KEY PERFORMANCE INDICATORS (KPIs) FOR LAND RELEASE AND STOCKPILE DESTRUCTION OPERATIONS

Notes on a New Technical Note for Mine Action

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In March 2021 the International Mine Action Standards Review Board (IMAS RB) adopted by consensus a new Technical Note for Mine Action (TNMA): Key Performance Indicators (KPIs) for Land Release and Stockpile Destruction Operations.[1] The TNMA detailed new Common Counting Rules for land release outputs, identified elements of Context Capture at points of data entry and underlined the need for operational staff to prioritize the collection of relevant good quality data. The purpose of this article is to set out why the TNMA was developed and explain certain aspects of its content, particularly those where prolonged debate was necessary in order to achieve agreement.

In its most basic form, the TNMA is a list of thirteen suggested operational KPIs that organizations may wish to consider when designing the dashboards they use for operational oversight and management. They may also be considered by donors when developing their reporting requirements. However, the KPIs are in no way obligatory; they are there to be used if considered helpful. The KPIs are disaggregated in broad headings, such as Land Release, Planning and Progress, Open Burning and Detonation, Safety, Reporting, and Compliance.

The TNMA was subject to prolonged discussion by a Technical Working Group (TWG) of the IMAS RB over the course of 2020.[2] The TWG included representatives from DCA, DDG, FSD, HALO, MAG, Mine Action Review, NPA, HI, and UNMAS.[3] It debated at length the key issues of Common Counting Rules for Land Release outputs and Context Capture at the Point of Data Entry.

One example of how individual KPIs are detailed in the TNMA is meter squared per explosive ordnance item (m^2/EO item).[4] This KPI is a useful metric when assessing land release operations but, like all KPIs, may be subject to misrepresentation. The TNMA tries to present this KPI in a way that, while acknowledging how it may be misused, demonstrates how it can be used well. Firstly, the importance of situating the KPI in context is emphasized. For a typical m^2/EO item KPI such as meter square per anti-personnel mine (m^2/AP mine), the meters squared might very well be quite low when clearing dense minefields in a country like Sri Lanka, and quite high when clearing nuisance/low density minefields in a country like Bosnia and Herzegovina. The KPI could tell us equally about the nature of the contamination in a country as about the operations there.

Also, this KPI can be used to discern different factors about a given land release activity. For example, m^2/AP mine can help us understand the efficiency of a clearance plan for a pattern minefield. If for a comparable site this figure is 20 m^2/AP mine, but on the site in question it is 200 m^2/AP mine, this may imply inefficiency. However, in the same scenario, it might also be an indicator of the effectiveness of survey and operational planning that targeted the clearance. As with all KPIs, m^2/EO item does not necessarily lead to hard conclusions, at least not immediately. The TNMA emphasizes that analysis of KPIs should invariably lead to more questions being asked to understand why a given KPI apparently indicates what it does. There might be a number of explanations as to why we could see 200 m^2/AP mine instead of 20 m^2/AP mine in the clearance of seemingly comparable minefields. It could be inefficient clearance or ineffective survey, or another explanation to do with a particular context. The key point is that indicators based on "data of a higher quality"[5] induce managers to find out why and allow us to know and understand our operations better.

The comparative use of the m^2/AP mine KPI for a set of tasks is also demonstrated. For example, the dataset in Figure 1 shows a comparison of results in one country over different timescales (before 2009 in blue, between 2009 and 2012 in red). The red line sits below the blue line suggesting that later operations are more "efficient" than earlier ones. A range of influences could be significant: later operations could have benefited from initiatives such as the adoption of improved concepts and methods of land release that took place around then. Additionally, improvements could reflect a general learning curve over time as a result of managers repeatedly encountering similar sites and

