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THE PROPOSED ESTABLISHMENT OF A GLOBAL DISASTER INFORMATION NETWORK (GDIN): THE SOCIAL DIMENSIONS INVOLVED*

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THE PROPOSED ESTABLISHMENT OF A GLOBAL DISASTER INFORMATION NETWORK (GDIN): THE SOCIAL DIMENSIONS INVOLVED

Introduction

In the last few years many proposals have been advanced to improve disaster planning and crisis managing by making much greater use of modern technologies. Most of these have focused on taking advantage of the explosion in information/knowledge as a result of the computer related revolution. We have discussed problematical aspects of these efforts elsewhere (Quarantelli 1997). However, our intent here is to examine a major proposal of a related but different nature. This is the proposed establishment of a global disaster information network (or in the acronym used, a GDIN).

Initially we outline the evolution of this proposal, which interestingly has been spearheaded by national security agencies. This is followed by a brief presentation of in what way and how disaster planners and managers might use a GDIN. We finish with an extended discussion of what we see as the major overall obstacle to the implementation of a GDIN. This is the slighting of the social dimensions involved in what essentially is an instance of technology transfer.

Our comments rest on two sources. First, we had a peripheral involvement in an evaluation of a Task Force set up to examine the feasibility of a GDIN. This involved us in informal interviewing, participant observations and document gathering. Second, we drew upon the social science literature, particularly the disaster research of the last 45 years (as summarized in Drabek 1986; Dynes, DeMarchi and Pelanda 1987; auf der Heide 1989; Kreps 1989; Drabek and

Hoetmer 1991; Cutter 1994; Dynes and Tierney 1994; Porfiriev and Quarantelli 1996; Sylves and Waugh 1996; Quarantelli 1998), as well technology transfer studies that have exponentially appeared in the last two decades (e.g., Jeremy 1992; Baker, David and Soucy 1995; Committee on Environment and Natural Resources 1995; Rogers 1995; Valente 1995; Kirkland 1996; Cooke and Mayes 1996).

The Historical Background

During the Cold War, both the Soviet Union and the United States extensively developed advanced technologies to spy on one another. Intensive efforts were made, such as through remote satellites, for the obtaining of intelligence information from outer space, but there were also similar although less well known ground and ocean data gathering technical systems. However, with the end of the conflict, the idea developed that what was once produced for military purposes could be used for peacetime activities. Thus, in the last few years there has been the advancement of proposals on how the wartime technologies and data producible from them could be used for monitoring risks in the environment, efficiently using natural resources, and the more effective planning and managing of disasters (for initial actions in the US, see Broad 1995; Pace, O'Connell and Lachman 1997).

A crucial step occurred in 1992 when the U. S. Central Intelligence Agency established the Environmental Task Force (ETF). It assessed the potential value of classified information from space and ground systems for the study of global climate change and other environmental research. The conclusion was that there was value in using the technical systems created for national security purposes to monitor the earth, ocean and the atmosphere, as well as data already gathered. This positive assessment of the ETF led to steps ranging from the declassification of high priority imagery data sets to efforts to identify new civilian applications from existing intelligence missions.

The idea of international cooperation in the area was given a strong impetus by a June 1995 U.S.-Russia meeting in Moscow, which created an Environmental Working Group (EWG) that:

> examines approaches to the use of space-based, airborne, oceanographic, and *in situ* products from national security collection systems for environmental purposes (Pace, O'Connell and Lachman 1997:9).

Current cooperative projects between Russia and the US include global environmental disaster monitoring, earthquake prediction, land use/forestry studies, and military base and radioactive facility clean up. In both countries also, as a low cost source of historical data, older satellite imagery has been declassified and published (e.g., US data from 1960-1972 on snowfall variations, deforestation, changing lake and stream patterns, Brugioni 1996; see also US-Soviet spy imagery 1996).

Stemming directly from EWG activities, the U.S. Vice President in a letter of February 26, 1997 requested that senior officials in Federal departments and agencies "discuss the feasibility of establishing a global disaster information network" (Pace, O'Connell and Lachman 1997: iv). Responding to that request, a Disaster Information Task Force (DITF) was set up to evaluate the need and feasibility of a network, the issues involved, and to outline a phased, integrated approach to collecting and disseminating all-source data and information to possible users.

The DITF effort initially focused on what relevant components of a network existed in the United States. Thus, much effort was spent on identifying the nature of the current sources of disaster related information available from Federal, state, local and private sources in the country. By looking at actual and possible interconnections, an attempt was made to see in what ways the information could be made more accessible to potential users. Another goal was to see what could be done to further the potential for public and private sector partnership in the implementation of a national network. It was also thought that would be found and what could be done at the domestic level would provide some cues about what might be expected globally. Although what just described occurred in the United States, actually this kind of examination would have to be done in any country contemplating joining a GDIN.

