ordnance contamination on the basis of indirect evidence of the presence of Explosive Ordnance"

Confirmed Hazardous Area
"refers to an area where the presence of explosive ordnance contamination has been confirmed on the basis of direct evidence of the presence of Explosive Ordnance"

Triangulation
"in the context of mine action evaluation the term refers to the use of multiple theories, sources or types of information, or types of analysis to verify and substantiate an assessment. The sources of information may not necessarily be people but include documents, maps, photographs, satellite imagery etc."

For the purpose of this TNMA, the following additional term is to be defined as follows:

The term 'Reasonable' is used to describe something that is 'in accordance with reason'[9] and is therefore evidence based.

[9] Merriam-Webster Dictionary

Additionally, the following abbreviations are used:

- ARE All Reasonable Effort
- CHA Confirmed Hazardous Area
- EO Explosive Ordnance
- EORE Explosive Ordnance Risk Education
- HA Hazardous Area (this could be a SHA or a CHA)
- IED Improvised Explosive Device
- IM Information Management
- LR Land Release
- MDD Mine Detection Dog
- MFR Mine Field Report
- NMAA National Mine Action Authority
- NTS Non-technical Survey
- QA Quality Assurance
- QC Quality Control
- QM Quality Management
- QMS Quality Management System
- SHA Suspected Hazardous Area
- SOP Standard Operating Procedure
- TNMA Technical Note for Mine Action
- TS Technical Survey
- UNMAS United Nations Mine Action Service
- UXO Unexploded Ordnance

4. Laying the foundations for the management of land release efforts

In order to implement LR fully and ensure that ARE is applied, the fundamental elements of sound mine action management must be put in place. These elements include the following: implementing guidance for the establishment of a mine action programme; the development of a national mine action strategy; the elaboration of an effective risk management framework; the creation of a QMS (including policies for determining responsibility and ultimately liability for negligence and misconduct); and the establishment of an appropriate IM framework.

4.1 Analysing and managing risk

EO contamination poses risks to communities and to the economic development of affected states. These risks must be appropriately assessed and analysed in order to ensure that subsequent planning is robust, that prioritisation is carried out based on evidence, and to ensure that the LR response proposed is appropriate to the context. As noted in IMAS 07.14, “Risk management is often the first element of any management system to ‘hit the ground’ in new and challenging circumstances.”[10] In order to ensure that ARE is being applied, a comprehensive risk analysis must be used as a foundation for planning. The risk analysis will ensure that the LR activities planned will be proportionate and appropriate to the risks identified. In this regard, questions such as what type of EO is present (for example victim operated devices, UXO, cluster munitions, etc.) or whether contamination is on the surface or also sub-surface, will greatly influence the parameters of LR operations and which methodologies can be used safely and effectively. Risk management is a key defining parameter for the effort that should be expended on LR activities in order to mitigate the calculated risk of injury or death among the population, due to the presence of explosive ordnance.

Risk management is also an essential component in addressing the long-term monitoring and management of EO. Experience to date and risk analysis in EO-affected countries tells us that in most post-conflict contexts unknown individual items of EO may remain after the NMAA has completed the proactive phase of its work.

[10] IMAS 07.14, Section 5.5 p.5

This "residual contamination"[11] is because mine action managers often have access to incomplete information and find no physical evidence of EO. In many contexts, EO will be found in areas where no contamination was ever known or suspected (and therefore not reported) or potential informants were overlooked (such as women, children, marginalised groups). In other cases, EO could have been missed due to technical considerations (such as being undetectable with equipment used, or that natural disasters (such as landslides) could have shifted the location of EO. Negligence or human error is also possible as an explanation for residual contamination.

In order to manage the residual EO risk in countries affected by conflict, the appropriate management of residual risk needs to be considered early on in the life cycle of the mine action programme and the EO affected country should develop and put in place a long-term risk management framework well ahead of the end of proactive LR operations. Such a system will identify a sustainable capacity (often found within security or emergency services) that can respond to newly- discovered EO. This capacity should have access to information collected by the NMAA during the proactive phase of LR operations so that this long-term risk management framework can use this information for risk analysis during the reactive residual phase. A transition plan will need to be developed so that there is a smooth transition to sustainable long-term capacity. Failure to determine how they will address a long-term capacity to deal with any unknown items of ordnance that are found once proactive efforts cease, is in turn a failure to meet the requirements of ARE.

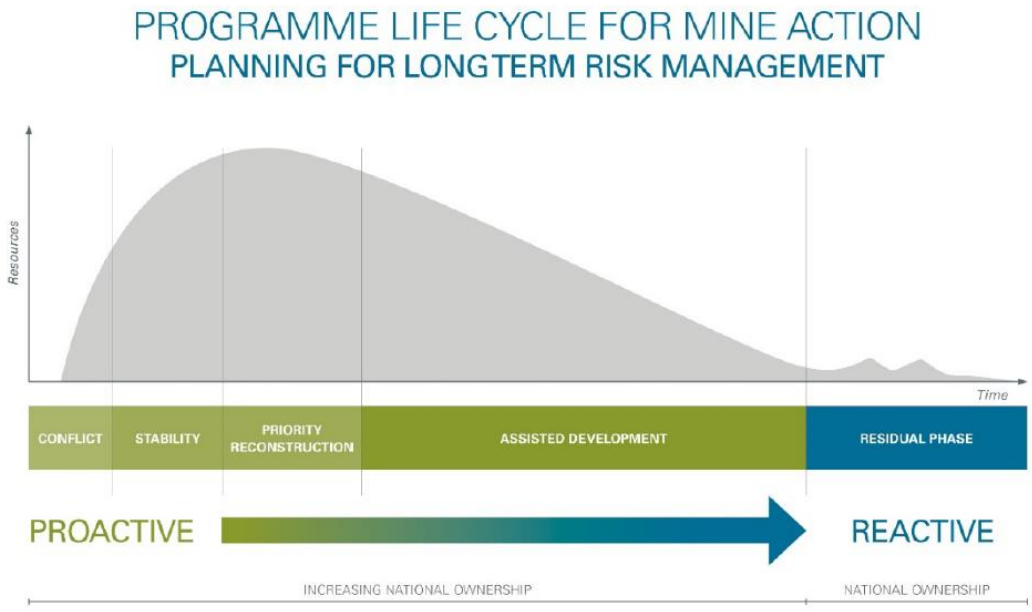

Figure 1: Evolution of Risk Management Response[12]

4.2 Planning for land release efforts

Guidance within IMAS 02.10 outlines the need to establish sound planning processes at the outset of a mine action programme that will provide a framework for LR efforts. A baseline of information regarding EO contamination is a minimum requirement for ARE since mine action programmes will require this information as a point of departure for planning. According to IMAS 02.10:

> *"planning must ensure that a process of information-gathering and analysis is implemented as soon as practically possible so that a comprehensive assessment of the mine problem and its impact on men,*

[11] See TNMA 07.14/01 on Residual Risk Management for more detailed information on this subject.
[12] TN 07.14/01, Figure 1, p.7

women and children in the mine affected communities and humanitarian and development activities can be made."[13]

Once a reliable baseline is achieved, NMAAs should make an effort to plan strategically, based on available resources. National strategies and their accompanying work plans provide a strategic orientation and a blueprint for the activities that will be put in place (normally on a year to year basis) to release land from the presence or suspected presence of EO contamination and determine what resources will be dedicated to each of these activities over the period of the plan. National strategies take into consideration the specific national contexts, including the type and extent of contamination, geography, security context/access to areas, national mine action operational capacity, and the available government and donor funding. Strategic planning processes also provide a framework for monitoring whether the mine action programme is on track (or not) in terms of its mine action response. An appropriate management structure (complete with qualified individuals to fulfil management functions) must be put in place so that planning and oversight can take place.[14]