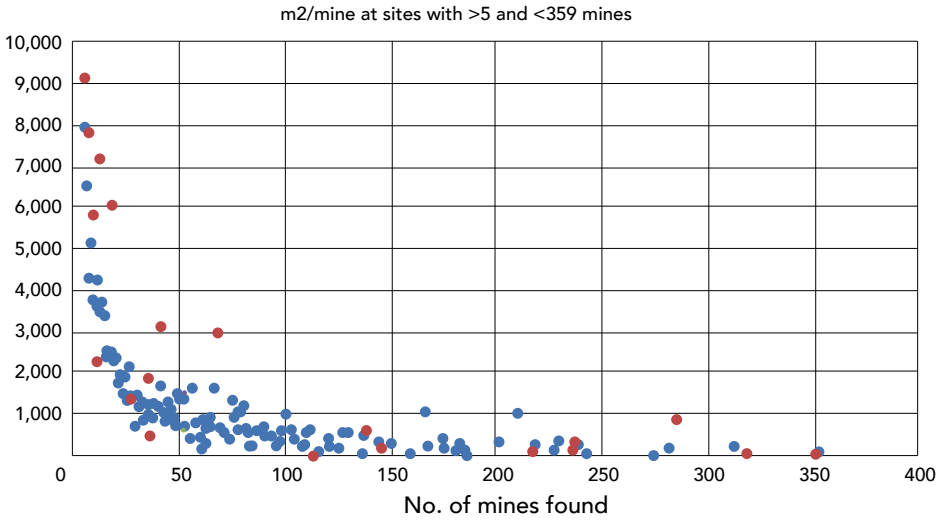


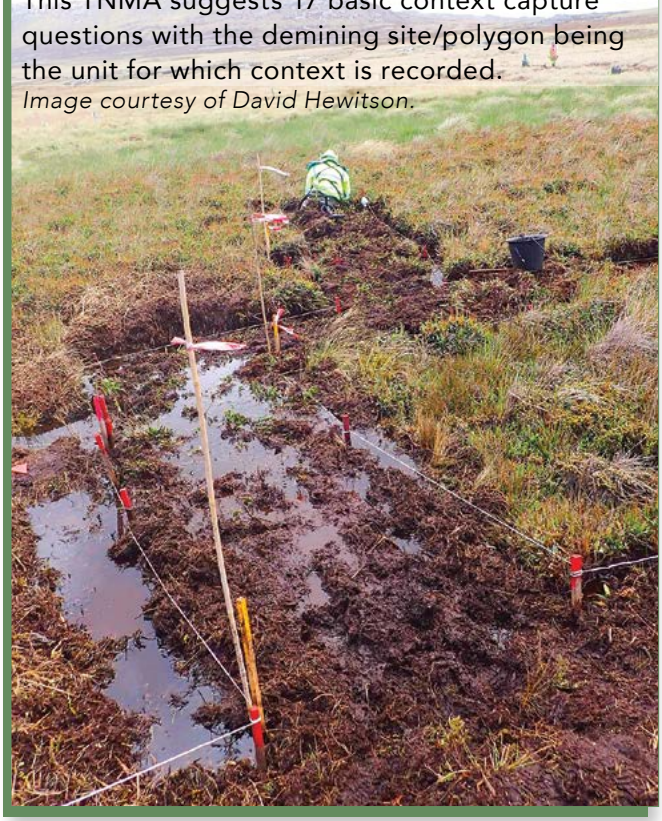
Figure 1. Analysis of m²/AP mine by number of mines at a site, including "best fit" curves, Afghanistan pre-2009 in blue, 2009–2012 in red: Survey Action Center (SAC) Afghanistan Database Project 2012; the fact that the red line is lower than the blue line implies an increase in average land release targeting efficiency within the pre- and post-2009 figures (base data provided by the MACCA).
Figure courtesy of David Hewittson.

circumstances. Other factors could also explain apparent differences in performance. For those conducting operational analysis, drawing on skills similar to those used in the root causes analysis or those found in quality and safety management systems may be necessary to understand why differences in performance occur and to identify appropriate management responses.

One theme that is emphasized throughout the TNMA is the need for good quality data. Unless the data that any KPI is based on is true and accurate, the KPI may not only be useless, it can also be misleading. Good quality data requires two things initially: well-designed forms and operational staff who understand that appropriate data collection is an essential part of their job. Forms that capture data, while not overburdening field operators, are not as common as we may like to imagine in mine action. Typically, it is only feasible to collect a finite amount of data about operations. Overambitious levels of data collection can result in lower quality data collected. What data is prioritized for collection is a choice. Operations managers should be clear about exactly what they want to measure and ensure that no superfluous data is collected when designing their operational forms. For this reason, design of data forms for operations should be led by operations managers. Moreover, all field personnel should not only be actively trained in data collection, they should use KPIs daily so that analysis becomes a norm and they appreciate the value of the data they collect. In short, if KPIs are relevant and help field staff perform better, and if operations managers closely quality control data collection, field staff will take more care in collecting the all-important data that feeds the KPIs in the first place.

