Landmine Impact Survey: Measurement and Display of Suspected Hazard Areas

The purpose of a Landmine Impact Survey (LIS) is "to facilitate the prioritisation of human, material and financial resources supporting humanitarian mine action at the national, regional and global level." The LIS process provides a different approach by measuring the socio-economic impact of landmines on affected communities. The global application of the LIS has successfully refocused attention away from a purely quantitative measurement of a mine and UXO threat to a qualitative assessment of impact on mine-affected communities.

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Introduction

The planning of safe, effective and efficient mine action requires accurate, appropriate and timely information. During the early stages of a mine action programme, the availability of such information may be limited. Over time, however, systems are established to collect, collate and evaluate information on the landmine threat and its impact. Such information is needed for planning at the strategic and operational levels and should be made available in a timely manner to planners at the national level (normally the staff of a mine action centre), to implementing partners such as demining non-governmental organizations (NGOs) and to other stakeholders such as the donor community.

Prior to the development of the LIS process, the scope and nature of the landmine problem was generally expressed in terms of the number of mines, the total area of land contaminated, or a combination of the two. The LIS process provides a different approach by measuring the socio-economic impact of mines on affected communities. The Survey Working Group (SWG) defines the purpose of LIS is "to facilitate the prioritisation of human, material and financial resources supporting humanitarian mine action at the national, regional and global level."

The global application of the LIS has successfully refocused attention away from a purely quantitative measurement of the mine and UXO threat to a qualitative assessment of the impact on mine-affected communities. Impact surveys have been completed for six countries: Yemen, Chad, Mozambique, Thailand, Cambodia and Azerbaijan. Surveys are underway in Bosnia-Herzegovina, Eritrea, Ethiopia, Lebanon, Somaliland and Vietnam and are scheduled to begin shortly in Angola and Afghanistan.

Those countries that have benefited from a full impact survey should have sufficient information to enable efficient and effective mine action planning. Notwithstanding the success of the global landmine survey programme, there is an ongoing debate on whether the LIS provides sufficient "technical" information on the landmine and UXO threat. It has been suggested that a national LIS should provide more detailed information on hazardous areas (by defining polygons) to enable the more efficient use of limited technical survey and clearance capabilities.

Following discussions at the SWG meeting in Geneva in February 2003, Cranfield Mine Action (CMA) was invited to prepare a discussion paper for consideration at the next SWG meeting.

Information Needs

An LIS forms part of a much wider information-gathering process within a mine action programme. In order to assist with the planning process, information is required on such issues as the scale and impact of the landmine problem; suspected areas of mine or UXO contamination; quantities and types of explosive hazards; and general information such as the security situation, terrain, soil characteristics, climate, routes, infrastructure and local support facilities. The name given to this process within International Mine Action Standards (IMAS) is General Mine Action Assessment (GMAA). The purpose of a GMAA is to continually gather, evaluate, analyse and make available sufficient information to assist and update the strategic planning of a national mine action programme.[1]

The information from an LIS addresses several of these issues, but it has its limitations. For accurate technical information on a threat at a given location, a technical survey is required. A technical survey is a specific operation conducted to gather the detailed technical and topographical information of known or suspected hazardous areas.[2] It is the usual pre-curser to clearance, with the primary aim being to collect sufficient information to enable the clearance requirement to be more accurately defined, including the area(s) to be cleared, the depth of clearance, local soil conditions and vegetation characteristics. The LIS process is not designed to gather such information, but that is not to say an LIS should not define the extremities of Suspected Hazard Areas (SHAs) as accurately as possible. As it will be shown later in this article, even small inaccuracies can have significant cost implications further along in the demining process.

The status of information gathered during an LIS must not only be as accurate as possible, but it must also be placed in context. For some reason, once a polygon is drawn on a map, it tends to gain a certain status out of proportion to the method used to put it there in the first place. Such information becomes very difficult to alter or remove at a later date through any means other than technical survey or clearance. The reliability and accuracy of information leading to an amendment of such data should be commensurate with the reliability and accuracy of the information that put it there in the first place.