The National Strategic Plan and its associated annual work plans provide the opportunity to address how resources will be prioritized, based on the national operational context and an overall risk analysis (as described below). Together these documents should be a comprehensive picture of how mine action programmes will ensure that all known EO-contaminated areas are addressed within the framework. In order for ARE to be achieved, NMAAs must ensure that they demonstrate that all suspected and confirmed hazardous areas (CHAs) have been assessed, and where suspicion continues to exist, that efforts will be made to clarify the presence of contamination or the lack thereof. There may be valid reasons for not being able to address suspected or known contamination at any given time, for example, this would apply to areas that cannot be accessed safely due to insecurity, or areas under the jurisdiction but outside of the effective control of the State in question. Situations where access is hindered by topography, or the complexity of the items of EO make work difficult (such as in the case of complex devices), would not be considered valid reasons for stopping LR efforts. These concerns may, however, play a justifiable role in the prioritisation of resources on the part of NMAAs. In such a case, a national mine action strategy and corresponding work plans may prioritise resources to accessible areas first and highlight that areas that are inaccessible, will be dealt with as soon as possible.

4.3 Managing land release information and reporting

LR efforts should be captured in a system that will collate all relevant information about the overall EO contamination picture and allow efficient updates on how national efforts are progressing. IMAS 05.10 describes the components of an IM system that are relevant for managing mine action programmes. According to IMAS 05.10, "The goal of IM is to supply stakeholders with timely, accurate and relevant information products that meet agreed requirements."[15] No decisions can be taken by mine action managers without information to underpin them. The management framework for LR is therefore premised on the availability of evidence-based information. ARE cannot be properly defined by the NMAA if the information available is either flawed or incomplete. For example, the knowledge of the depth at which EO is found, is key element in deciding the required depth for clearance of EO. Similarly, if known areas that are confirmed or suspected to contain EO contamination have not been recorded, the NMAA's planning will be incomplete and areas risk being overlooked or forgotten.

Accurate and complete reporting of LR activities is also essential to ensure proper oversight that verifies that ARE is being achieved. The acceptable minimum standard, in terms of what should be reported by mine action operators implementing LR activities and NMAAs recording and monitoring LR, is outlined in Annex B of IMAS 05.10 on Minimum Data Requirements. A simple matrix outlines these minimum requirements for each LR activity. Ensuring that these minimum requirements are being met (along with any context-specific information deemed necessary by the NMAA) will provide the key information to monitor ARE.

[13] IMAS 02.10, p.3
[14] See IMAS 02.10 sections 5.5 and 6.
[15] IMAS 05.10, Section 4, p.8.

4.4 Establishing an appropriate quality management system that facilitates learning

Establishing a responsive and robust QMS is essential for the safe, efficient, and effective implementation of LR. Additionally, a strong QMS ensures that NMAAs and mine action operators proactively identify lessons learned and integrate them into the planning and execution of mine action programmes. Notably, this information allows managers to address substandard performance quickly and rectify flawed procedures to avoid or mitigate the risks of non-compliance with NMAS and/or possible negligence.

The development of NMAS, based on guidance from the IMAS, provides the backbone of the QMS for LR. It is essential that key elements of LR activities are described in the NMAS and that the outputs of those activities are defined, along with reporting formats and terminology. In addition, a defined process for the accreditation of mine action operators (along with required competencies and training requirements), ensures that an acceptable level of professionalism and standardisation in relation to LR is established by the NMAA. Once a well-trained workforce is deployed to carry out LR activities, these activities must be monitored on an on-going basis through the analysis of reporting to NMAAs, as well as through field-level monitoring that verifies that work is being carried out to the required standards (contained within NMAS and operator Standard Operating Procedures (SOPs)). These two key elements of QM (reporting submitted and quality control through field-level monitoring) reinforce one another and provide confidence on the part of NMAAs that ARE is being achieved.

Operator negligence or non-compliance with NMAS and SOPs that could lead to missed items (that can in turn cause casualties), or uncontaminated land being mistakenly identified as contaminated without sufficient evidence, is dramatically reduced through appropriate training, accreditation and monitoring of agreed procedures and testing and regular controls of demining equipment. Lessons learned should be derived from QMS outputs (LR data, progress and completion reports, and findings of Quality Assurance and Quality Control (QA/QC) teams), in order to inform changes and tailor amendments to NMAS definitions and operational criteria for ARE. Similarly, a robust QMS helps operators to improve their internal procedures and compliance. A key principle in QM is the commitment to continual improvement within a given system. In mine action, continual improvement is tied to the on-going analysis of the outputs of the IM and risk management systems, along with the results and lessons learned generated from the QMS. For a NMAA to demonstrate that ARE has been applied during LR, the implementation of a QMS and the documentation of its procedures and outputs must be an integral part of the overall management of mine action operations, including monitoring, analysis and evaluation.

5. Guiding principles for ensuring ARE throughout the Implementation of land release

LR is an evidence-based process that rests on the foundation of the management principles outlined in Section 4 above. Setting the criteria for applying ARE throughout LR will help establish the boundaries within which technical and non-technical means will be applied. This creates a national framework for what is “reasonable”. Establishing the criteria for cancelling, reducing and clearing land, along with the accreditation of SOPs for LR activities, should help support the relevant stakeholders in making decisions about the following: how to identify EO contamination; when and where to start a task; what resources to allocate to the LR process; and, when to stop a task or declare that an area has been completed. These principles should also ensure that beneficiaries have confidence that the land is safe following the application of the LR interventions.

By documenting the application of the LR process in a manner that can be audited (by recording the evidence that formed the basis for key decisions, and a description of the activities carried out), risk management and decision-making processes can be improved in the future.[16] In this way, mine action programmes are continually improving both the knowledge regarding EO contamination, as well as the implementation of LR methodologies.

[16]For further guidance on QM in mine action see IMAS 07.12 and on Risk Management in mine action see IMAS 07.14.

In addition, information gathered about new EO threats and descriptions should be incorporated into NMAS and SOPs to enhance the safety of operators.

In order to illustrate some of the key areas of concern in terms of ensuring ARE, six guiding principles will be presented. These relate to:

1) the documentation of LR activities;
2) the development of objective criteria for the classification and re-classification of land;
3) the enhancement of inclusive dialogue with communities;
4) the implementation of land handover and responsibility;
5) the establishment of policies that clarify how the liability for LR is to be assigned; and
6) the use of well-defined and commonly understood terminology for reporting.[17]

5.1 A well-documented system for recording the identification and processing of hazardous areas:

As noted in Section 4.3 above, a comprehensive IM system is a foundation for LR and will ensure that all LR activities are accurately documented in a system that can allow managers to easily access the data they require. The IM system also serves as a platform to document major decisions that were taken (along with the evidence they were based on) during the implementation of the LR process (including NTS, TS and clearance). To show that ARE has been applied, LR activities, as well as the supporting processes (such as community engagement), should be properly documented.

It is good practice for a survey to define and record any SHA or CHA as accurately as possible, based on available evidence. Historically, the size of contaminated areas, recorded by mine action practitioners, has been over-exaggerated during the survey process. Evidence and decisions that lead to the HAs being established and classified should be clearly recorded using forms that ensure that all programme specifications (including minimum data requirements) and other relevant information is being recorded.