The need to try to reflect the context of a given KPI, not least to assist in an explanation as detailed in the hypothetical 20 m²/AP mine and 200 m²/AP mine example discussed previously, is also covered in the TNMA. Capturing even basic context will allow those examining data with no connection to the operations on the ground—and thus no intuitive knowledge of a given context—to understand why a given performance is indicated in certain KPI figures. However, capturing context at the point of data entry is not necessarily straightforward. For example, hard ground presents a significant challenge to manual deminers. How best to capture this context in a dataset? Should there be basic descriptors such as low, medium, or high and in which case how do we make valid comparisons if one individual would judge ground hard, but another might judge it as medium? Other issues include a lack of agreement about what would constitute heavy, medium, or low metal contamination. Would the threshold for heavy contamination be five indications per m² or ten indications? Agreement on this proved elusive. The imperfect compromise that resulted was just to capture as much context as practical with simple Yes or No questions. The TNMA details seventeen context capture questions that may be used by operators. The unit of measurement is the site or polygon as recorded in a task order or clearance plan. Where conditions vary significantly within a given site, the operator may consider splitting the site for reporting purposes. Given that conditions change as a site is processed, the point of context capture should be the first day of Technical Survey (TS) or Clearance.

Figure 2. Demining in saturated ground in the Falkland Islands. Capturing Context at the Point of Data Entry is difficult to do effectively. This TNMA suggests 17 basic context capture questions with the demining site/polygon being the unit for which context is recorded.
Image courtesy of David Hewitson.



Like-for-Like Principle

Analysis of performance invariably entails some form of comparison. In order for any comparison to be valid, data is required to be collected and reported in the same way: the application of the *like-for-like* principle. For example, for KPIs involving time, the unit of time must be standardized. The length of a working day can differ between organizations and countries, but an hour can be compared on a like-for-like basis. The same principle is true for teams, the size of which can vary. Thus, it is better to adopt a comparable "unit" such as a deminer. As a rule, the lowest common denominated unit should be chosen for a given KPI. For these reasons, KPIs such as m^2/deminer/hour are preferred.

The like-for-like principle becomes more challenging for land release outputs. While the key terms "*Cancelled*," "*Reduced*," and "*Cleared*" were last defined in the most recent editions of IMAS 07.11 Land Release,[6] those definitions were still open to a significant degree of interpretation. For example, clearance might entail full excavation in a demining lane on one site but be interpreted as only a visual check on another. This TNMA aimed to at least try to sharpen the definitions of key land release outputs. While some progress was made, it would be wrong to suggest that definitions are now fully clarified.

Cancelled land is now defined as "Areas designated as a SHA/CHA,[7] or part thereof, which have **not** been physically processed in any way, and meet set cancellation criteria. This includes areas re-designated as either SHA/CHA as the task progresses. Cancellation may be done at any stage of the LR process."[8,9] The key for such a definition are the cancellation criteria, which we are yet to develop in many National Mine Action Standards (NMAS) or International Mine Action Standards (IMAS). *Cleared* is now defined as an "area where the organisation has applied a process, or processes, to ensure the removal and/or destruction of all EO hazards from the specified area to the specified depth. Where multiple processes are applied to the same area to achieve the clearance standard, the area shall only be reported once, although the processes that achieved clearance may be recorded in order to reflect the accumulated effort applied."[10] What those processes should be remains undefined.

Cleared versus Reduced Land

The TWG spent a long time debating what constitutes *Reduced* land. A significant sticking point was whether land processed to a clearance standard during the course of technical survey could be counted as *Cleared* rather than *Reduced*. Some operators were adamant that it should be, emphasizing the need to record the effort that goes into releasing a site. However, this is not necessarily straightforward. For example, a grid of lanes is not easy to disaggregate as processed to a clearance standard from the areas they encompass that are not processed to the same standard. This is especially true for those demining operators who don't employ Differential GPS when surveying progress on their sites. Some pointed out that it would be simpler to try to maintain these areas as one coterminous unit, bounded as a polygon. This view prevailed. Of course, if EO is found on-site, inevitably what on one day might have been recorded as *Reduced*, by default becomes *Cleared*. For this reason, land release outputs should typically reflect the respective totals on the last day on site.