Stakeholder Needs and Expectations

The key stakeholders[3] in a national mine action programme have different needs and expectations for an LIS. Mine-affected communities, who provide information to survey teams, expect that their participation in the LIS will lead to timely and effective demining interventions in line with their own priorities and needs. Clearance organisations expect the LIS to provide information to assist them with their own management decisions. In particular, they require information in sufficient detail to enable them to conduct technical surveys and other follow-up activities effectively, efficiently and safely. The information includes:

- The boundaries of suspected contaminated areas and technical details of the threat
- The proximity of settlements to SHAs
- The type of terrain and vegetation cover
- The condition of routes and the proximity of medical facilities and other relevant infrastructure
- The number, frequency and types of accidents that have recently occurred

There is an expectation from clearance organisations that the LIS will lead to an enhanced service from national mine action authorities—including a logical and transparent prioritisation system and annual work plans. National mine action authorities need information that will allow them to coordinate and/or manage mine action resources in the country. They need to be able to set mine action priorities based on the country's development needs so as to ensure that the mine action programme is focused on realising the wider goals and objectives of the national government. They will need information with which to develop a national mine action strategic plan, especially for the socio-economic impact of mines on affected communities, the extent of the contamination and the prevalence of victims. Finally, they will expect that this information will allow them to define the problem in such a way as to assist them with resource mobilisation. International organisations and the donor community require information that enable the mobilisation of resources and assists in funding decisions. The LIS enables the donor community to target programmes for clearance, training, mine risk education (MRE) or victim assistance.

LIS Outputs

The LIS process has four primary outputs:

1. It provides information on mine and UXO victims and general behavioural patterns.
2. It provides general information on topography, infrastructure, conflict history and threat.
3. It provides information on the socio-economic impact of mines and UXO on affected communities.
4. It provides an indication as to the general extent of the contamination in SHAs that correspond to these communities.

These primary outputs enable a wide range of other processes and activities to take place. Information on victims and their behaviour enables victim support activities and programmes to be focused where they are most needed and provides information useful for the development of MRE activities. General information is used for the planning and preparation of operations by a number of different actors, including mine clearance operators, technical survey teams, MRE and victim support organisations, national mine action authorities, and numerous bodies and organisations from outside the mine action sector.

The measurement of socio-economic impact enables a ranking of communities to occur based upon the level of impact. This information can then be used in the development of a national mine action strategic plan, which in turn assists with prioritisation, resource management, coordination and resource mobilisation. Information on the general extent of contamination is used to determine the physical resources required to deal with the problem. This includes the number of technical survey teams that will be required to define the area required for clearance and estimates as to the clearance resources required.

Effectiveness

The LIS process generally meets the needs and expectations of most key stakeholders. Affected communities are prioritised according to their needs, if not always their expectations, and follow-on activities that generally address their own stated priorities. National authorities receive information on affected communities that greatly assists them in meeting their prioritisation and strategic planning responsibilities while the information provided to regional organisations, international organisations and donors allows them to make more informed funding decisions. However, mine action operators do not receive the type of information that they want and need to do their work.

While mine action operators gain a large amount of the general geographic and topographic information they require from an LIS, the fact that the process is designed to provide information at a more strategic level means that information of direct operational use is limited. For example, most mine clearance operators require information on the extent of SHAs so as to plan follow-up activities as accurately as possible. They would like this information presented graphically so as to show the estimated boundaries of each SHA, i.e., a polygon. But because the LIS process allows for the use of data enumerators that do not have mine action-specific training, they are less able to use experience and judgment to make decisions on the scope of an SHA. Additionally, and perhaps more importantly, there are no guidelines on the minimum amount of time or level of effort that should be invested in the information-gathering process in each community. This allows for superficial assessments to be made and important detail on the extent of SHAs to be overlooked. Due to the type of work involved, technical survey and clearance represent the two of the most expensive activities in mine action. When the extent of the area to be cleared or surveyed is not accurately defined, then large areas of uncontaminated land can be dealt with unnecessarily.

Accuracy of Delineation of SHAs

There is a tendency to overestimate the size of SHAs. Impact surveys rarely use experienced deminers or technical surveyors, and safety margins are often included around each SHA. However, such margins become subsumed into their parent SHA and as such exaggerate the scale of the problem. And in due course, they also have to be demined-at a cost.

To illustrate this point, data from the SHAs corresponding to 495 high-impact communities recorded in the Cambodia impact survey were examined to assess the effect of small changes in the accuracy of the outer edge of the SHA. For example, if the dimensions of each SHA are reduced[4] by just 25 m, the overall size of contaminated land is reduced by 76 million sq m.

Assuming a cost of $1 (U.S.) per sqaure meter to conduct technical survey on this area, the potential savings are significant. In practice, of course, not all of this additional land will need to be cleared and much may be released through area reduction during technical survey. However, even if just 10 percent of this land remains to be cleared after technical survey, there are still potential savings of some $7.6 million to the programme.

