Working notes for Information Management in Mine Action

Geneva International Centre for Humanitarian Demining
Centre International de Déminage Humanitaire - Genève

The **Geneva International Centre for Humanitarian Demining** supports the efforts of the international community in reducing the impact of landmines and unexploded ordnance (UXO). The centre is active in research, provides operational assistance and supports the implementation of the Anti-Personnel Mine Ban Convention.

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Introduction

Since man's earliest efforts to organize hunting and gathering, and then agriculture, managers have recognized that "knowledge is power". Knowing where to find game or when the rains might come could make individuals into kings and conquerors. In today's complex and rapidly changing world, knowledge continues to be a very powerful instrument. But how and where do we get knowledge? What kinds of knowledge do we hold? And how can we manage the extensive information available to us and transform it into knowledge?

This guide is designed to help managers in mine action answer these questions so that they can build effective information management systems.

Like any project, information management requires careful planning, hard work and the use of appropriate tools for the given task. The following pages outline strategies for building knowledge through the collection, preservation, use and dissemination of information. The guide concludes with a short introduction to the new Version 3.0 of the Information Management System for Mine Action (IMSMA) and an example of how it is being used to support Mine Risk Education efforts.

The information management cycle

Planning for information management

The first step in information management is the development of a plan of action — leading from the decision to actively manage data to the final use of the data managed. This may seem like an obvious starting point, but all too often information managers overlook this key element. Plans can vary from being very simple to complex, formal or informal, but without exception they should always include a clear outline of the goals to be achieved by the management of information. Good plans should include an understanding of the whos, whats and wheres of the local situation and guide everything that follows. Taking the time required to develop a plan saves time and funds and makes the information manager's job much easier.

One of the key elements in every information management plan should be a clear picture of the local situation and of who will be involved in the information management process. Be careful not to think that all the actors involved have sufficient and adequate knowledge of either each other or of the local situation. For example, while it may be obvious that the country or region is involved in a conflict situation it might be very difficult to determine, without a thorough investigation, what kind of information gathering will be feasible under the circumstances.

The plan of action should outline both the needs and goals of the information management process. The institution(s) or organisation(s) involved should have a clear and defined list of their needs, and of what they hope to gain from the data gathered. Moreover, the needs and goals of a data-gathering process must agree with the overall analysis of the situation and of the actors involved. The needs and goals must be adapted to the situational reality and to the actors who can and will be involved in the process. Knowing the goals before starting will make it much easier to know when they have been reached.

Irrespective of what the goal might be, information management should always address four basic components. These are *data collection (sources, methods, trials and monitoring)*, *preservation*, *use* and *dissemination*. Every programme will have a different mix of these basic components, but all will be included in some form or another. The suggestions that follow should assist in defining the right combination of components for any one individual programme.

Data collection — sources

The first step in information management is generally data collection. No data management system, IMSMA or otherwise, will be able to produce a good product from bad data. We have all heard the old adage "garbage in, garbage out": the problem is that it is sometimes difficult to know what is bad data and what is not.

One way to begin separating the garbage from good data is to identify what type of data is needed, how it will be gathered and who has it. Data on mine accidents, maps of mine fields, demographics and other items of interest may all exist already, but knowing which sources to use and where they are is not always clearly evident. The following short list may help to identify some of the data sources available.

State sector

State or governmental data sources refers to governmental organizations working at national or regional level. State data sources can include statistical and geographical information centres; the armed forces; ministries and departments of government such as health, education, police, agriculture, transport, parks and human rights, to name but a few.

Ombudsman offices may also hold important information. The information available from the state sector can include census information, the location of key infrastructure such as schools or hospitals, or information on individual landmine accidents.

Private sector

Private sector organisations need to gather information in order to conduct their operations and this can include substantial information on the population or sectors of the population and or geographical area. Oil and mineral producers, for example, often gather information on local infrastructures; energy and transportation companies often have information on transport routes; communication agencies and the media hold key information on effective information dissemination methods.