It is important to understand that the boundaries of a HA are, in many cases, the best guess of the extent of the contaminated area, based on the available evidence. Where information was scarce and the reliability of information sources is questionable, the initial boundaries of a HA may prove to be grossly inaccurate but should be increasingly accurate as the LR process moves forward. For this reason, a robust effort to gather information from as many sources as possible, including from women, men, girls and boys who are in a position of knowledge about suspected areas from diverse perspectives, is the first step to ensuring that ARE is applied. This information must be systematically documented in order to record the evidence that led to the creation of SHAs and CHAs, and how they were processed, in order to feed into the learning process

The LR process sets out the requirement for a comprehensive audit trail to be established in order to document ARE. The relevant inputs that should be recorded as part of LR documentation include the following:

- NMAS (including evidence criteria);
- Operator SOPs;
- Records of training and accreditation activities;
- Equipment testing and annual control results;
- Risk analysis documentation;
- Tasking documentation;
- LR activity reports (progress reports and logs containing key decision points);
- Documentation for lessons learned;
- Meeting records (information, stakeholders etc);

[17] These principles were elaborated in the paper prepared by Norway “Applying all available methods to achieve the full, efficient and expedient implementation of Article 5”, 30 May 2008.

- Completion reports (cancelled land, reduced land, cleared land);
- Field-level QC reports from monitoring visits; and
- Handover documentation.

Efforts to provide accurate and timely information to all stakeholders will enhance the confidence in the LR process and allow the NMAAs to illustrate the steps more clearly being taken to ensure that ARE is being applied.

5.2 Well-defined and objective criteria for the classification and re-classification of land

The principles of classification and re-classification of land are clearly laid out in IMAS 07.11 on LR. Fundamentally, this is the process of classifying land as hazardous when there is evidence of EO contamination. This also ensures that where there is no evidence of EO contamination, no hazardous area is recorded.

Although the principles, as laid out in IMAS 07.11 and IMAS 08.10 are universal, the details will be context (country, region, or location) specific. A detailed analysis of the local context must be conducted (as noted above with respect to strategic planning, risk management and IM). This analysis ensures that there is a good understanding of what constitutes valid evidence of EO and establishes criteria to determine its level of reliability. Triangulation of evidence and all data sources should be carried out (ensuring that women, men, boys, and girls who may have information are consulted) so that informed decisions are made when classifying and re-classifying land. It is particularly important that NTS teams are properly composed, trained, and accredited and know what specific evidence to consider. Good quality evidence at the outset of the process will ensure that the initial baseline information is as accurate as possible, and that land is classified based on the best information available.

Guidance within IMAS 07.11 and IMAS 08.10 also sets out some generic examples of the type of evidence that may be used to inform decision making when classifying land into SHAs and CHAs.[18] However, these examples remain general and are not sufficiently contextualised to be used as definitive objective criteria in local contexts. Figure 2 below brings together examples outlined in IMAS 07.11 and IMAS 08.10 regarding direct and indirect evidence that should be documented when identifying and classifying HAs. If only indirect evidence is gathered then an area should be classified as a SHA, whereas if more reliable direct evidence is obtained, then an area may be classified as a CHA.

[18] See IMAS 08.10 on Non-Technical Survey, Section 6.4, p 6-7 and IMAS 07.11 on Land Release, Section 5.3, p.5

Indirect Evidence (SHA)	Direct Evidence (CHA)
• *EO records, where the reliability of such records remains open to doubt or has not been assessed.*	• *EO records, where the reliability of such records has been confirmed during previous operations.*
• *Potentially productive land not in use.*	• *Visual observation of EO, EO parts, fragmentation, or craters.*
• *Verbal reports from local population, former combatants, and other relevant actors.*	• *Detonations during fires or by animals.*
• *Analysis of other known contamination areas, tactics, and historical sources.*	• *EO signs, fencing, ancillary equipment (ammunitions boxes, canisters) etc. associated with contamination.*
• *Former combatant zones.*	• *EO accidents or incidents where the location of the event can be accurately determined.*
• *Evidence from previous surveys, not supported by direct evidence of the presence of contamination.*	• *Visible evidence of IEDs appropriate to the context, for example this could include partially exposed wires, pressure plates, locally manufactured main charges etc.*
• *EO accidents or incidents where the location of the event cannot be accurately determined.*	
• *Visible potential IED components – context specific depending on local construction of IEDs and their method of placement.*	

Figure 2: Guidance from IMAS 07.11 and IMAS 08.10

Robust criteria for using direct and indirect evidence should, however, be developed for the local context and defined in NMAS and subsequently specified in SOPs. These objective criteria should provide as much support as possible for individuals and teams making decisions on land classifications (see Figure 3 below for examples of possible NMAS criteria). These criteria should be updated periodically, or as relevant information becomes available and used to support decision-making in the field and incorporated into training and the QMS. This process makes decision-making for LR operations more consistent and improves the quality of survey reports, by clarifying what constitutes reliable evidence to be used by survey teams.

Where required, it is also important that the re-classification of land and the redefinition of the boundaries of SHA and CHA polygons can be justified by clear decision-making criteria, as the LR process moves forward. For example, the classification of a sizable CHA based on a single visible mine during a survey may warrant questioning of the boundaries of the CHA. Decisions such as these, made based on flimsy or limited information or on vague criteria can lead to over-estimates / under-estimated of the EO problem and reduce the accuracy of the information available to NMAA managers. Ultimately resources are also wasted because of inaccurate estimates, which leads to inappropriate tasking of assets. Faced with an accumulation of poorly or inaccurately defined SHAs and CHAs, affected countries face significant and costly challenges when working to update and correct entries in their databases.

Examples of possible criteria for defining and classifying HAs[19]

Creation of a SHA

A SHA may be established based on the documentation of the following Indirect Evidence examples:

- *Testimony provided by community members or former combatants about the presence of explosive hazards in an area that has been documented in writing and includes a map (signed by the informants). This information must be corroborated by two other witnesses who agree to sign their names in support of the information.*
- *Visual or documentary evidence that former combatants were in an area. Where possible, this should be corroborated by at least one community member and appropriately documented.*
- *Accident Reports (without precise locations) provided by recognised emergency response organisations such as the ICRC, National Red Cross/Red Crescent societies, or national hospitals. Supporting evidence that is triangulated from multiple sources (such as community member corroboration, or visual signs of combat having taken place) should subsequently be gathered by an NTS team (including visual inspection of a suspected site from a safe area, if required).*

Creation of a CHA

A CHA may be established based on the documentation of the following Direct Evidence examples:

- *Visible evidence of even one mine. Additional evidence should be sought in order to define the area accurately.*
- *Visible evidence of an EO component parts, combined with additional indirect evidence (as defined above).*
- *Minefield maps provided by parties to the conflict.*

Cancellation of all or part of a HA

Through the application of NTS, land may be cancelled to define a HA more accurately or to eliminate the HA altogether if new evidence is found to indicate that the suspicion of contamination was unfounded. The following criteria demonstrate examples that may be used to cancel HAs recorded on a national database:

- *Land that has been cultivated for a defined period (e.g. 3 years) and to a given depth (e.g. 10 cm) and verified by at least 2 key informants in addition to the landowner.*
- *Land that has seen moderate to heavy traffic of people and vehicles over a defined period (e.g. several months).*
- *Land on which construction works have taken place for a given period of time (e.g. 3 months), and to a given depth (e.g. 1 metre) without the occurrence of an EO accident or incident.*

Reduction of a HA

Through the application of TS, land may be reduced to define a HA more accurately or to eliminate the HA altogether if no direct evidence to substantiate the presence of explosive hazards is obtained from processing land through technical means. The following criteria examples may be used to reduce HAs recorded on a national database:

- *A tiller that has systematically covered 100% of the HA, followed by another clearance asset that systematically covers 100% of the HA*
- *Systematic manual clearance that has processed no less than 25% of the total defined HA.*
- *1 mine detection dog applied systematically to 100% of the HA*

Figure 3: Examples of possible criteria for the classification and re-classification of land

Criteria for ERW-contaminated HAs can be slightly easier to determine. For example, cluster munition remnants, specifically explosive submunitions, can be used as direct evidence for establishing CHAs that do not pose a mine threat. In South-East Asia, a form of technical survey involving rapid searching of 50mx50m (2,500m²)

[19] Figure 3 represents only a few examples of criteria for the classification and re-classification of land. Refer to the relevant IMAS chapters for a comprehensive list of criteria related to these processes.

boxes, has allowed extensive and accurate survey of cluster strikes, greatly improving the efficiency of the subsequent clearance. The methods used are consistent with the LR principles but are adapted to a context where trained personnel can enter into a HA and directly identify evidence in a way that is easier than for HA where there is an AP mine threat.

Re-survey can be one methodology used by an NMAA to improve the quality of information on the location and classification of HAs. Prior to re-survey, however, there should be a thorough desk assessment, including the analysis of completed TS and clearance as well as historical NTS activities. This analysis can be used to establish the accuracy of outdated SHAs and inform the most appropriate methodology for new NTS. The information from the desk assessment should be used alongside the experience of operational staff to update the criteria of indirect and direct evidence that is used to re-classify, reduce, and cancel land where relevant. In doing so resurvey may serve as a component of ARE by redefining outdated SHAs or CHAs to obtain more accurate information on EO contamination.

5.3 Involving communities in the land release process

Community engagement (commonly referred to as community liaison), in most circumstances, is fundamental to the success of the LR process. Given that high quality LR is dependent on accurate information, it is critical that accurate information is collected from communities that may have vital knowledge regarding the location and the nature of hazards. In addition, ensuring local confidence in LR activities is essential. In this regard, it is vital that land classified as free from EO contamination, or land that has been cancelled, reduced, or cleared is perceived to be safe to use by all when it is returned to the community. Given the importance of the relationship with affected communities, there is a responsibility at the level of NMAAs and operators, to ensure that community liaison is established as early as possible during the various LR activities and maintained throughout its various phases. In this manner, the eventual users of the land will have increased confidence in the process and the pressure to conduct additional clearance, aimed at instilling confidence in the future users of the land can be avoided.

Conflict, gender, and diversity sensitive community liaison in support of LR (NTS, TS and clearance) facilitates more effective communication and information exchange with affected communities. This allows operators to collect relevant and more complete information from a wider range of sources, resulting in a more thorough understanding of the extent and nature of the contamination and its impact on different people. Well established community liaison can also help mitigate misunderstandings pertaining to information that has been shared. To ensure that ARE is planned and documented through community liaison activities, NMAS should clearly state at what stage of the decision-making process there needs to be a record of community involvement. For example, as a minimum, it is good practice for the operator to set up meetings with local authorities and representatives from all relevant groups prior to the implementation of NTS, TS and clearance, so that all parties are introduced to the planned LR activities. Joint meetings should be repeated if there are any major changes to the LR process. Once the survey and/or clearance have been completed, it is essential to ensure that community members, including men and women, and EO survivors, understand what kind of work was carried out, and in which areas, so that they can contribute any additional information that is relevant.

The timing of initiating community liaison can be critical to ensure community confidence in the work completed. Long delays between the completion of a task (through cancellation, reduction, or clearance) and the subsequent handover of land can lead to a loss of confidence by local communities. If there is going to be a delay of the formal handover process, written documentation should be shared with community representatives from all groups and explained so that community members have a chance to ask any questions they may have. All work should be transparently documented, as stipulated by NMAS and SOPs, preferably with photographs, to help maintain trust with local communities. Where possible, acknowledgement of the documentation and explanations should be recorded with the signatures of community representatives.

Relevant personnel from NMAAs and operators should receive appropriate training on how to establish effective gender and diversity sensitive communication with the targeted communities, key informants, and local

stakeholders throughout all LR including the handover. Community liaison teams should always be gender-mixed and reflect the access requirements to all groups in a specific context. When working with illiterate key informants or community members, the documentation should be transparently explained and if possible, confirmed with a literate independent figure (it may be possible to record and leave a photograph as a record to help increase confidence). This documentation could be a record/receipt that a meeting took place with date and location or the confirmation of a landowner/ land user that they are confident that there is no evidence of EO contamination. NMAS and SOPs should have clear guidance on the requirements for personal data protection in line with IMAS and relevant national legislation.

5.4 Land handover and responsibility

The tasking process for NTS, TS or clearance, assigns temporary responsibility for a defined area of land to the mine action operator. Upon completion of the designated tasks, the government (normally represented by the NMAA) regains full responsibility when the land is handed over by the operator once the task is finished. Following the completion of the LR process on a defined area, there should be a formal handover, to mark the handover of responsibility for the land from the operator to the government and/or to the community or landowner(s).

The formal handover should be supported by all the relevant documentation. This documentation should prove that ARE has been applied to remove the presence, or the suspicion of the presence of EO contamination. Prior to handover, all the documentation of the work completed should be checked and confirmed as satisfactory by the NMAA. The documentation should include the following:

- What has been done and where (including specified area and specified depth);
- Copies of survey reports;
- Who has completed the work (i.e. qualified/accredited personnel);
- Summary of equipment and procedures used;
- Proof of internal and external QM;
- A list of the EO located and destroyed during clearance (including maps of where they were located);
- Details of any incidents and accidents which occurred during clearance and;
- A formal recognition from the EO-affected community or a designated representative of community involvement and acknowledgement of the final status of the land.

The handover of land should not infer personal liability for individuals present at the meeting, however. A properly implemented LR process will include an audit trail of documentation that represents proof that national standards have been effectively applied, and that decision-making has been based on the appropriate evidence. By signing a completion certificate, a representative of the state confirms in an official (not personal) capacity that all required documentation is present and properly filled out and work has been completed to the required standards.

Both the operator and national authority/external QM personnel should clearly understand what documentation is required. Documentation should be designed in such a way that those responsible are confident to sign-off on the work completed if it has been done to the required standard. When obtaining signatures from relevant community members and local authorities as part of a handover process, or at the point of completion, it is vital that the individuals understand what they are signing and for what purpose. Should a signature from community level representatives be unavailable, the NMAA should designate alternate signatories such as a representative within the NMAA or from another administrative division. These processes should be ensured and established in the SOPs of NMAA and operators involved in or overseeing the handover process and included within well-designed clear handover formats for documents.

At a higher level, the “handover” principle can be applied to confirm that ARE has been applied to a specified administrative area, such as a district or a province or, for example, to better document compliance with international convention obligations. Governments may decide to implement additional survey or assessments to increase confidence that no evidence has been missed and that any international obligations have been met.