Finally, the defacto standard, the Information Management System Mine Action for (IMSMA), displays the estimated affected area as an indicative circle centred on either a point in the village/community or a viewing point[5] rather than representing the situation on the ground. This can have the effect of confusing the true location of the SHA when displayed graphically.

All of these factors lead to frustration on the part of many mine clearance operators who believe that such a survey should provide them with information for use at an operational level. With the average cost of an LIS now around $2 million, there is a feeling among some mine clearance operators that their operational needs should be addressed as part of the LIS process. The problem is that this requirement conflicts with those of the other stakeholders due to the potential increases in time and cost that such changes may bring, as well as the increase in the potential for misuse or misinterpretation of polygons depicting SHAs.

Recruiting enumerators with a background in demining for inclusion in the survey teams and developing guidelines detailing the recommended minimum amount of time to be spent in each community would address these problems. It would help to ensure that more in-depth information on the extent of SHAs is gathered and recorded during the "visual inspection" phase of the survey. This information would be represented as polygons on the sketch maps produced during the community interview/visual inspection process and subsequently geo-referenced in IMSMA or geographic/geospatial information system (GIS) for succeeding analysis. However, it should be made clear to planners and policy makers using the survey data that these polygons would simply represent the suspected contaminated area and that all planning and resource allocation should be conducted with this in mind.

Summary and Recommendations

While the LIS process is a far more effective means of measuring the scope of the mine action problem than previously existing methods, because it does not demand accuracy when defining the size of SHAs, it can overstate the problem significantly with implications for all stakeholders. Furthermore, by not portraying the hazardous areas in a usable way, it neglects the needs of one of the most important stakeholders: the demining operators. It is therefore recommended that:

1. Technically qualified personnel be included in the survey teams to assist with a more accurate delineation of the SHAs.
2. Guidelines be developed outlining the minimum time to be spent conducting community interviews.
3. Polygons be recorded during the visual inspection phase of the LIS process and that these be geo-referenced using an appropriate GIS.
4. The LIS component of IMSMA be altered so SHAs are portrayed as polygons as the default setting.

Review

The general mine action assessment is not an end in itself. As stated earlier, it should normally be subject to continuous review with new information being added and the implication(s) of that information being adequately addressed. In particular, changes to assumptions and to the reliability of sources of information should be revisited on a regular basis and the implication(s) of these changes examined fully.

National Mine Action Authority

Responsibilities and Obligations

The national mine action authority is responsible for the regulation, management and coordination of mine action in a mine-affected country and for ensuring the national and local conditions that will enable the effective management of mine action projects. The national mine action authority is ultimately responsible for all phases of a mine action programme within its national boundaries, including the general mine action assessment. In particular, the national mine action authority shall establish and maintain a system and procedures for the collection, collation, analysis and dissemination of information on the mine and UXO threat and its ongoing impact.

Glossary

Extracts from IMAS 04.10
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General Mine Action Assessment

The process by which a comprehensive inventory can be obtained of all reported and/or suspected locations of mine or UXO contamination, the quantities and types of explosive hazards, information on local soil characteristics, vegetation and climate, and an assessment of the scale and impact of the landmine problem on the individual, community and country.

Note: These elements of the general mine action assessment can be conducted concurrently or separately.

Impact

The level of social and economic suffering experienced by the community resulting from the harm or risk of harm caused by mine and UXO hazards and hazardous areas.

Note: Impact is the product of:

a) The presence of a mine/UXO hazard in the community.

b) Intolerable risk associated with the use of infrastructure such as roads, markets etc.

c) Intolerable risk associated with livelihood activities such as agricultural land, water sources and distribution.

d) The number of victims of mine and UXO incidents within the last two years

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Impact Survey

An assessment of the socio-economic impact caused by the actual or perceived presence of mines and UXO, in order to assist the planning and prioritisation of mine action programmes and projects.

Technical Survey

The detailed topographical and technical investigation of known or suspected mined areas identified during the planning phase. Such areas may have been identified during the general mine action assessment or have been otherwise reported.

Endnotes

1. IMAS 08.10
2. IMAS 08.20
3. Defined in this paper as affected communities, mine action operators, national authorities, regional/international organizations and donors.
4. As the shapes of the SHAs are unknown, circles were used to demonstrate the reduction of area in a consistent manner. Circles also represent the minimum reduction of area; polygons would show even greater reductions.
5. Design setting; this can be by passed by using the "Dangerous Area" component of IMSMA.

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