The DITF report reached four major conclusions. One was that there already exists a wealth of usable information and capabilities for an American domestic network. It was also concluded that while there were technical problems in its further development, they were relatively minor. A more serious issue was the need to improve the domestic organizational integration of all the stakeholders in the effort, especially those from the private sector. As such it was felt that the information network should be developed in a phased manner, starting with Federal level agencies, then involving other national level entities and only at a later stage implementing the international aspects of a GDIN. As the DITF final report (1997: 7) states:

> In summary, we are now in a position to take advantage of technologies that make it feasible to build a robust,

integrated, virtual network for the cooperative exchange of timely, relevant information through all phases of disaster management to save lives and reduce economic loss. Such a virtual network would consist of a knowledge base with data, information, sensor characteristics, analyses, and models contributed

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and utilized by a wide variety of stakeholders. This virtual network would connect people to resources and people to people. The information would be organized in a logical manner so that people with widely varying needs and levels of expertise could rapidly find and access what they need to know. The network would be a focus for cooperation in developing standards and tools for integrating data sets into products that could be used to take timely and appropriate actions.

We will not discuss further the historical evolution of a GDIN and its origins in the military

area. It is of interest that at least social science disaster research also had its initial impetus from the military area (Quarantelli 1987, 1994). That the military was involved in both areas is an interesting example of how social change can indirectly come from sources that many might consider unlikely. However, the logic of using any military derived technical systems and products for civilian environmental purposes are fairly clear. Thus, it has been written:

> The data are already being gathered, or have been gathered . . . for one set of purposes, and it may be possible to use the same data for another class of more public purposes. Thus, there is the potential to increase public welfare at some relatively low additional cost. Moreover, these data may represent unique observations, in both time and content,

> that can advance scientific understanding of the environment (Pace, O'Connell and Lachman 1997: x).

Now, a fuller analysis of the range of proposals that have been advanced about using modern technologies for the purpose of risk and disaster analysis would have to consider other trends and happenings in the civilian arena such as the growth in interest about global climate change (see National Research Council 1995). As an illustration, last year it was argued:

> Although forty years have passed since the launch of the first orbiting satellite, we have yet to put in place the integrated, international observing system that is needed to track significant global changes, to identify the marks of man on the natural environment, and to help separate concerns from false alarms. Coordinated, on-going measurements from the land and oceans and the vantage point of space, could aid immensely in understanding and predicting climatic and other environmental changes, now and in the future (Kennel, Morel and Williams 1997: i)

As examples of other current efforts, next month there will be a conference on using *Space Technologies for Disaster Mitigation and Global Health.* Earlier there was one on *Making the Most of New Real-Time Information Technologies in Managing Earthquake Emergencies.* But for various reasons having to do with what is already in place and the resources that can be mobilized, the GDIN proposal is currently in the lead (Including a US government financial commitment to further develop the network in 1999).

The Proposed GDIN

We turn now to the projected characteristics of a GDIN. The values or advantages of having such a network is only briefly indicated since they are relatively obvious. Therefore, our discussion will focus more on the less evident problems in any implementation effort. Also, although we have described the evolution in the United States because that is where the project was initiated, at this point we note the possibilities visualized from a GDIN if it were in place in any society be it Japan, Mexico, Great Britain, or Egypt.

According to its proponents, a GDIN has an infrastructure consisting of three elements or components: knowledge, interconnectivity and integration. The knowledge infrastructure includes:

> the systems of measurement, methods of data visualization and exploitation, information analysis, event forecasting, knowledge modeling, and data and information management.

The interconnectivity infrastructure consists of:

> the modes of communication employed to retrieve and distribute data, and to disseminate the information products, knowledge, and understanding developed within the knowledge infrastructure.

The integration infrastructure encompasses:

> the processes needed to ensure that the "mechanical" parts of the system are synchronized and that the "human" parts of the system are cooperating (DITF l977: 46)

Clearly one general assumption underlying the proposed network is that the available and possible information derivable from a GDIN is useful for better planning and managing. But in what ways? What useful products can be visualized from the proposed network? From the descriptions so far advanced, in the main the GDIN is seen as useful both for *data acquisition* and *data analysis*. The former as described (in DITF 1997: 37) would include "remotely sensed imagery, digital maps, and ancillary data (e.g., analog maps, graphs, census data, field reports."). In particular it is assumed that data from different sources could be fused. For example, digital maps could be derived from a combining of imagery data, hard copy maps, and information from field surveys.

As to data analysis, a GDIN would allow better "image generation, data fusion/integration,

GIS-derived product generation, and modeling and simulation" (DITF 1977: 37). It is especially assumed, for instance, that data layers from various could be combined within a GIS information set to generate relevant disaster information. For example, it would be possible to create a population density map that could assist planners and managers to more efficiently determine evacuation routes, calculate response times, and to predict the destruction of resources.