5.5 A formal national policy addressing liability issues

According to IMAS 07.11, the term "liability refers to any legal responsibility, duty, or obligation that a country, organisation or individual may have. Liability in relation to an adverse event, such as an accident or the discovery of a missed item in an area, is normally linked to non-compliance with an agreed policy or procedure".[20]

National liability policies are essential to address the processes and implications of transferring responsibility for contaminated areas from operators who have completed LR activities, to the government or the local communities. Such policies ensure that all participants engaged in the process of LR understand their responsibilities, and that there is an agreed framework to allow landowners, local authorities and/or NMAAs to accept responsibility for land that has been released, according to NMAS. Liability policies should be developed in a coordinated manner that is governed by certain key principles:

- According to International Law, states have overarching responsibility for the safety and security of their citizens.
- All stakeholders involved in the LR process have accepted the definitions and criteria for ARE, set out within clear, well communicated and agreed NMAS chapters.
- A reliable, transparent, and well documented QMS is established at the national and operator level, to ensure that mine action organisations conduct their operations in compliance with approved NMAS and SOPs.

5.6 A common set of terminology should be used when describing land release

The IMAS 07.11 on LR sets out clear terminology for LR activities that is accepted at the international level. However, at the national level there can still be confusion regarding the use of these terms, what they represent, and how they relate to national reporting requirements. These detailed aspects require some explanation within NMAS, in relation to the following terminology and definitions:

- NTS;
- TS;
- Systematic investigation;
- Targeted investigation;
- Clearance;
- Terminology for land classification and categorisation; and
- Terminology related to evidence.

Any country-specific terms should be defined and linked to IMAS definitions where possible. It may be useful to include a lexicon of terminology as an annex to the NMAS, especially when multiple languages are used within a mine action programme. Much of the IMAS terminology cannot be translated word for word into other languages, hence an explanation of the equivalent national terminology is useful.

IMAS LR terminology is available and may be appropriate for many national programmes if there is appropriate training to ensure a common understanding of all terms. It is critical that all personnel understand the definitions behind terminology and are not using out-of-date definitions. To achieve and prove ARE it is important to be able to clearly communicate what has been done where and why, and this requires a common frame of reference. It is challenging to document and give managers the confidence to sign-off on work if there is not an understanding and a consensus around key terminology used.

[20] IMAS 07.11, Section 11, p.10

Good Practice Checklist

The following check-lists present practical guidance on achieving ARE. If the various elements of these lists are implemented, a mine action programme should be confident of having expended an acceptable level of effort to address its EO problem. Learning, however, is a continual process, and as new information is available, it must be integrated into analysis and procedures. In practical terms ARE will therefore evolve over time in EO-affected countries.

NMAAs:

	Activity	IMAS Chapter Reference
	Establish relevant institutions (national bodies) responsible for managing mine action activities aimed at making land safe to the country's population and related to fulfilment of the international MA obligations (this includes planning, accreditation, monitoring, training and development of national regulations and capacities).	**IMAS 02.10** Guide for the Establishment of a Mine Action Programme
	Carry out a comprehensive analysis of EO contamination on your territory through a General Mine Action Assessment.	**IMAS 02.10** Guide for the Establishment of a Mine Action Programme
	Identify risks associated with the suspected EO contamination and how different groups are affected by those risks through a Risk Analysis.	**IMAS 07.14** Risk Management in Mine Action
	Develop a National Mine Action Strategy (including concrete and measurable goals and objectives) to address EO contamination. The strategy should include a monitoring mechanism.	**IMAS 02.10** Guide for the Establishment of a Mine Action Programme
	Develop NMAS that define key land release terms and processes, as well as key parameters (such as depth	**IMAS 01.10** Guide for the Application of IMAS

	requirements, and other criteria such as whether areas are required to be metal-free).	**IMAS 02.10** Guide for the Establishment of a Mine Action Programme
	Establish a national-level quality management system, including accreditation, that establishes a clear and documented audit trail for LR activities and allows follow-up, lessons learned, and investigations related to establishing liability to be carried out. Ensure that this QM system contributes to the continual improvement of methods, priorities, and standards, including required mine action competencies.	**IMAS 07.12** Quality Management in Mine Action **IMAS 07.11** Land Release **IMAS 07.30** Accreditation of mine action organizations **IMAS 07.40** Monitoring of mine action organizations
	Set up an information system that manages LR information and provides the evidence of 'reasoned' decisions during the LR process.	**IMAS 05.10** Information Management for Mine Action **IMAS 07.11** Land Release
	Establish clear laws and regulations related to liability to give operators the confidence to carry out LR using all reasonable effort without risks of unforeseen consequences.	**IMAS 07.11** Land Release **IMAS 07.14** Risk Management in Mine Action **IMAS 07.12** Quality Management in Mine Action
	Establish a prioritisation system guided by the national objectives outlined in the country's strategy and linked to the regular risk assessments and additional information related to the impact of Explosive Ordnance (such as casualty data).	**IMAS 07.11** Land Release

	Carry out regular analysis of the results of LR	**IMAS 07.12** Quality Management in Mine Action **IMAS 07.11** Land Release **IMAS 07.40** Monitoring of mine action organizations
	Evaluate lessons learned through the QMS and integrate learning into NMAS	**IMAS 07.12** Quality Management in Mine Action **IMAS 07.40** Monitoring of mine action organizations
	Establish a sustainable long-term framework to **address residual contamination**	**IMAS 07.10** Guide for the Management of Land Release and Residual Contamination Operations TNMA 07.14/01 Residual Risk Management
	Establish post LR assessment process to find out how people are benefiting from released land and how the prioritization system can be improved	**IMAS 07.11** Land Release **IMAS 07.10** Guide for the Management of Land Release and Residual Contamination Operations **IMAS 07.40** Monitoring of mine action organizations

Mine Action Operators

	Activity	IMAS Chapter Reference
	Set up an internal QMS that ensures an auditable record of LR activities and reviews procedures based on lessons learned (in particular where EO accidents or incidents have taken place).	**IMAS 07.12** Quality Management in Mine Action **IMAS 10.60** Investigation and reporting of accidents and incidents
	Undergo accreditation to demonstrate organisational and operational compliance with national regulations, standards, and quality requirements	**IMAS 07.12** Quality Management in Mine Action **IMAS 07.30** Accreditation of mine action organisations
	Identify and **understand the nature and characteristics of contamination** within the area of operations, including on-going risk assessment.	**IMAS 02.10** Guide for the Establishment of a Mine Action Programme **IMAS 07.11** Land Release **IMAS 07.10** Guide for the Management of Land Release and Residual Contamination Operations
	Identify and gain access to all relevant sources of information (in a gender and diversity sensitive manner), including any available historic records, former combatant statements, and the viewpoints of the affected populations.	**IMAS 07.11** Land Release **IMAS 07.10** Guide for the Management of Land Release and Residual Contamination Operations
	Establish an internal information management system that can record, store, and analyse information using all appropriate	**IMAS 05.10** Information Management for Mine Action

	means of triangulation of evidence, in support of documented decision-making	
	Include clear guidance for decision-making within SOPs, including the identification of competent and authorised/accredited people for key decisions.	**IMAS 07.12** Quality Management in Mine Action **IMAS 07.30** Accreditation of mine action organisations
	Ensure that all stages of the land release process have been recorded according to NMAS (or IMAS where no NMAS exists) and that the required reports have been submitted to the relevant NMAA or other mandated organisation in a timely manner.	**IMAS 07.11** Land Release **IMAS 07.30** Accreditation of mine action organisations
	Ensure that communities are fully informed about LR activities and that comprehensive information-gathering has been carried out during the LR process (including women, men, girls, and boys)	**IMAS 07.10** Guide for the Management of Land Release and Residual Contamination Operations **IMAS 07.11** Land Release
	Engage regularly with the NMAA regarding ways to improve data regarding EO contamination and LR	**IMAS 05.10** Information Management for Mine Action
	Develop SOPs and review them on a regular basis and ensure their compliance with NMAS and in order to integrate the learning captured by the internal QMS.	***Refer to relevant NMAS in each country of operation***
	Develop required training packages for capacity building of staff to ensure competent and qualified staff are deployed for LR operations.	**IMAS 07.11** Land Release **IMAS 07.12** Quality Management in Mine Action **IMAS 07.30**