Non-Governmental Organisations (NGOs)

As the name indicates these organisations are not linked to the government in an official manner. These include national associations, which by their nature unite sectors of the population (e.g. retired armed forces personnel, unions or religious organisations); other examples include organisations involved in humanitarian, emergency or developmental support (e.g. victim assistance, education, and health care/prevention). NGO data sources are most often directly linked to the type of programme or project they are conducting (e.g. information on landmine victims with prosthetic providers).

International Organisations (IO)

International organisations are, as their title indicates, characterized by the international scope of their work. IOs are often required to gather information before or during their work. Much like NGOs, they often have information on specific geographical areas or sectors of the population. Examples of this type of organisation include the different agencies of the United Nations system, regional organisations such as the Organisation of American States (OAS) and military alliances such as the Inter-American Defence Board (IADB). Again the type of information IOs are likely to hold will be most often directly linked to the type of project/programme they are conducting.

With all these types of organisation, it is important to keep in mind that they are often independent institutions governed by a wide variety of laws and internal regulations. Thus they may not be willing, or able, to make their information available. In some cases it may even be difficult to find a consensus among all of those involved in mine action that the information being asked for is indeed needed to support mine action.

Good data collection efforts not only focus on who will be involved in providing the raw information, but also on how the data collected will be used and disseminated.

Data collection methods

Data can be gathered through a variety of different methodological approaches. Some of the most commonly identified and effective methodological tools are outlined below.

Surveys

Surveys are written questionnaires characterized by the ability to provide substantial amounts of data in standardized form. Using this data-gathering method eases considerably the data analysis process. Surveys are most often used to target specific individuals or groups of people who can provide relevant information. The value of the data is strictly linked to the quality of the survey (how it was designed, worded and conducted) and the target groups (did it target a relevant population). One example of the use of survey as a data-gathering approach in mine action is the Landmine Impact Survey, which gathers data on a regional or even national basis from communities that are affected, or believed to be affected, by landmines.

Interviews

Interviews are normally more flexible than surveys, in terms of the data that can be gathered. Interviews can provide non-standardized information that may lead to unforeseen changes in data gathering, or the effects of gathered data. Interviews may even be used as key sources for the creation of effective survey tools. The collection of expert opinion through interviews during the Landmine Impact Survey process is an example of this technique.

Literature reviews

A literature review involves the use of secondary data. This is information which has been gathered and written-up or published for other purposes. In some cases, secondary data may be the only source of information available and/or viable, for example in a country with active armed conflict. Even if primary data can be gathered (e.g. surveys and interviews) secondary information can substantiate, reinforce and support the primary data. This form of data gathering may also be useful in providing leads to new information sources. Examples of secondary data sources include the news media, hospitals, published details of national social and economic priorities and records of mine action activities such as technical survey information or clearance reports. Literature reviews are most often conducted by using one or more of the following data sources:

Archive searches

Archival data gathering refers to the search and compilation of information which is contained in a specific place but which may have been gathered for different purposes. Good examples of this are health record information, which may be held at hospitals and can hold key data regarding mine accidents.

Publication reviews

These can range from independent reports to newspaper articles. An article on landmines found in a particular area of a country may yield useful data that may lead to changes in the geographical focus of the data-gathering exercise, for example.

Institutional reports

This includes a wide variety of documents relating to specific activities conducted by individual institutions or organisations working in the mine action arena. These reports are most often produced by individual organisations about their own specific programmes (e.g. Mine Risk Education efforts) or actions (e.g. drama as an MRE method).

Data collection trials

After clearly reviewing the existing realities (situational and actor analysis, programme needs and goals, information sources and the methodological tools available for use) a specific strategy for data collection should be selected. However, selection of a strategy should not be an end in itself. The strategy selected should be subjected to field trials to test its effectiveness and practical application in the field. This field-testing allows for the discovery of flaws in the plan before the process leads to wasted time and/or funds.