In addition, it is assumed that if disaster planners and emergency managers had specific data,

they could do a better job whether that was the application of mitigation, preparedness, response and/or recovery measures. Many of the derivable products could be used for multiple purposes. As an example, the DITF report notes it would be possible to model the following:

> Once an appropriate baseline data set is assembled, analysis can be performed for different disaster types. Combining digital products like FEMA's Q3 Flood Rate maps (modeled floods), USFS fire threat and drought data, and NOAA's storm surge models . . . can delineate at-risk areas. These analyses can yield potential threat maps for different disaster types such as population and infrastructure susceptibility, dangers to aquatic and terrestrial ecosystems, and potential hazardous material effects. This process can be enhanced using expert systems. Such analyses could identify areas that should be rezoned or regulated because of their susceptibility to different disaster types (DITF 1997: 39)

It is clear that even at the technical level, the overall process of data acquisition and data analysis is somewhat complex. For example, it is recognized that different modes of communication are needed to have information distribution between sensor readers, expert analysts, archival retrievers, model builders, and key decision makers. This would involve current and developing modes especially the Internet and subnets, wireless broadcast, fixed telecommunications, and documents. These are seen as having varying strengths and weakness for such factors as security, congestion control, cost, reliability, etc.

Because of such technical complexities, the assumption is that a GDIN must be built in an iterative fashion, and country by country. In the US, for instance, the first step necessary is seen as integrating federal level capabilities. The last domestic step would be a way to operate globally. With respect to the last stage, it is explicitly stated that "the GDIN is likely to evolve from the interconnecting of national networks" (DITF 1977: v)

Basically what is being proposed, at the global level, is an instance of *technology transfer*. Implicit in the approach is the notion that the most advanced technologies available be linked to less advanced technologies, to provide information/knowledge transfer from the former to the latter. Cooperation is stressed but it is clear that the flow is thought of as mostly one sided from the societies with the advanced technologies to those less advanced. Thus, there are statements that "disaster-prone countries . . . have minimal early warning or mitigation tools," that" a GDIN will be an incentive for improvements in such systems" and that "in many countries, the availability of sophisticated communications technology is limited" (Web site 1997b: 1). To be sure, much is said that GDIN ought to involve a partnership of governments, the private sector,

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NOS, and international organizations with remote sensing and communication capabilities. However, since it is explicitly recognized that national systems are uneven in their access to and use of the most advanced machines, methods and products, it is implicit that what is being proposed is an instance of technology transfer.

The Underlying Problem

Rampant in this approach is an equation of technology mostly with physical or mechanical artifacts. In our view, at the most general level this is the basic problem--the slighting of the social dimensions involved. Now social scientists conceptualize technologies as elements in *sociotechnical systems* (Nigg 1996; see also Bijker, Hughes and Pinch 1989; Bijker and Law 1994). Such systems are composed not only of the physical artifacts themselves but also of people and organizations who construct technological systems out of a variety of components (hardware, software, management procedures, experts and specialists, laws, regulations, research program, etc.) A focus on these elements forces a dynamic conception of the phenomena in contrast to the more static or artifact-centered view of technology.

To illustrate the implications of this broader view underlying technology for risk planning and disaster managing, let us note the major problem involved in the Bhopal disaster in India. Over 3,000 persons were killed and about 200, 000 suffered ill consequences from an accidental release of a toxic gas (methyl isocyanide) from storage tanks at a Union Carbide pesticide plant in that city of 670,000 inhabitants. Research has shown that what happened was mostly a failure in technology transfer (Weiss and Clarkson 1986; Bogard 1989; Meshkati 1991; Jasanoff 1994). The machine and plant technology for producing the pesticide, developed in the United States, was transposed more or less to Bhopal. However, because of differences between American and Indian societies, the accident and safety culture as well as the appropriate organizational work culture typical of many chemical plants in the United States never came into being at Bhopal. More generally, it can be said that much of the disaster planning that existed with respect to mitigation, preparedness, response and recovery in the American plants of the chemical company, never got transferred to the Indian plant.

Why was this the case? To a great extent it is because of cross-societal and cross-cultural differences, both comparatively and in terms of social change trends. In what follows we discuss ten issues or dimensions (relevant to disasters) that stem from such differences. There are major differences in values and beliefs as well as in social structures and social institutions, not to mention social experiences and social contexts. These do not automatically preclude disaster relevant technology transfer, the development of disaster planning and its implementation in the managing of crises. However, unless such comparative and dynamic factors are explicitly recognized and their problematical aspects for disasters addressed, attempts at transplanting technologies will not succeed. This is what happened at Bhopal. Few of the more relevant factors were recognized in that situation before the accident, with a major consequence being the worst chemical disaster in history.

> All national level social systems share some common elements (e.g., governmental entities).