		Accreditation of mine action organisations
	Integrate appropriate technology and innovative methodologies into operations to enhance productivity and safety.	**IMAS 10.10** Safety & occupational health - General requirements **IMAS 10.20** Demining worksite safety **IMAS 10.30** Personal Protective Equipment - PPE
	Ensure that the work is in line with the national legislation and policies (including the national MA strategy).	***Refer to relevant NMAS in each country of operation***
	Safeguard the organisation's staff throughout all phases of LR.	**IMAS 10.10** Safety & occupational health - General requirements **IMAS 07.14** Risk Management in Mine Action **IMAS 10.20** Demining worksite safety **IMAS 10.30** Personal Protective Equipment - PPE

Annex A
Putting ARE in context: Examples of its application [21]

Examples of the application of ARE illustrate both good and bad application of ARE. While the countries are fictional, the examples of ARE are based on experience from various field contexts.

The first three fictional countries, countries A, B and C, demonstrate good examples of the application of ARE. The examples are not comprehensive and are not intended as instructional guidance of how to address similar situations. The circumstances of real-life situations are different and context specific and must be addressed according to the particularities of the facts that are available. The third fictional country, country D, gives examples of where ARE was not applied.

Country A – Good Practice

Country A experienced a protracted civil war over a ten-year period. Both parties to the conflict used conventional weapons including anti-personnel mines. After the conflict ended, large parts of the country were left contaminated by explosive ordnance (EO) including suspected and known minefields along the main front lines, as well as large battle areas contaminated by unexploded ordnance (UXO). Emergency assistance was initially provided to communities affected by the conflict by the international community, including explosive ordnance risk education (EORE), emergency medical assistance to those injured by EO and emergency clearance of routes and areas needed for the provision of humanitarian response. An effective information management system to manage these activities was established and maintained throughout the programme. National institutions with the mandate to deal with the problem of EO contamination were established and gradually took over the management and oversight of mine action activities.

Management Considerations

Strategic Planning

- *In country A, once the conflict ended, an initial Threat Analysis was carried out and emergency assistance was provided. Following the establishment by the Government of the relevant bodies, including a NMAA, a general mine action assessment was conducted, and survey work was carried out based on the information gathered. A strategic planning exercise was conducted to establish the objectives for the national mine action programme, including a monitoring framework with targets for progress on LR. After the first two years of the mine action programme were completed, a mid-review of the strategy was carried out and actual progress was measured against targets. Due to slow progress in releasing UXO-contaminated areas, a review was carried out of the Battle Area Clearance NMAS and operating procedures, including the depth established for sub-surface clearance. After much discussion with mine action operators and other relevant stakeholders, the decision was taken by the NMAA to reduce the depth requirement for BAC.*

Quality Management

- *A mine was found near a community where mine clearance operations had taken place. The QMS established by the NMAA included the submission of detailed completion reports for clearance operations, including the exact boundaries of clearance work and the location of the mines found. The Country's policy on liability outlined the necessary steps required to complete an initial investigation led by the NMAA. Based on the reports submitted by the MA operator, the investigation could clearly conclude that the mine found was outside the original CHA tasked for clearance. This allowed the MA operator to be cleared of any responsibility for missing a mine during clearance. The issue led to a review of the standard for NTS, of aspects related to decision-making criteria for the cancellation of land.*

[21] Although these examples are based on real situations, they do not represent a description of any EO-affected country.

- *After a five-year period, an analysis of areas cleared showed that in over 60% of completed mine clearance tasks, no mines were found. Additionally, the percentage of areas without mines was not decreasing over time. Analysis of information on the national database and consultations with operators led the NMAA to the conclusion that the nature of contamination (low density nuisance mines) made NTS and TS very challenging. In this context, the size of areas, access and environmental conditions meant that manual deminers equipped with metal detectors were very often selected as the most appropriate tool. Operational managers concluded that although it was reasonable to expect that in a higher-than-normal percentage of areas no mines would be found, the NMAA decided that not finding mines in over 60% of areas cleared brought the quality of survey into question. There was subsequently an effort to improve NTS and use the results of NTS, TS and clearance to improve the full LR process. This effort included doing desk research and live trials using new information-gathering tools such as drones, and new mechanical tools and methods to improve TS.*

The Land Release Process

Non-technical Survey

- *Land mines were used by both parties to the conflict along the main front line. A high percentage of Mine Field Records (MFR) were available to the NMAA, however, shortly following the conflict, some mine lifting was conducted by military peacekeepers who kept limited records of the work done.*

  The following steps were completed and documented, as a minimum, to ensure that ARE is applied to NTS:

  - *Desk assessment was carried out with the purpose of geo-locating all MFR;*
  - *Field visits to the MF locations took place to confirm if there is evidence of EO;*
  - *An updated list of the status of all the MFR (including the boundaries of the HA, mines lifted and land in use) was made; and*
  - *Evidence of other EO contamination was collected through meetings with affected communities (including women, men, girls and boys and representation from diverse groups such as mine survivors). All communities with evidence of EO contamination should be surveyed.*

Technical Survey

- *An NTS team working with key informants saw what they believed were visible mines from a safe distance. This information was used to define a CHA which was recorded and subsequently entered in the national database, according to the IM NMAS. Subsequently, a TS team tasked to the CHA, conducted a targeted investigation that opened breach lanes to the visible mines. When the breach lanes reached the visible mines, they were in fact identified as unused empty mine casings containing no explosive content. This new evidence was reported by the TS team and the task was suspended pending further investigation. NTS staff were tasked with gathering additional information from new informants who had first-hand knowledge of the use of the area during the conflict. An additional visit to the site with the additional informants (women had not been consulted in the first survey), and the triangulation of this information with written records that were eventually found, provided sufficient evidence to confirm that the HA in question was just an abandoned mine fabrication point. The CHA was finally cancelled by the NTS team, based on the direct and indirect evidence found.*

Clearance

- *Clearance depth is often standardised across an entire country. In Country A, SOPs stipulated that signals were investigated to a depth of 25cm. This was to ensure that all metal was found at a depth of at least 20cm, as stipulated in the NMAS. Based on information collected on the depth of mines, an analysis determined that 99% of mines were located at a depth of 10 cm or less. This resulted in the investigation depth being adjusted to 15cm, significantly increasing efficiency by reducing the time spent investigating signals, often in hard compacted ground. (Of note, the investigation depth was from the original ground level, so it was increased in areas where there was evidence of sedimentation and mines were buried deeper than normal, for example in the banks around bridges).*

Country B – Good Practice

Country B contains legacy minefields from a conflict with a neighbouring country 25 years ago. A national mine action programme led by the NMAA was established shortly after the conflict ended. In the past decade, the rise of a separatist non-state armed actor in the south-eastern province has led to a period of internal unrest, where the widespread use of improvised explosive devices (IEDs) occurred.