After the trials the selected strategy may need to be modified. It is important to remember here that any approach to information gathering can be refined and perfected. Hence the conduct of trials and the subsequent process of strategy modification should not be solely regarded as a way to fix mistakes, but also as an opportunity to improve an already good product. After the trials are finished and the data gathering process has been adjusted data gathering work can begin.

Monitoring data collection

Once work is underway it is important to monitor the process closely to ensure that it is providing the type of information required and that the methodology selected is being appropriately used. Again, feedback and adjustments designed to improve the result of the data collection effort are

key to success. To this end it is important to keep in mind the importance of the role played by the individuals collecting the data. Their impact on the outcome can be both positive and negative. Avoiding personal bias, remaining objective and paying close attention to detail are all important for successful outcomes. Conversely, lack of attention to detail and assuming the answer before asking the question are attributes in a data collector that can ensure the failure of the data collecting process.

Data preservation

While gathering data is the first step in the information management process it is of little use unless the data collected is properly preserved. To this end an information management system should store data in an orderly and logical manner. In most cases this is done using some automated or computerized process. The Information Management System for Mine Action (IMSMA) is an example of one such system.

No matter what system is used it is important to be sure that all of the data preserved is valid. Data validation can be difficult under the best of circumstances, but efforts expended at the early stages of data collection pay big dividends in the end product. One factor that makes data validation difficult is the wide variety of formats in which the data arrives. Data developed for entry into computerized systems such as IMSMA may be received digitally, while other data may arrive on hand- written mine action standard forms or be gathered from interviews or non-standard mine action surveys in the field. This does not affect its quality per se, but it does mean that the person handling the data must understand the source and purpose of the data. One simple way to ensure this link is to assign the final user of the data the responsibility and authority to preserve and validate it.

To avoid the “garbage in garbage out” problem, one of the most important tasks to conduct during both the data collection and preservation processes is data validation. Data validation refers to the process of confirming the reliability and validity of the information gathered. This process is of principal importance because if the data is incorrect the value of an information management system is drastically reduced. Clearly the ultimate goal of managing data in mine action is to provide support to field operations. The success of the information management system in reaching this goal is directly linked to the reliability of the information it contains.

It can be very difficult to make a good assessment of the validity of any information. The large number of factors involved in data validity means that it is nearly impossible to verify every aspect of every report. Despite this there are a number of checks that can, and should, be made to ensure the reliability of the information collected and preserved. These checks can be grouped into the following two categories.

Format based reviews

This involves checking whether or not the information received is complete. This can be as simple as looking at the forms submitted to ensure that all of the required data has been collected. It can also mean checking to ensure that all of the reports required have been submitted to the national coordination body, or data managing organisation, by the individual organisations responsible. Format based reviews are often linked to data collected or preserved by an easily identified organisation or group. Often there are contractual agreements that govern the data gathering efforts of these organisations or groups. This means that the receipt of incomplete information may be reason for direct discussions with the data provider or review of the contracting agreement.

Data support reviews

This type of review is based on performing a crosscheck of the data received against other known sources of the same data. In other words finding data that corroborates the information obtained. Finding support or corroborating information can be done in a variety of ways including the use of archives, public sources or expert reviews of the data. Data support reviews are most often used in connection with information provided by ad hoc sources. This often means that the data does not follow a pre-defined format and that no formal and/or ongoing relationship exists between the collector/data provider and the information management system. These factors can make it difficult to detect or correct errors in the data.

Finally, the importance of transparency in the entire data collection and preservation process should not be overlooked. Combined with proper validation procedures transparency in data-handling activities can make the difference between a trusted and valuable information management system and one that is poorly understood and mistrusted. Indeed a lack of transparency and confidence in the content of a database can easily outweigh any benefit produced — no matter how good the data collection, validation and preservation process might be. Data providers should therefore be encouraged to be as open and transparent as possible regarding the sources of data, and the manner in which data is collected. Moreover, all actors must have a clear understanding of the objectives and uses of the data gathered.