Nevertheless, there are always significant differences between one society and another. They will also be at different stages of societal development. These must be recognized in any attempt to transfer, export or link any technology in one system to other systems elsewhere. At best such

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differences create difficulties and problems that need to be solved, at worst they make any transfer all but impossible. Any attempt to establish a GDIN is in that situation. In our view, the following factors affect the feasibility and the ease of going from the national to the global scene with respect to both having and using a disaster information distribution network. They are:

1. **The experiences with and social perceptions of disasters in particular societies.** There is no equality of vulnerability to disasters in the world. A very few social systems such as Denmark, Uruguay or Singapore have no natural hazards of consequence. On the other hand, no society is exposed to all risks. For example, the U.S. and Japan although subject to many disaster agents, are not at risk for instance to the locust infestations as are countries in Africa, or the kinds of droughts/famines/epidemics that occur in Asia, Africa and Latin America. Also, the scale of disaster consequences can be rather different. Recent disasters in China, Peru and Yemen were of a catastrophic magnitude beyond anything that has ever relatively happened by way of casualties, homeless and social disruptions in the US or most of Western Europe. What threats, which ones are involved in disasters and what effects they have can vary substantially around the world

These experiences affect the kind of specific information and knowledge needed for coping

with such occasions. So, for example, if there are no data on famines for a country primarily and regularly subject to them, involvement in a GDIN might not be given high priority. The reverse may also occur. At a professional meeting we once attended, Western participants questioned why the UN listed locust infestations as occasions to be also covered in its Decade of Natural Disaster Reduction. The listing was attributed to political reasons and not seen in the same category as atmospheric and geophysical phenomena that lead Westerns to see some of them as disasters.

To the extent that it is assumed that the kinds of disasters and effects in one society are always perceived in the same way by others, it may miss what is significant to other systems. In fact, what is seen as a "disaster" is not a given, but is mostly a social construction dependent on prior experiences (Quarantelli 1998). For example, what may be taken as a "major" disaster or even a risk threat in Sweden may not be at all so perceived in Bangladesh (for disasters in the latter see Haque 1997; Reddy 1997). Consequently, interest and use of GDIN would vary depending on the perception of disasters and experiences different societies have. One GDIN generated document in fact notes that:

> potential partners will not provide access to their assets unless the system also serves their interests (Web site 1997b: 2)

Some societies in the developed world as well as some developing countries with disaster agents rare elsewhere, would seem to require inducements for participating in a GDIN other than direct experiences with disaster phenomena generally.

2. **The salience of disasters to other ongoing crises in social systems.**

Disasters in the US, Canada, Western Europe and Japan typically occur in stable social environments. But disasters in many other places in the world occur in everyday turbulent social settings (such as ethnic strife and conflict, malfunctioning governmental units at all levels, corruption and large scale organized crime, widespread unemployment, and other collective social pathologies). This affects not only the priority that will be placed on disaster planning but the kinds of resources that can be mobilized in

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managing such occasions. Crisis oriented UN agencies characterize such happenings as *complex emergencies*, to distinguish them from ordinary disasters, and to indicate the different and more complex management problems involved (e.g., the matter of political priority in such occasions).

As the UN has found, most recently in Afghanistan, unless information and knowledge about the turbulent environment is incorporated with that about disasters, little of a useful nature can be accomplished. Disasters cannot be meaningfully seen in isolation from their larger social context. For example, the US has a very stable social environment, so the threat or appearance of a major disaster is given high priority and attention. In other societies, as Russian colleagues of ours have noted, because of other aspects of the larger setting, even major disasters--apart from the crisis period-- will not necessarily be given any precedence over other social issues in their systems. In some systems, a GDIN that does not monitor the turbulent social environment may not be deemed very relevant.

However, any move to expand coverage in that way will generate a host of other serious problems regarding the adoption and use of a GDIN. The statement "The system will assist in natural and technological disasters as well as complex humanitarian emergencies" (Web site 1997b: 2), makes an unlikely assumption about social similarities across all these crises. The latter occasions differ substantially and in contexts from disasters associated with natural and technological agents.

3. **The disaster-related cultural values, and beliefs regarding knowledge of different societies.**

Culture makes a difference in risk perception. How danger and vulnerability are visualized and what is bearable, as well as the views on what can/should be done with respect to disaster planning and managing, are deeply rooted in the cultural framework of social systems. Even what is considered relevant for such purposes are relative to the culture involved. Scientific knowledge as the most if not only valid way of understanding the world is primarily a Western belief. So is the notion that technological solutions to problems should not only be sought but most valued (although both these ideas have increasingly come under very critical scrutiny even in Western professional, intellectual and scientific circles). However, as has been found in studies of how Japanese and Americans view earthquakes and how to cope with them, there can be profound cross-cultural differences (Palm and Carroll 1998). It cannot be assumed that what is valued and conventional is universal.