The new definition also emphasizes the need to capture exactly what was done to land counted as *Reduced* and where it was done: "Within an area reported as reduced, organizations shall record clearly where is processed and where is not. Area processed shall be further disaggregated into those subject to manual, mechanical and ADS processing, with multiple processing of the same area by different assets recorded in detail."[11] The *Reduced* figure is not counted multiple times, but the processing, possibly the repeated processing, that

Figure 3. The edge of a minefield marked by the Iraqi Mine Clearance Organisation (IMCO), Iraq. The new TNMA has attempted to add more definition on what is Cancelled, Reduced, and Cleared land, albeit full definitions will depend on the development of agreed criteria, most likely at a national level.
Image courtesy of Roly Evans.

Figure 4. A deminer processing land by means of raking. What constitutes clearance was one of the topics subject to debate by an IMAS Review Board Technical Working Group during the development of this TNMA. Further definition will most likely require the development of transparent criteria.
Image courtesy of Roly Evans.

produces the figure is different and is captured (most likely in daily reporting). In this way it is hoped the effort that goes into releasing a site is recognized, but pitfalls such as multiple counting of the same meters squared as released is avoided. Ultimately, at the point of handover, the combined meters squared of *Cancelled*, *Reduced*, and *Cleared* should equal the surface area of the polygon, with reasonable margins allowed for topography.

Another issue of significant discussion was how to define clearance; specifically whether the actual removal of an item of EO was a requirement for clearance to have taken place. The discussion was based on the need to try to reduce instances where many meters squared are reported as cleared without any EO removed. A number of operators were adamant that there will always be instances of sites that were cleared in good faith based on a reasonable level of evidence providing sufficient justification at the time. These operators believed such instances should still count as clearance even if no EO is actually removed. This was the viewpoint that prevailed in the TWG despite some concerns about the need to minimize clearance of uncontaminated sites. One of the benefits of standardizing KPIs such as m^2/EO item is that such instances will be more easily identifiable as they occur. There may be a reasonable explanation as to why no EO was found during the clearance of a site. The important thing is to find, document, and learn from that explanation. Hopefully instances of clearance where nothing is found will become increasingly rare.

The Common Counting Rules[12] outlined in this TNMA are not mandated by a *shall* statement as might be found in a full IMAS. However, they have been approved by the IMAS RB. When IMAS 07.11,[13] 08.10,[14] and 08.20[15] are reviewed, these terms will possibly be incorporated into that revision, along with the standard updating of IMAS 04.10.[16] The definitions may be seen as a step on the road to a clearer explanation of the key land release outputs, but they are certainly not the final word. There remains a degree of ambiguity with definitions still open to interpretation. How land release outputs are reported and counted in the coming years will need to be closely monitored to see how well these revised definitions are serving the sector. Ultimately definitions for each land release output and activity will require criteria, at least at a national level, in order to be fully transparent. It might be said that until clear criteria are developed for land release outputs and activities, they will not be sufficiently defined. The development of criteria is an important and overdue task for the future.

Determining Cost

Noticeably absent from the TNMA are any KPIs dealing with cost, specifically cost per meter square (cost/m²). Historically this is a difficult KPI to calculate since there is no Common Counting Rule for the cost element of this KPI. It could be that only "operational" costs are counted, or that all costs including overhead support costs are calculated. Fixed price contracts tend to give a clearer view concerning the real cost/m², but even in this context figures can be misleading. It could be that organizations with a significant existing footprint in a given country, where equipment is already procured and imported under a previous contract, might be able to artificially reduce their operational costs. Some estimate initial deployment costs at 30 percent of a first-year budget.[17] While many donors would welcome a clear common counting rule for cost, or maybe a defined disaggregation for different cost categories (e.g., operational cost, operational cost minus equipment, overall cost, etc.), it was not possible to agree on a cost/m² during the development of this initial TNMA. It is hoped that if this TNMA is revised in the future, development of a cost/m² KPI will be possible.

