Geographical Information Systems and the Management of Humanitarian Programmes

by HPN

Many of the hundreds of reports written, nutrition surveys carried out and evaluations undertaken by NGOs and UN agencies are never released into the public domain, despite the often critical need for information during the course of a humanitarian programme. Those that are released are often of limited use because data has been collected and presented in response to individual agency requirements rather than the broader needs of all of those involved.

A number of reasons help to explain why the sharing of information is so limited: relief operations often take place in rapidly-changing environments, with information quickly becoming out-of-date; poor road, rail and air links may make it difficult for agencies to meet to swap information; there is often no single body with the mandate and capacity to manage information flows in the field; and postal systems may be weak or non-existent.

Competition between agencies may also be a factor. Recent technological improvements, such as easier access to Internet and local E-Mail systems suggest, however, that much more can now be done to overcome some of these constraints.

A number of NGOs and agencies already make use of the Internet system, to cut the cost of sending reports between the field and headquarters, and to access extensive worldwide sources of information (see RRN Network Paper 13 -"Getting On-Line in Emergencies: A Guide and Directory to the Internet for Agencies involved in Relief and Rehabilitation").

However, very few humanitarian organisations seem fully aware of the considerable potential of modern forms of communication. In recognition of this, DeLorme Mapping - a US-based commercial company, selling computer software, including a detailed digital world atlas - has set up Response.Net, a non-profit subsidiary, in the belief that the appropriate use of technology can be a significant tool for humanitarian organisations.

Response. Net is currently developing a low-cost mechanism for the coordination of humanitarian assistance, involving the setting up of an 'open' geographical information system (GIS) in the field of operations, that can be freely accessed by humanitarian organisations to provide timely, accurate and reliable information. State of the art Internet technology, and a digital map system are both fundamental parts of this mechanism, so that any region of the world can be brought on-screen and then overlaid with information from a geographical database.

Response.Net is offering its maps, software and expertise, without charge, to humanitarian organisations, to improve the coordination of relief operations, and to give its parent company practical experience of operating international 'open systems' that may benefit non-related commercial endeavours.

A GIS is a database in which data can be processed and then presented geographically, in map form.

The use of such information systems in the management of humanitarian operations is nothing new: GIS were established in former Yugoslavia, for example, and in Mozambique during the peace process of 1992-94. However, the maps and the software available from Response.Net considerably enhance the potential usefulness of a GIS.

In Mozambique, the GIS was managed by a single organisation - DHA/UNOHAC - which collected data from UN agencies and NGOs working in the country and then presented it in map form. At a glance, it was possible to see, from the shading used to locate imbalances in the number of NGOs working in health; food deficits or surpluses; shortages of seeds; high rates of malnutrition; mined roads; etc.

Although useful as an accompaniment to the planning process, the time taken to enter new information into the database, publish and distribute the findings, meant that the system was always out-of-date.

In addition, the information was not sufficiently disaggregated, presented at district-level only. Significant differences in rain-fall, harvests, population density, access to health-posts etc, could occur within a district, as well as between districts. It proved impossible to improve both the timeliness of the data and the level of detail, however, for more detail meant considerably more time spent collecting and then processing the data.

The Response.Net approach, where information is provided and then made available through the Internet, or through a

locally-created E-Mail system, means that as soon as an agency has prepared a report or dataset and posted it on the system, it can be immediately accessed by any other agency in the field.

Considerable problems remain to be overcome, but, before considering these, we present an edited account of the experience of Ian Attfield (now with the Emergency Unit for Ethiopia) of developing a GIS for managing and disseminating information on the humanitarian relief effort inside Rwanda.

The Rwanda GIS was established within the Integrated Operations Centre (IOC) - a joint UN/Rwandan Government body, set-up originally to coordinate the return of internally displaced persons (IDPs) to their places of origin.

"Soon after my arrival, in April 1995, the IDP camps were shut down by the army and the IOC consigned to history, its tasks superseded by the Humanitarian Assistance Coordination Unit (HACU) of the Ministry of Rehabilitation.

The IOC/HACU database was developed and run using Microsoft Access software, incorporating maps prepared using XMAP - a Geographic Information System provided by Response.Net.

The information entered into the Rwanda GIS was collected primarily from NGOs and international agencies operating within the country, the former being generally much more cooperative regarding the sharing of information!

A core fact sheet was prepared for each of the approximately 200 organisations present, combining information on the organisation with basic details of the projects in which they were involved, namely the types of activity undertaken, and their geographical location (prefecture or commune).

Important regional information was also compiled into commune profiles (Rwanda is divided into 145 administrative communes) listing demographic and general data regarding agriculture, infrastructure damage, security and humanitarian activity.