For meaningful information flow and exchange in a GDIN there has to be at least a minimal

consensus on values and beliefs about whatever is thought of as valid knowledge. In all cultures there is a tendency to rail against the "irrationality" of those with different views of nature and the physical world. Thus, unless attention is paid to what counterparts in other cultures consider legitimate and acceptable information, there will be less risk communication flow in a GDIN than might be desirable. Cross-cultural differences, even about what constitutes knowledge, are more deeply rooted than many believe.

4. **The disaster relevant social institutions and structures of different societies.** How societies are organized also makes a difference in their approach to risks and crises. The importance of and the relationships among different social institutions can vary considerably.

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For example, many nations have far more centralized governmental systems than say, the U.S. and Australia that are both relatively decentralized. As another illustration, the extended family and kinship system is far more important in most other social systems such as many in Latin America, the near East and Africa, than in the U.S. or Western Europe. Which institutions are structurally more important necessarily affects the transmission of information of any kind as can be seen in the differential roles and operations of mass communication systems in different societies (and can be observed in how disaster warnings are processed and distributed everywhere). In addition, how well different social institutions and subsystems of a society are integrated with one another will affect any information dispersal between and among them.

These may appear to be abstract matters. But they go to the very heart in developing any kind of domestic/ international risk and crisis information distribution system. Not taking societal variations into account can lead to an unwarranted assumption that the social forms in one society, either exist or can easily be put into place elsewhere. Yet, it is obvious, for example, that nominal democratic political/governmental institutions clearly do not translate into actual democracy in many places (a fact not irrelevant to the implicit assumption that the citizenry everywhere could act as a social pressure in support of a GDIN system). More generally, the point is that in developing a GDIN, country specific institutions have to be taken into account. For instance, in Australia their coast guard operations are outsourced to private entities, and many response and recovery functions handled by government agencies in the US are carried out in developing countries by international disaster relief and religious groups. A GDIN involving multiple social arrangements within social systems has to cope with information flows among and between different social links and paths.

5. **Military/security groups vary in legitimacy and their prime roles.**

Military and security organizations in most societies are primary gathers of intelligence data about domestic and foreign risks. For a variety of reasons, such agencies are practically everywhere mistrusted if not actually seen as illegitimate by the citizenry. This is often true even in most Western type societies. However, generally in such systems the mistrust is balanced off by a strongly held conviction that there is civilian control or supremacy over the military/police. However, in many societies the prime role of the military/security police is to support the existing power elites and to act ruthlessly against anything that could contribute to any subversion of their control. Contrary to many Western type societies where the military at least is supposed to stay out of politics, in some countries the very opposite role is strongly enacted, a most extreme current example being Bosnia, as well as some of the former Soviet republics and a number of SubSarahan African nations.

Now, the major providers and users of intelligence driven information about risks and crises, especially in developing countries, are likely to be those with security interests, especially the military. Thus, information obtained may be used to mostly prevent subversion or insure pacification rather than providing disaster mitigation or aid. This possibility raises questions about the relationship of a GDIN and the foreign policy of any involved nation. How many democratic societies want to provide information that can help other systems suppress their own populations? This is probably not what is meant in a GDIN related document that such a network will "contribute to political stability in fragile nations" (Web site 1997b: 2). But what is one to make of a statement that "GDIN's international phase will provide significant added value to the status quo" (Web site 1997b: 2)?   Clearly the involvement of foreign military/security

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groups, requires understanding their domestic legitimacy and role and the implications that might have for the providing of GDIN data.

We now turn to the more dynamic aspects of social dimensions that can increase as well as decrease societal differences. Even worldwide trends influence societies at different levels of social development. Thus, though there may be a nominal movement toward equalization of effects, there will necessarily be differential consequences. In almost all cases, this will force choices among varying options on how to deal with risks and crises.

6. **The changing role of the private sector.**

There are drastically different relations around the world between the public and private sectors that can affect disaster planning and crisis managing. In many Western type societies, organizations in the private sector have a relatively limited number of stakeholders to which they must respond; government agencies are legally responsible for protecting citizens in general. Private groups although often having specialized resources do not have the almost unlimited access to the full range of resources available to governmental agencies in whatever social system is involved. Private sector entities except within their own organizations and even that only within limits, cannot "order" anyone to do anything. Governments at all levels have formal authority and resources to "force" compliance to many "orders." These features do not exist elsewhere.

Now such basic differences are partly masked by a world wide move toward privatization. In present day China and Russia, for instance, the line between what are "private" and what are "public" entities is often very murky especially if real ability to exercise power is considered rather than whatever the formal arrangement may appear to be (military backed or run "private" corporations exist in both systems). In some developing countries recent moves to privatization of certain organizations are not much more than changes in labels on what is public and what is private. Put another way, not only is the role of the private sector changing around the world, but there are also differences in the meaning of the private.