Management Considerations

Strategic Planning

- *In Country B, a new strategic plan was developed two years ago to replace the one that had expired. The process began with a review of the previous strategy and the analysis of key information regarding the mine problem within the framework of context analysis. Based on concerns from local stakeholders that estimates of AP mine contamination were inaccurate, an effort to carry out a re-survey of SHAs was conducted prior to the finalisation of the new strategic plan. New information collected from the NTS of existing SHAs revealed a much smaller AP mine contamination than was originally suspected. The new strategic plan was developed based on more accurate and reliable information and allowed Country B to mobilise new resources to complete mine clearance more quickly.*

Risk Management

- *A comprehensive Threat Analysis was conducted in urban centres in the south-east province of Country B, where non-state armed separatist group was recently active. This analysis identified new EO contamination of an improvised nature. Based on the need for technical expertise related to IEDs, NMAS were amended to include a chapter on IED Disposal and various modifications related to IEDs. All mine action organisations working in the affected region were required to integrate recognition of IEDs into their training curricula for community liaison, explosive ordnance risk education (EORE) and NTS. Teams focusing on clearance in IED-affected areas were subject to additional training according to a new SOP that had been developed in coordination with operators, in keeping with the amended NMAS.*

Information Management

- *An assessment of information requirements for government decision-makers in Country B led to the development of reports for the Ministry of Economic Development (MoED) that outline where major infrastructure projects coincide with EO contamination. This information helped the MoED to better plan their projects and ensure that any public works planned in terms of processing the land was shared with the NMAA and an operational analysis could be carried out to determine if any LR was required.*

The Land Release Process

Non-technical Survey

- *In Country B mines were laid close to its international border, some for defensive purposes by the nation's military, and others by invading forces while they occupied the territory during an episode of conflict between the bordering countries. Information in the national database has come largely from a Landmine Impact Survey (LIS) conducted in 2001, resulting in the mapping of very large areas, where the use of mines and contamination from EO because of battles, were reported. These areas were recorded as SHAs in the national database. Recently, 10% of the historical SHAs have been re-surveyed by qualified NTS teams, trained according to the specifications in an updated NMAS (in line with the latest IMAS chapter on NTS). The results showed that there was no evidence that would lead to a suspicion of EO in 95% of the SHAs. Thus, it was concluded that 95% of the cases of the HAs should be re-surveyed. The NTS teams used a high proportion of their time to gradually cancel many SHAs entirely, based on the updated indirect and direct evidence gathered, using the updated NMAS on NTS (including a matrix that guides decision-making on cancellation by providing concrete examples of evidence requirements). It would now be reasonable to carry out a re-survey of all SHAs in the national database that were created as a result of the original LIS, with a focus on using the indirect and direct evidence of EO (as defined in the updated NMAS) to confirm, define and delineate HAs more accurately.*

Technical Survey

- *Once a CHA had been established, operators (accredited to carry out the technical survey) conducted targeted investigation of the CHA by clearing lanes through the CHA in order to gather evidence on where the mine lines are found within the area. Once the trajectory of the mine lines was found, the CHA could be reduced significantly. This methodology was accepted by the NMAA and is clearly established as a recognised method of conducting TS within NMAS. In a context where mine lines are very well defined, decisions were made regarding the reduction of CHAs with considerable certainty. NMAS in Country B also specified that Mine Detection Dogs (MDDs) could be used to carry out targeted investigation for TS on SHAs. Once an MDD team identified evidence of contamination, an operational decision on where and how to deploy clearance assets was made based on a reduced SHA. In the exceptional cases where evidence could not be identified by the initial MDD investigation, another asset was deployed to ensure that the area is indeed free of contamination. Using MDDs as a TS asset in this way has increased the speed of operations and will allow land to be handed over to the local population more quickly*

Clearance

- *In Country B, clearance was being conducted by a number of operators in line with quality requirements for clearing areas containing Type 72 AP mines outlined in the NMAS. The work of all operators was monitored by the NMAA through the national mine action programme's QMS. An investigation was launched due to a mine found in an area that had been "cleared". Based on the analysis of evidence collected, it was revealed that Type 72 AP mines were not reliably found by the metal detectors used by the mine action programme at the time, due to their minimum metal content. Research carried out as part of the investigation's analysis found that a new generation of the metal detectors being used in the programme was able to reliably detect the metal content in the Type 72A mines. Analysis of information on where these mines had been found by clearance teams in the past was conducted and a programme-wide plan for re-clearance with new detectors was launched by the NMAA and implemented by operators. The work of NMAA and operators in this context ensured that ARE was applied. The programme did so by utilising and analysing newly available information updating the operational procedures and equipment according to the identified risks. The NMAA's work in ensuring that a plan was put in place to address areas already cleared with unreliable equipment, was also an important component of avoiding further accidents and achieving ARE.*

Country C – Good Practice

Country C experienced prolonged aerial bombardment for over a ten-year period. The bombardment consisted of a range of ordnance in particular High Explosive aerial bombs, and cluster munitions containing explosive submunitions. The bombing left significant areas of the country, including farmland, villages, routes, and primary jungle, contaminated, largely by unexploded submunitions. Road junctions, fords and bridging sites were areas where high levels of contamination were noted. Initial clearance during and immediately after the conflict had been conducted by both the local population and the military. Decades later international actors came to assist the country in not only the survey and clearance effort, but also with victim assistance and advocacy pillars efforts.

Management Considerations

Strategic Planning

- *After a number of years of international assistance, funding for survey and clearance of cluster munition remnants became less certain. Donors wished to see more progress in terms of clearing areas known to be contaminated, rather than request-based clearance that aimed to make sure an area was clear regardless of whether any evidence had been identified there. The key was to develop an accurate baseline of what contamination remained to be cleared so that a strategy could be developed to finish the clearance is as quickly as practicable. In conjunction with the NMAA, both national and international operators developed a system of evidence-based survey, to identify accurately where was contaminated by cluster strikes. The evidence-based survey was known as Cluster Munition Remnant Survey (CMRS). Due to the extensive nature of the contamination, which ran to over 1000 km ², the survey element of the task was incorporated into the workplan of the strategy as much as the*

subsequent clearance. Once a data set of areas that had been both technically surveyed and subsequently cleared had been developed, (disaggregated to different terrain types), a projection could be made concerning survey and clearance rates, and funding levels, in order to move the country towards Convention on Cluster Munitions Article 4 completion.

Quality Management

- *The QMS in Country C was integrated into all levels of operations. Operators themselves conducted their own quality management including a standard 10% minimum quality control of all land cleared. The NMAA also conducted monthly field visits to operators that were often not announced in advance. While the NMAA Quality Managers were rigorous in their identification of non-conformance, a culture of working with operators and helping them improve prevailed. Operators who identified errors themselves were encouraged, with the sense that it was a collective effort to improve quality in all aspects of field operations.*
- *Very importantly a key element of the QMS at all levels was the analysis of data by both IM and Operations staff working in tandem. Senior operations staff were expected to spend significant time cross-checking operational reports for accuracy, advising IM staff on reports that required reconfirmation. Data quality was everybody's responsibility, and data quality at the lowest levels fed up into a national database that gave NMAAs, and donors a credible basis on which to make decisions.*

The Land Release Process

Non-technical Survey

- *A form of national survey had been conducted by an INGO when foreign organisations first started engaging in the country. The survey, described as a form of General Mine Action Assessment, only gave a very general indication where contamination was believed to be. This led to an inflation of the land believed to be contaminated. Almost two decades later it was decided that a full national re-survey would be required, with all survey teams undergoing a standard re-training package, orientated towards supporting the CMRS process.*
- *While NTS teams were tasked to identify all evidence of explosive ordnance, identification of CMR was prioritised, since this was the most extensive form of contamination in the country. It also presented the greatest socio-economic impact. NTS teams prioritised the collection of credible CMR evidence points for CMRS teams to conduct technical survey around. NTS teams were well trained, and capable of judging if a reported item had possibly been moved from a cluster strike during the decades since the war, or whether there was a reasonable assumption that it indicated where a cluster strike would be found.*
- *Country C's lowest level of governance was the village unit, that incorporated not only the area of village buildings but all the associated land holdings. NTS progressed village unit by village unit in each district in each province until all affected provinces in the country had been resurveyed.*