Clearly, no matter how much information is available it can be difficult to effectively use it if it is not properly organized. This applies irrespective of the system being used. Pins in a map, spreadsheets, hand-written notes and computerized databases can all be effective tools, *if* they are properly organised. In other words it is of key importance that data is preserved in a standardized manner irrespective of the format in which it was received or the system being used to preserve it.

Using data

One way to put data to use is in its "raw" or unprocessed form. The use of "raw" data refers to employing information which has not undergone an analytical process (i.e. information which is simply compiled and reproduced). A second way information can be used is after it is analysed. Analysis may be as simple as grouping data sources together so that they can be easily compared and show possible relationships between different factors. It may also include sophisticated geo-spatial or mathematical processes. No matter what system is employed or how an analysis is accomplished it is important to remember that an experienced human being must always determine the meaning of the data. Systems can only compile information in response to given questions. They do not define the questions or explain the reasons behind the findings. IMSMA and other systems can provide information about what has happened, but cannot explain why it has happened.

Being able to maintain and manage information is an essential element of success for an effective information management system. In the real world data is dynamic and maintenance can be simply defined as the process of adapting to meet the changing needs and conditions of the real world. In order for data to remain an effective and useful tool it must actively reflect changes in the environment. Effective information management means that programme managers can more easily and quickly define priorities, assign tasks and undertake operations in the field.

Disseminating data

All of the above steps set the stage for dissemination of the data. Dissemination of data is often regarded as the single most important aspect of information management. Sharing information can be guided by a variety of goals but these should never cloud the fact that, as with data collection, *transparency* should be a primary consideration. Including the widest possible number of groups in the data sharing process is one way to improve transparency.

Plans for data sharing should include not only data gathered for the specific purpose at hand, but also archival information gathered for other purposes at earlier times. The latter can be especially useful when primary data gathering is restricted due to security conditions or other factors. Finally, data sharing can provide positive feedback to the data collectors and broaden the opportunity for data validation by making information available for review by the community at large.

Data is normally distributed in the form of reports produced by the information management system to assist in the mine action process. The reports are based on the data available in the system and should be readily adaptable to the changing needs of the programme. Simple changes to the way in which data is extracted from the system or how it is collated can make significant differences in the reports

produced. It is well known that different stages and aspects of the mine action process require different kinds of information. This translates into the need for different products at different stages of the mine action process.

The following suggestions should help to create reports that are easy to understand and support the goals of the programme.

- Reports should be easy to understand and clearly outline the source and date of the data being presented.
- Reports should help assess whether or not national mine action goals are being met.
- Reports should be linked to the real-world needs of the programme and not based on what can be easily produced or on what is readily available.
- Reports should be easily adapted to meet the changing needs of programmes.
- Reports should only be produced to fulfil identified needs. Production of reports should not be arbitrarily timed: they should be produced to provide the needed information at the needed time.
- Standardized reports make it easier for users to understand the information being presented. They also make it easier to compare various aspects of the work being accomplished.
- Keeping the number of different standard reports available small makes it easier to maintain and support the reporting system.
- Report generation should be a process driven by field users. This helps to improve user confidence in the reliability of the data and the system being used.

Restarting the cycle

Data sharing should not be viewed as an end to the cycle of information management, but a chance to assess progress and improve operations. Above all, information management should be driven by the needs of the field users. Successful systems change and adapt over time to reflect these needs. Closing the information management loop takes us back to the planning stage and ties together all of the activities involved.

IMSMA — the Information Management System for Mine Action

The Information Management System for Mine Action is a data management tool which has been expressly designed to assist with the management of the information needed to implement efficient and effective field programmes in mine action. The principal focus of the system is demining, but it also provides support for the collection of victim and Mine Risk Education (MRE) data.