There is emphasis in much of the current planning for a GDIN that the private sector must

be heavily involved. But apart from the just noted complications of a changing and different conception of the private, there is at least one other major problem. This is that some developed countries such as Germany and Japan have consciously entered the disaster technology area with the expressed purposes of enhancing the markets of their domestic producers of technology (and this is implicit in the U.S. approach as can be seen in such statements as that a GDIN "will strengthen the economic positions of American firms," Web site 1997b: 2). As such, the idea of a GDIN clearly has the possibility of generating a competitive marketing situation (Schaeffer 1997) rather than a cooperative international humanitarian effort. We have known for decades that competition among international disaster relief agencies has been a serious problem (Kent 1988). A GDIN with such a characteristic is equally not desirable.

7. **The changing importance of the local community in disaster planning and response.**

Everywhere there are many governmental and even private sector levels involved in risk planning and crisis managing. However, the current view is that the primary implementation of any kind of disaster planning and managing has to be at the local community level. All human

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societies up to the present have essentially been organized around some kind of community life. As such, this is where most aspects of disaster planning, be it mitigation, preparedness, response or recovery--have been actually carried out. Policies and programs, requirements and mandates are often established at higher levels of government. But as studies have consistently shown, the actual execution of whatever has to be done, is mainly carried out at the local level. And of course it is at the local level where the managing of disaster sites primarily occurs.

Whether this local focus for risks and crises should remain is unclear. A logical case can be made both ways, which would affect the use of a GDIN. We could argue that fundamental changes in overall disaster planning and implementation are necessary. If the nature of risks and associated disasters change, including the appearance of a threat at one place but with effects at a far distant location (e.g., the radiation fallout from Chernobyl, or the smog/smoke pollution in the air in six southeast Asian countries from massive fires in Indonesia), it may be that preparation for such an occurrence cannot be handled solely at the local community level. On the other hand, we could argue that it is still necessary to proceed in the traditional way, rooting disaster planning at the community level. Human groups continue to be organized around community life, and this may mean that the risks to such groups therefore have to be handled locally.

Clearly, the strategies adopted to assess hazards and disseminate risk-related information, as well as the organizational "players" in the process, depends largely on whether disaster planning and management is conceptualized as mostly a local, supra-local, or national responsibility. That will probably vary from one society. This will create difficulties in the effective flow of information from a GDIN when information starts at one level and has to be transmitted for use by another level. To the extent the problem is currently acknowledged the solution offered is of a non-social nature. Thus, it is said that:

> A range of technological solutions will actually be needed by GDIN. In many countries, the availability of sophisticated communications technology is limited. Such a suite of solutions should be robust enough to pass information quickly to lower levels (Web site 1997b: 2)

Again this involves using technological solutions to problems of a social nature, which will not work.

8. **The ever increasing information/knowledge base.**

By most criteria, the world as a whole is accumulating more and more information and knowledge about everything. On the surface, a GDIN would appear to add to that base and help in its distribution. However, that seemingly simple statement obscures a number of potential problems in using a GDIN for disaster planning and crisis managing.

A major one is the *information overload* problem. We are hardly the first to recognize that

a glut of information can be a major problem at times of crises. There are many examples of this in the military intelligence area, with often very serious consequences. Similarly, at one level, a GDIN seems certain to produce far more information than can be handled during crises. But as noted:

> Information cuts both ways and herein lie the dilemmas or paradoxes arising from ever more information created, processed, and disseminated by proliferating information technologies. More information can result in more control but it also creates circumstances that reduce or defy control. It clarifies some issues but it obscures and complexifies others . . . unprecedented amounts of information can be brought to bear on issues of policy and action but the persons who must use the information to make the decisions become overloaded and everything gets muddled. In some cases one feels more information really gives an understanding of a situation. In more cases more information deepens a feeling of uncertainty (Michael 1985: 34).

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In addition, any information or data at some point has to be assessed and interpreted. For example, the U.S. National Weather Service despite its massive technological input, has this problem

in issuing hurricane warnings. The problem of *interpretation* and *meaning* cannot be solved by the adding of more technology. The use of "artificial intelligence" might help, but cannot provide ultimate answers. In an early symposium on the use of computer technology in emergency management it was said that:

> The essential point that humans provide in an operational center . . . is to act as a corporate
> memory. They have to know who the people are, who knows what, at what point in time . . . no amount of technology can make up for the inadequacies of training, quality, motivation, and energized leadership (Vincent Heymen quoted in Chartrand 1985: 22).

In the same symposium it was noted that:

> While the presence or absence of a computer in an EOC or a networking arrangement with some external resource may affect to a degree the effectiveness of such a facility, it is generally agreed that <u>the key ingredient is the human being</u>. It is this component, usually represented by a team of persons who have trained together, that must cope with the situation at hand. And all too often, when crises arise unexpectedly, the ensuring situation is much like that characterized by William Allen White as: "that indefinite, shifting intangible series of hunches, guesses and hypothetical phantasms." In emergencies . . . the responses required are often akin to those demanded in political imbroglios. Diverse and conflicting human mpressions which comprise the data that must be acted upon, sometimes along with at least tangentially useful background information, may be all that exist for the emergency manager besieged by intense advocates of opposite claims and decisions (Chartrand 1985: 20).