It should be stated clearly that operational KPIs are just a number, or a metric, that inform us about our own operations. They are not necessarily targets. If KPIs are used to set targets, that may well be positive, but it should be done with a degree of care. Many in mine action are aware of targets such as mines destroyed being prioritized in the past. In certain circumstances this incentivized clearance of sites where there were high volumes of contamination rather than those where a higher socioeconomic impact was possible.[18] Scenarios such as this are not a reason for not using KPIs, they are a reason for using them well.

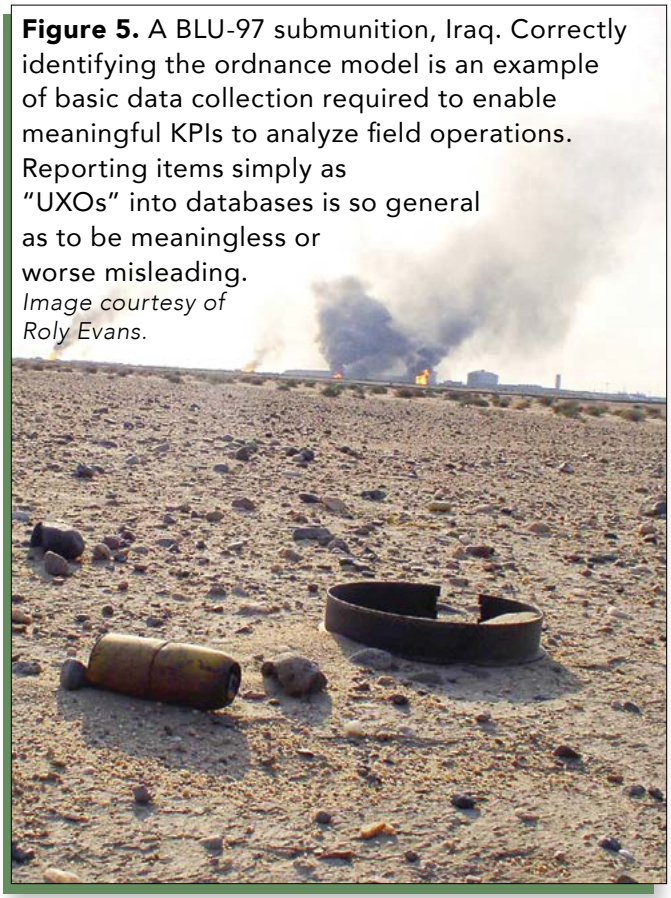


Figure 5. A BLU-97 submunition, Iraq. Correctly identifying the ordnance model is an example of basic data collection required to enable meaningful KPIs to analyze field operations. Reporting items simply as "UXOs" into databases is so general as to be meaningless or worse misleading. *Image courtesy of Roly Evans.*

Figure 6. Inspection of BETAB-500 concrete-piercing aerial bombs. It is important such items are reported into databases in detail and not just as abandoned unexploded ordnance (AXO) or worse, misidentified as unexploded ordnance (UXO). *Image courtesy of Roly Evans.*

Figure 7. An NPA cluster munition remnants survey (CMRS) team prepares to move to a new search box in Saravan, Lao PDR. CMRS better targets subsequent clearance efforts, producing better m²/submunition cleared figures.
Image courtesy of Roly Evans.

This TNMA should be seen as a starting point. As with all TNMAs, it is intended to complement the broader issues and principles addressed in IMAS. It also supports a key element of the 2019 Oslo Action Plan that made multiple references to the importance of analyzing good quality data.[19] Until now, IMAS have had no agreed standard definition of performance or standard way of measuring performance. This has had an impact on how well we can analyze and subsequently improve our operations. This TNMA should at least start to address this issue. It is in no way a final word on how we collect operational data and analyze it. In its simplest form the TNMA can be seen as a list of suggested KPIs that mine action operators, national mine action authorities, and donors can consider when analyzing operations. However, in many ways its main focus is improving the quality of data on which KPIs are based, enabling a real analysis of that data by operations staff. Doing so while recognizing the context, even in a limited way, is key. For without good quality data counted in a standardized way, KPIs can actually be misleading. Hopefully this TNMA will contribute towards development and use of suitable KPIs that are not misleading and that actively support mine action operations.

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BIOGRAPHIES

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