IMSMA Version 3.0

Despite the introduction of a number of new functions in Version 3.0 of the system the general handling of information within IMSMA has not changed significantly. As in previous versions, IMSMA V.3.0 is a client – server system, based on the Microsoft Access User Interfaces (IMSMA.mdb). The most important addition to V.3.0 is the replacement of the Microsoft Access data base engine for data handling activities. The new system retains Access for its user interface while using MSDE for data handling. The use of this free version of SQL Server provides a number of user benefits including improvements to system reliability and an increase in the number of simultaneous users possible.

Perhaps most importantly, SQL Server enhances the security and reliability of the system by reducing the possibility of database corruption. In the unlikely event that corruption does occur, a number of built-in back up and restoration features, along with a set of IMSMA specific administrative tools, make it easier to make repairs. The use of this customised IMSMA tool set for administration means that the administrative tools available to full SQL versions are not needed to use IMSMA.

Apart from some SQL syntax changes, which are important in the design of database queries, no structural changes have been made. This means that for the average user occupied with entering and processing data the change will be entirely transparent. However, system administrators will find that some additional knowledge of SQL Server may be required to maintain and support the system. But the change does not require an in-depth knowledge of SQL Server. Additionally, it is important to note that there are key structural differences between SQL Access and SQL Server. This will make it necessary to ensure that any customised queries and views are made compliant with the new Microsoft SQL Server protocols.

The introduction of the SQL Server has provided the opportunity to make some changes to the table structure designed to improve system performance. The changes include a restructuring of the ammunition information (to increase the level of user friendliness) and the addition of the tables for recording MRE activities and agency archival information. The principal tables, containing process and object information — such as Minefield, Dangerous Areas or Clearance — have not been modified. Again, these changes are transparent to system users, but are noted here for the benefit of system administration and maintenance staffs.

The new Mine Risk Education function provides support for the storage and retrieval of data relating to MRE activities by organisation and location. IMSMA MRE permits the user to store information on mine action actors, their individual capacities, resources and tasks assigned.

In support of the MRE function a standard system for the assignment of a status to mine action activities or areas being tracked was developed. Built-in error-checking

routines help managers to ensure that both areas and activities follow logical workflows by flagging possible work sequence errors. This allows managers to more easily track and monitor the work carried out in support of mine action. While originally designed for MRE specifically, this function is also linked and provides the same kind of check to all other activities registered in IMSMA.

Finally, improved organisational and task tracking extends the ability of managers to ensure accountability and provides an additional base from which to examine the need for, usefulness of, and the end result of the work being accomplished by each organisation. The combination of these new functions should greatly enhance the ability of the system to support the planning and monitoring of MRE activities.

Preparing for the upgrade to Version 3.0

IMSMA V3.0 has already been released for Pilot Testing and will be distributed to all IMSMA users beginning in 2003. The IMSMA team will be visiting all IMSMA locations to provide assistance with the installation and training for V3.0. Clearly it may take some time for the installation team to reach all sites. Yet once the visit is planned, IMSMA users can carry out a number of tasks to prepare for the installation or upgrade visit.

First, a task of crucial importance, the creation of a back-up of the whole system. The importance of doing this cannot be over-stressed. As with all system back-ups it is recommended that the back-up be stored off line with copies maintained in secure locations off site whenever possible.

Second, any local modifications or add-ons should be copied so that they can be introduced into the new system once it is installed. If this task is not conducted all modifications made will be lost as soon as the system is updated to V3.0.

Third, plans should be put in place to provide the core staff with training on the new system. Sites should plan to include not only the technical and administrative staff, but also operations officers and mine action management. Clearly all training will be tailored to the needs of the individual category of participants.