More and quicker information is often also not necessarily better. This might run counter

to popular opinion but is a finding of disaster research. For example, managing problems can be compounded by the availability of real time information that discourages delaying responses. However, research has shown that a timely response in a crisis is one thing, a quick response is another. (A Disaster Research Center field study found that an unauthorized radio network request that all ambulances come to the scene of a night club fire that resulted in over 160 deaths, quickly led to a massive convergence of so many vehicles that soon all entry by vehicles in and out of the disaster site on the one usable road was totally blocked). A GDIN is certain to speed up crisis time responses. That is not always good. It is questionable that a GDIN should "ensure that information can be quickly accessed by those who need to make decisions" (Web site 1997b: 2). One of the very earliest findings of social science disaster research decades ago showed that delay in responding to crises generally led to better decision making.

9. **The renewed emphasis on disaster mitigation**

How does the proposed GDIN square with the current priority being placed on disaster mitigation, or perhaps more accurately with the renewed emphasis on that process? Contrary to recent assertions, a focus on disaster mitigation is not new. Such a societal attempt to do something about risks and hazards can be found as far back as ancient China and Egypt (Quarantelli, 1995). However, it is true that there has recently been a renewed emphasis on the value of mitigatory measures. This partly reflects rising disaster costs as well as the UN Decade for Natural Disaster Reduction (UNDNDR).

Nevertheless, while there is widespread use of the term "mitigation" it is used to refer to two

different sets of activities. In one broad usage, mitigation refers to any and all measures that could improve disaster planning and managing. But in another more limited use, mitigation is seen as only one of the four phases of planning and managing, and different from what goes on for preparedness, response, and recovery. So at that general level, provision of information or

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data through GDIN about “mitigation” will not necessarily be communicating about the same process (as we witnessed at the UN Yokohama Conference marking the midpoint of the UNDNDR where both two major conceptions of mitigation were used, without much conscious awareness of the difference but affecting understanding of what was being communicated). To argue that this conceptualization is not a technical problem that the GDIN should concern itself about, is actually to accept the fact that more is needed in the process of developing a network than a complex physical apparatus.

A basic question insofar as a GDIN is concerned is whether such a network is equally useful

for all four phases. Even the DIFT report, already noted, suggests that there are differences in the information infrastructure needs depending on the disaster phase involved. Thus, it is said that:

> Each phase imposes unique requirements on the infrastructure, since data needs change according to the disaster phase and people involved. The preparation and response phases are characterized by high timeliness and reliability needs along with highly variable volume. Mitigation and recovery phases have less urgent delivery needs and a broader audience (e.g., government, academics, builders, insurers) but often cannot accommodate long delays (DTIF 1997: 48).

Leaving aside the dubious validity of the last part of the last sentence, the overall statement

does raise the question of the equivalence of the payoff of a GDIN for all phases of disaster planning and managing. The current proposal for a GDIN, to the extent it is explicit on the topic, primarily emphasizes its value specifically for issuing emergency warnings, and more loosely, for disaster mitigation. While possible examples are given from all the four phases of disaster planning, there is a strong tendency to highlight probable positive results at crisis or emergency times (thus an often reiterated statement about the use of a GDIN for emergency warnings). Dramatic instances of suddenly saving lives or alerting to an immediate danger are highlighted rather than more prosaic and longer term activities. As such, there is a clue here to other possible problems for a GDIN.

A major one is that it is probable that a GDIN will tend to look at the more tangible aspects of whatever it deals with. Looking for more easily seen physical things would seem to be reinforced by the artifact bias in much of the thinking about a network. For example, the remote sensing capabilities involved in a GDIN are obviously more usable for looking at, say, structural aspects of mitigation rather than non-structural ones (e.g., building codes, taxing incentives, educational programs, etc. for which there are no tangible or readable products). To be sure a GDIN could be used to communicate about any aspect of disaster planning or managing. However, given a choice between technologically accessible data or information and that which cannot be so directly accessed, we have little doubt about what the choice will be. The issue of course is not whether a GDIN should deal with everything--an impossibility--but instead whether whatever information or data it processes should have the highest priority or are among the more important questions that need to be addressed.

This is related to another probable inclination of a GDIN. This would be the tendency to use the network for more easily solved issues or problems. In other discussions elsewhere about computer technologies, we have noted and we think it applies also to a GDIN, that:

> . . . there will also be a reinforcement of an already existing tendency in disaster planning/

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management to apply technology to those problems that are addressed most easily by the technology, and to ignore or downplay those that cannot be handled so easily . . . there may be a movement away from more basic and important problems and mostly doing studies that easily lend themselves to the use of computer-based technologies or the end products such as databanks or whatever is available on the Internet.

