Effective Information Systems for Disaster Mitigation

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THIS ARTICLE HIGHLIGHTS DESIRABLE CHARACTERISTICS OF AN EFFECTIVE INFORMATION SYSTEM (IS) USED FOR DISASTER MITIGATION OR EMERGENCY SITUATION MANAGEMENT. SUCH AN IS CAN BE DEFINED AS A STORAGE AND RETRIEVAL SYSTEM THAT PROVIDES NECESSARY INFORMATION TO USERS FOR A SPECIFIC PURPOSE BEFORE, DURING AND AFTER A DISASTER OR EMERGENCY EVENT.

Examples of users and their requirements are: community leaders for events monitoring; disaster managers for current situation management; crisis action teams for rapid deployment of resources; experts and scientists to share specific knowledge and skills; local and international communities for benefiting from available knowledge; and the media for accessing accurate background information.

An IS should facilitate co-operation and synergy by allowing for storage and retrieval of information through multiple access points. This in turn promotes interaction between national, regional and global organizations, both horizontally among peers and vertically between the various levels of government and international disaster mitigation organizations and local communities.

Despite recent progress in information technologies and information management, no single system has yet emerged to completely satisfy all the requirements of the diverse groups of users, although some are coming close in their specialized fields of expertise (Reliefweb, EPIX, Hazardnet, etc.). The proliferation of disaster and emergency information systems shows the increasing demand for relevant information and the ongoing efforts to satisfy the varied user requirements.

Purpose and Function of an Information System

The primary purpose of an IS is either to serve as a management tool in the management of crises or emergencies or to serve as a research and educational tool (and usually as an archive and a storage system of historical data as well). A typical disaster mitigation IS today serves both primary functions, but seldom equally well. There are significant differences between management information needs and the needs of the continuing research, education/training and historical data archiving .

An effective management IS system must provide information that is precise, case-relevant, specific, up-to-date and quickly available by a variety of access methods. Delivering what users want and where they want it in a timely and precise (executive) form with additional detail available if needed is of paramount importance.

Simple and robust methods of retrieval and delivery are preferred to proprietary or experimental means, ensuring that the IS is not vulnerable to disruption during disasters or accidents, when there may be bottlenecks in delivery systems or a shortage of qualified operators. Diversity of depository sites, telecommunications paths and means of access and delivery are very important. Simple, tried-and-tested formats of data and information are preferable, particularly when an international community of practitioners is involved.

The IS systems for research, training and educational purposes can be broader in concept and context, providing more depth and even historical data and collateral information, which can be in the process of validation or development. The IS must be cost-effective, as developers and users are frequently publicly funded organizations, universities or experts in the parts of the world where affordability is a major concern. What constitutes good value for that particular system needs to

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be periodically assessed and care taken that any duplication of effort is avoided. An effective information system should be simple to access by a variety of means and simple to operate.

A system can be designed to support both of these major functions by basic design and structure or by using the already available information retrieval tools that can do that in an efficient, user-friendly manner. It is important that the IS is available both before and during the crisis event. After the event, feedback should be processed quickly to incorporate lessons learned, thus improving the system all the time.

Cost-effectiveness and affordability are important to the final users

An important aspect of effectiveness is for the information to reach all the intended recipients - be it a handful of managers or the widest number of communities. The cost of doing so is obviously important as well. Going away for a moment from the fact that in the middle of a crisis the right bit of information is priceless, even a disaster information system needs to be built and operated along sound economic principles of supply and demand. Affordability, i.e. the ability to pay for access to the system or to acquire required retrieval equipment varies enormously, and the most vulnerable regions or localities are typically at the lowest end of affordability.

The costs of designing, building, maintaining, updating and providing access (all supply side factors) can be very high. Obviously, if the system is accessed by a large number of users, or used frequently, it has achieved a lower cost per user or a ìhitî in the Internet parlance, than a system whose costs are similarly high, but caters to very few users or is used infrequently. The supply-side costs can be minimized by a choice of storage and retrieval technology, locating databases in least-cost locations, and using a variety of sources for the labour-intensive activities.

Contents: quality, availability and feedback

The usefulness of an information system hinges on the quality of information even more than on the choice of system or technology used. The quality that goes into generating, updating and validating the information, i.e. the content selection and preparation for use, is what ultimately makes an information system useful.

The reach of an IS into local communities and to experts may be vast. Therefore, a question of language may arise. While most international IS information systems are using English, regional or specialized systems may provide information in Spanish, French, Chinese or any local language of the country. How can the knowledge gained in one region be effectively made available in other languages? Maintenance of at least top-level information and content directories in several languages would increase the reach of an IS. Are automatic software-based translators what is needed?

Diversity of storage and delivery systems reduces vulnerability to disasters

An IS system that is impervious to disruption and delivers information under any conditions is obviously most desirable. Disruptions can occur both before and during an emergency event: a specific network (Internet, PSTN, ISDN, satellite) can be down (even destroyed) or overloaded at a specific node or along a specific route; hosting computer or its peripherals can suffer an outage; an operator can inadvertently cause a temporary but disruptive bottleneck .

Because such disruptions, however rare, are possible, they should be avoided by whatever means available. Using redundant, diversified paths for telecommunications networks, and using technology that is appropriate for the purpose, robust and easy to maintain are just two examples of ways of assuring the delivery of needed information before and during disasters and emergencies.

The hosts and depositaries of data should take all possible precautions to protect their sites from disruption. A whole new industrial discipline has emerged to deal with business continuity and disaster recovery - a good example are the efforts of IBM and others in this area.

Users can also contribute to disaster preparedness by having access to diversified modes of access: access to Internet and fax , even telex, by terminals able to use 2 or more networks: telephone, ISDN, mobile radio or satellite.

Conclusions

There is little doubt about the benefits information systems bring to disaster mitigation. IS builders, sponsors, contributors and managers deserve a special recognition for their major contribution to the improvements in disaster mitigation that occurred during the