Technical Survey

- *CMRS teams consisted of sections of four searchers, led by a section commander, each equipped with detectors suitable for BAC work. Team leaders could control a number of sections along with a medic in order to maximise resources. Team leaders deployed sections in search boxes of 50m²x50m² (2500m²) that could be searched in about 30 minutes. Typically, given the nature of the cluster munitions used in the conflict, searchers would identify if unexploded submunitions or fragmentation from exploded submunitions was present with 05-10 minutes. The intent was not for the searchers to identify all the contamination in a box, nor to clear it, just to confirm whether contamination was present or not so as to better target the subsequent clearance operations.*
- *Each search box had a specific location identifier. Team leaders used electronic forms on tablets to confirm whether a box had been searched and what the result was. Results could be represented visually on good quality ortho-images with grid overlays. A colour code system was employed to enable better visual identification of contaminated boxes (red), boxes where fragmentation had been found (amber) and boxes where no evidence was present (green). Relatively tight polygons were drawn around clusters of red and in some cases amber boxes to produce CHAs ready for clearance.*
- *The key to successful technical survey for cluster munition remnants was the effective processing of the significant amounts of data generated. This demanded close support of operations by IM staff who would use the evidence points collected by NTS teams, plot them as a shapefile using GIS software,*

and create box overlays in the surrounding area. Each box had a centroid which was the starting point for the search sections. A list of centroids would be downloaded onto section handheld GPS units, enabling CMRS staff to search in the right place. Combined with the use of electronic reporting forms, CMRS represented the application of technology, alongside a real working coordination between operations and IM staff, to accurately identify where cluster munition remnant contamination was.

Clearance

- *Since clearance was directed by the technical survey, the amount of clearance where no submunitions were found was reduced to almost zero. Key Performance Indicators such as m² cleared/submunition gradually showed a marked improvement, indicating that teams were increasingly clearing in the right place more often, thereby reducing the threat that these explosive hazards presented to the local population more quickly. The final polygons of cleared cluster strikes tended to be greater than the tightly drawn CHAs from CMRS, once fade out distances were cleared from the submunitions found at the CHA's edge. Nevertheless, this fade out provided the assurance that all of the strike had been cleared and was calibrated in accordance with the actual location of submunitions, each of which was digitally recorded. In this way fade out decisions were made on hard evidence, representing all reasonable effort in this context.*

Country D – Poor practice where All Reasonable Effort is Not Observed

Country D experienced a three-year civil war between the two main political factions in the country, a peace agreement was brokered. Conflict battle areas remained contaminated with AP minefields, and many urban towns and cities were suspected or known to have explosive ordnance.

Management Considerations

Strategic Planning

- *In country D, following the establishment of the mine action programme, and in accordance with an initial five-year strategy, mine action operators had been clearing land for two years. The progress of releasing land suspected to be contaminated by anti-personnel landmines was slower than had been expected. Despite some within the sector calling for a mid-term strategy review, NMAA decided to wait until the five-year strategy had been completed to review it. The end of strategy review made a few recommendations including changes to clearance methodology noting that large swathes of land could have been released through TS and NTS methods, but which instead had been cleared using more costly and less efficient mechanical clearance assets. If a mid-term strategy review had been completed, changes to the LR system could have been implemented earlier and would have increased the speed of LR and reduced costs.*

Quality Management

- *A mine was unearthed by a farmer on land that had been released two years previously. The NMAA, in accordance with its NMAS, commenced a full investigation. Completion reports indicated that the land had been released through NTS. However, further investigation revealed that certain accreditation documents of the NTS team that had released the land had not been completed, and that members of the team did not have the required training and experience to undertake NTS. The NTS processes had not been conducted in accordance with NMAS and that this had led to land that contained mines being incorrectly released through NTS. An accident subsequently occurred on land released through NTS. Many in the local community lost confidence in the LR process and despite the land being reprocessed correctly, large areas of cleared land remained unused decades later, as local farmers were wary that further mines remained.*

Information Management

- *In the immediate aftermath of the conflict, there was a high expectation on mine action operators to release land quickly in urban communities where displaced populations were returning in high numbers. While a comprehensive IM system was being developed, mine action operators began clearance, in some instances using rudimentary recording tools such as spreadsheets on team members' laptops and using terminology that had not been defined by NMAS. Once the IM system was launched, it became apparent that some of the data recording systems that had been used to store clearance data*

lacked key information, and in some cases, data had been lost. Further, organisations had in some instances used the same terminology to mean different things or had used different terminology for the same thing. The lack of an adequate IM system at the start of operations meant that it was no longer clear what methods had been used to clear several SHAs/CHAs, and in some instances, whether areas had been cleared at all. This led the NMAA to redeploy clearance assets to clear areas that might have already been cleared. The overall LR effort took much longer as a result and added substantial additional costs to the mine action programme budget.

The Land Release Process

Clearance

- *In Country D, in accordance with SOPs, mechanical assets were set to excavate CHAs to a depth of 30cm. This was to ensure that all AP mines were found at a depth of at least 25cm, as set out in the NMAS. Subsequent clearance data showed that no mines had been located deeper than 20cm. Despite this evidence-based analysis the NMAA chose to ignore the new information and decided not to review the NMAS requirements. Managers within the NMAA were afraid that a mine could be found at a greater depth and that they would be held responsible for any accident that occurred. Maintaining the deeper clearance requirement was therefore considered the safer decision for managers but resulted in land being released slowly. Over the longer term, the country was later required to seek an extension to its clearance obligations under Article 5 of the Anti-Personnel Mine Ban Convention.*

Annex B
(Normative and Informative)
References

The following normative documents contain provisions, which, through reference in this text, constitute provisions of this part of the standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of the standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid ISO or EN:

a) IMAS 01.10 Guide for the Application of IMAS;
b) IMAS 02.10 Guide for the establishment of a mine action programme;
c) IMAS 04.10 Glossary of mine action terms, definitions, and abbreviations;
d) IMAS 05.10 Information management for mine action;
e) IMAS 07.10 Guidance and requirements for the management of Land Release and Residual Contamination Operations;
f) IMAS 07.11 Land Release;
g) IMAS 07.12 Quality Management in Mine Action;
h) IMAS 07.14 Risk Management in Mine Action;
i) IMAS 07.30 Accreditation of mine action organisations;
j) IMAS 07.40 Monitoring of mine action organisations;
k) IMAS 08.10 Non-Technical Survey;
l) IMAS 08.20 Technical Survey;
m) IMAS 08.30 Post-clearance documentation;
n) IMAS 08.40 Marking mine and ERW hazards;
o) IMAS 09.10 Clearance requirements;
p) IMAS 09.11 Battle area clearance;
q) IMAS 10.10 Safety & occupational health - General requirements;
r) IMAS 10.20 Demining Worksite Safety;
s) IMAS 10.30 Personal Protective Equipment.

Informative:

t) Technical Note 07.11/01 Land Release Symbology;
u) Technical Note 07.14/01 Residual Risk Management.

The latest version/edition of these references should be used. GICHD holds copies of all references used in this standard. A register of the latest version/edition of the IMAS standards, guides and references is maintained by GICHD, and can be read on the IMAS website (http://www.mineactionstandards.org/).

National mine action authorities, employers and other interested bodies and organisations should obtain copies before commencing mine action programmes.