This tendency calls to mind an admonition that PH.D. advisers frequently give their graduate students, namely that the methods to be used in a dissertation should be dictated by the research question being addressed, and not to let the methods determine the question. Use of computer technology in the disaster area should similarly be determined by the problems that needs solutions, and not vice versa (Quarantelli 1997: 97)

10. **The emergence of new types of disasters.**

How well can a GDIN deal with the risks, disasters and crises of the future? As is typical of almost any area, its development has tended to look at issues and questions from the past and the present. Some GDIN documents do allude to the problems in the future. However, as said in a chapter entitled “Moving to . . . the Future” (DITF 1997: 64-75) in the final DITF final report: "The previous findings [9 out of 12] have dealt with technical challenges" (DITF 1997: 68), and as we see it mostly about past or present time issues. However, the future is not simply a repeat of the past nor an extension of the present. The future will create some different challenges of a social rather than technical nature.

. There are newer types of disasters emerging that have not been well thought through by researchers much less planners and managers in the area (Quarantelli 1996) There are at least three kinds of newer risks, some of them at times interrelated. One of the consequences of the development of newer technologies is that they create the probability of their own disasters. We have in mind massive computer system breakdowns and biotechnical or genetic engineering accidents, both of which could eventuate in catastrophic disasters. A relatively new second kind of disaster is where a crisis results in huge economic losses, extensive social disruptions and deep psychological stress, but no casualties or physical damage (such as the in the nuclear accident at Three Mile Island or the evacuation over three days of 213 000 residents of Toronto, Canada because of a chemical spill in nearby Mississauga). The third new kind of risks are exemplified by the recent economic crises in South Korea, Thailand and Indonesia or the negative weather effects of El Nino off Peru on countries far distant. Essentially these are occasions whose initialing origins are in one place and the effects usually are distant both in terms of social time and social space (for discussion on classifying such phenomena as “disasters” see especially the chapters by Rosenthal and Stallings in Quarantelli 1998).

A question that needs to be considered here is whether these newer kinds of disasters have qualities that affect information or data about them that might be processed through a GDIN. These include in general the separation of source and place of impact, the lack of casualties and property destruction, the very diffuse nature of the crisis, the often low profile nature of the risk except at the time of the crisis, etc. These relatively distinctive qualities exist. However, we are not sure of their implications for a GDIN, except we suspect that some might be very significant. Many of the examples we have used would seem to have relatively stronger political and economic implications than can be seen the older and more traditional types of disasters. Whether this or some other aspects, our general point is that a GDIN should consider what future

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kinds of disasters might involve, and that the network should not be developed just on the basis of more traditional natural and technological disasters. If a GDIN is going to be a 21st Century development, it ought also to deal with disasters that will surface in that century.

. In conclusion, we should stress that none of the above problems or difficulties should be taken as an argument against the establishment of a GDIN. Actually there are other social trends that we have not discussed that could affect the effective use of a GDIN. As examples, such a network will be in informal competition with an ever globalizing mass media system, and also the nation-state is decreasing in importance (Quarantelli 1996). Nevertheless, for a variety of strong reasons we do not discuss here, some form of a GDIN will come into being in most places in the world, sooner or later.

Moreover, even if the present effort under discussion is not implemented, some other similar effort will succeed. As said earlier, there are competing proposals. For example, the developers of GDIN recently discovered that there was an overlapping domestic effort in the US. This involves an attempt to create a National Emergency Resource Information Network (NERIN). This effort basically focuses on the development of a national Internet-based human services infrastructure for disaster recovery (see Web site 1997c).

In any case, the current possibility of systematically and efficiently developing any kind of global network would be considerably enhanced if the issues noted above were consciously recognized and directly addressed. Few of the problems we have noted have been explicitly discussed by proponents of a GDIN. Much of the ongoing effort is still concentrating on the more technical aspects, a necessary but incomplete view of the problem.

More attention is needed on the social dimensions of a GDIN. Fortunately, these aspects are either known or knowable. Thus it is mostly a matter of involving those who are knowledgeable about such matters and having them make explicit what research has found or could find.

Finally, we should accept that what might be at least initially put into place through a GDIN may not be all that might be desirable. But it still could be worthwhile doing. To illustrate this, let us end by quoting a recent statement by an official of the Centers for Disease Control and Prevention:

> I've heard all sorts of airy-fairy kinds of things about how we'll all be connected by technology and be able to call up anywhere in the world and find out about epidemics. But we still have to actually go there with gloves and masks, get samples and get them out to a lab, even in a country where there isn't one. During the Ebola outbreak in Zaire, we sent a satellite phone with our people so they could tell us what they needed most urgently. In Kikwit, a city of 250,000 people, there was no E-mail, fax or regular electricity. There was no radio station to deliver health messages. they had to be delivered, instead by bicyclists with megaphones (C. J. Peters in the New York Times Magazine September 28, 1997, p. 45).

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