This data was gathered from diverse sources such as agency surveys and reports from field officers working in the appropriate commune.

Much of the information in the database was included as free text, entered under general sectoral headings, such as health, water and sanitation, etc. Attempts to keep updated records on emergency stocks were abandoned due to the impossibility of collecting the required information on a regular basis.

Initially, print-outs were provided containing information on projects and communes, the telephone contact list always being one of the most popular.

In addition, XMAP was used to display data such as refugee camp locations, its graphic output used in handouts and reports. However what made the database useful and popular was that an updated version was distributed monthly on diskette, with interactive software 'embedded' in the database, so that users with only a standard desk-top computer running MS Windows - a requirement met by most operational organisations - could undertake certain operations as if they had sophisticated database software themselves.

Without such an approach, users would have required more powerful computers, expensive database software and expertise in managing databases to carry out the same operations.

A simple-to-use Windows interface was developed to allow users to view and print required information. Maps that had been prepared using XMAP were embedded into the database so that users could also view and print these. As XMAP requires a CD-ROM for operation this provided a service beyond the reach of most NGO's.

A local E-Mail system was set up, the server (a computer dedicated to communicating with others, that receives and transfers E-Mails and computer files) provided by the NGO Mission Aviation Fellowship. NGOs, with just a computer and modem, could access a 'bulletin board', and receive electronically updated reports from the database, for example on the daily numbers of returnees from the refugee camps.

Considerable problems were encountered in operating this service: an intermittent power supply and a backup generator broken for three months; telephones cut off for weeks at a time and a poorly trained and bureaucratic ministry staff.

At one point, for fear that it would not be returned, a Ministry official refused to let a broken computer be taken from the building to be repaired for free at the UN workshop, despite the fact that the computer had been donated by the UN in the first place. Ironically, the official's fear was not misplaced, as the computer's VDU eventually 'disappeared' from the UN workshop, never to be seen again!

The Ministry of Rehabilitation sometimes found itself in conflict with some of the NGOs with which it worked. The negative effects of such conflicts were mitigated to some extent, however, by the existence of the database within HACU: NGOs appreciated the useful information service it provided. The database acted as a central point of contact to answer one-off questions on a multitude of topics, including unrelated technical queries such as computer virus clearance techniques.

The database was used in internal assessments of ongoing projects and the location of future ones, pinpointing, for example, areas not covered by an NGO health programme. The tasks of information officers were also facilitated by the provision of information that could be directly passed on to donors and head office or pasted into reports that were being independently written. Copies of the database have been passed on to agencies to provide reference sources and Response.Net have placed reports from the database onto the Web for global consumption.

The value of information services is always difficult to quantify; the strategy used here of low cost collation and distribution of existing data provided a useful, time saving service that helped organisations make informed decisions about a difficult, volatile region of the world."

One of the factors limiting the usefulness of the Rwanda GIS was that many of the reports provided by NGOs and agencies were in textual form.

If these were posted onto the system as they were, NGOs needing information on malnutrition rates in a particular commune, for example, would first have to search through a huge quantity of unrelated text. T

he alternative, however, would involve someone in the IOC/HACU laboriously going through each report, sorting all the information sectorally and geographically. Given staffing constraints, the information would have been out-of-date by the time it was processed.

Ideally, when GIS are set-up, agencies and local government need to be involved from the very beginning to ensure that the service is capable of meeting their needs. Commercial companies do exist (eg GISL: contact gisl@gisl.co.uk) that can help set-up the initial data collection systems, analyse information received and then incorporate it into a GIS.

Response.Net are currently supporting SCF-US in the development of the AzerWeb, in Baku, Azerbaijan. This initiative, funded by DHA, is similar in many respects to the Rwanda GIS, involving the setting-up of an E-Mail system and a bulletin board.

Information is sorted by sector - health, nutrition, water and sanitation, etc. - with the system managed by SCF-US, but accessible to all. A detailed digital map of the country is also provided, on which bridges, warehouses, refugee camps and other features can be superimposed.

A user can 'click' on an icon and bring on screen information on the capacity of a warehouse, the number of refugees in a camp, the state of a bridge, etc. Similarly, where sufficiently detailed maps were available, a user could 'click' on a town and access a street map, showing individual houses. This could be used to prepare an evacuation strategy in case of conflict. Agencies in the field can obtain the maps either through the local E-Mail system, via Internet or on diskette.

Response.Net seems to offer an extremely valuable service. It does, however, require that humanitarian organisations are open with their information, and more 'technology-ready' than they are at present. They need to adapt their own reporting procedures for the common good: presenting textual and data information separately, in a standardised geographical and sectoral format.

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