IMSMA NG

Looking to the future, the next generation of IMSMA or IMSMA NG is already in the final design stages. Planned for release in 2004, IMSMA NG will build on the lessons learned from the work already completed and current updates from the field. Planned enhancements include an improved user interface based on the functional role of each system user, improved reporting and analysis functions and simplified data entry and retrieval. While the focus of the system will remain support to field operations, improvements to the existing Victim Data, and Mine Risk Education

modules and the addition of a Quality Assurance function will add new support mechanisms for operations and programme managers.

IMSMA NG will move from the design phase into coding and development over the next 12 to 18 months. A pilot test lasting several months will thoroughly test the system in the field before it is released for general use. In the meantime IMSMA V3.0 will continue to be supported and maintained based on requests from the field.

IMSMA as an information management tool

Support to Mine Risk Education

The earlier sections of this guide focused on the general principles of information management and the steps that must be taken to develop reliable support systems. This section focuses on the IMSMA MRE functionality as an example of how IMSMA is being used to meet new needs. To this end our gratitude is extended to the management and staff of the Nicaraguan Mine Action programme and the OEA-PADCA offices in Managua for their cooperation and support during the development of this part of the guide.

This example describes the integration of the IMSMA MRE function into an ongoing mine action programme. The IMSMA MRE function was first installed as part of the V3.0 Pilot Test in Managua in October 2002. Before then there had been active MRE projects/programmes in the Republic of Nicaragua for a number of years. Activities were conducted by a wide variety of organisations including UNICEF, OAS-PADCA and the Red Cross, to name just a few. Records of these activities were not generally maintained centrally, but instead were available individually from the organisations supporting the various programmes.

One of the first steps in the integration of IMSMA MRE was the development of a plan to locate, collect, and validate the available information. The sources included both paper and digital records in a variety of formats. Planning made it possible to gather the data and make it available in IMSMA within 90 days of the V3.0 installation. The planning stage of the process included the creation of the reports needed to support the analysis of the data based on locally defined needs.

During the data collection process a close review of the existing data forms and of the available data revealed that most reporting was linked to activities rather than organisations. This made it difficult to track the work of the wide variety of organisations taking part in MRE activities. The data validation process helped to identify this as a potential problem and lead to the design of a single standard data collection format for MRE. This new standard format links organisations to tasks, which should improve the ability of managers to track work progress and outcomes by organisation. These changes were directly based on local needs and local initiatives. This simple change will make it possible to organise the MRE information

collected in a manner that helps the programme to enforce a clearer process of accountability.

Once data collection and validation had been accomplished, attention was turned to putting the data to use. A small number of simple standard reports were developed in order to disseminate the information collected. Some of these were based on raw data while others focused on a geo-spatial analysis of the data. This included the creation of a number of different map products designed to highlight the impact of MRE on a geographic basis.

In Nicaragua, the principal goal for IMSMA MRE support was to provide data that could be used to plan future activities. The identification of this goal during the planning stage helped to focus attention on the key data elements needed to support MRE planning. These elements were then included in the custom reports and used to form the basis of the analysis functions developed.

While these efforts have all contributed to the ability of local managers to more easily assess MRE activities and their role in mine action it would be difficult to quantify their impact on the programme. Having more and relevant data readily available can, for example, assist in making assessments of the impact of MRE activities on accident rates and the behaviour of at-risk populations. Unfortunately, as pointed out earlier, only skilled and experienced analysts can judge the effectiveness of the efforts carried out to date. However, using IMSMA MRE can provide the initial information needed to make a more complete assessment of the success of the different projects and approaches that have been used.

Finally, efforts are already underway to complete the information management cycle by using the experience gained to guide future activities. Future work may include:
improvements to the way MRE data is mapped and its relationship to other mine action activities;
increased use of the available national demographic data and its relationship to MRE; and
improvements to the data filtering techniques used during the analysis process.

These tasks and others will help local users to adapt IMSMA MRE and the entire information management system to better serve their needs.