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DISASTER REDUCTION:
THE IMPORTANCE OF ADEQUATE ASSUMPTIONS
ABOUT SOCIAL ORGANIZATION

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Introduction

The paper focuses on the importance in having adequate assumptions about the nature of social behavior in designing training materials oriented toward the goal of disaster reduction. The paper will argue that disaster is a social rather than a "natural" happening. Thus any effort at disaster reduction will involve planning and action by various social units. The success of those efforts will depend on the adequacy of understanding that social base. The local community is taken as the primary focus of attention since that is the common unit which is affected by disaster and, more importantly, responds to deal with the event.

Disaster planning is seen as an ongoing social activity which needs to be incorporated into social life, and disaster training needs to be incorporated at different social locations within a society. That training should not be organized on a prescriptive or a normative basis but should be grounded in the existing knowledge of disaster behavior. Although that knowledge base has been derived from research in industrialized societies, much of it can be applied more universally. Three different illustrations from the literature will be detailed -- first, on the form of preparedness planning for response; second, on dealing with flood mitigation issues and third, on resettlement, an often suggested solution for recovery and for future mitigation. Finally, certain criteria will be suggested for evaluating the utility of various disaster reduction efforts.

Disaster as a "social" rather than a "natural" happening.

Part of the difficulty we have in communication relates to the words which we use. Certainly "disaster" is one word which has a multitude of meanings. For example, a number of years ago, I identified (Dynes, 1974) at least four different meanings -- (1) as the designation of the disaster agent, such as a flood or an earthquake; (2) as the indicator of physical damage, such as "ten houses destroyed;" (3) as an indicator of social damage, such as disrupted family relationships and (4) as an indicator of a negative evaluation, such as "this is bad." Unfortunately, these different meanings have little consistent relationship among them. For example, for one family to lose its house - a disaster to the family - does not necessarily mean either physical or social damage to the community. Even considerable physical damage does not automatically translate into social damage.

The tenuous relationship between physical damage and "social" damage can be illustrated by the fact that the 1988 earthquake in Armenia was 6.9 on the Richter Scale. That earthquake killed approximately 25,000, injured more than 31,000 and left 514,000 homeless. The next year, an earthquake of greater magnitude (7.1) occurred in the United States; the Loma Prieta earthquake killed 62, injured 3,757 and left more than 12,000 homeless.

Apart from semantic confusion, it is common, of course, to designate "disasters" in terms of their physical agents. Since many of the physical agents are from "nature," there is a tendency to talk about "natural" disasters. Certainly, to a sociologist, this is an inadequate label, since disasters are the result of human actions. Floods and earthquakes have social consequences only as a result of the actions of human beings and societies. High density populations in flood plains and unreinforced housing are far more important than the physical agent in creating the human and property losses and the disruptions of community routines. The physical agents act as only triggering events and in fact many social consequences can still occur without the physical effects, such as reactions to "false" alarms.

The fact that "natural" disasters are social rather than natural phenomena has a number of implications.

1. Prevention and mitigation must stress social, rather than physical, solutions.
2. Disaster planning is not primarily the search for the implementation of technological solutions.
3. The emphasis on the social allows for the opportunity for proactive, rather than reactive strategies. Thus, it is possible to take actions prior to the appearance of the physical agent.
4. The emphasis in planning can be on internal, rather than on external factors. The potential threat is not "out there," but resided in the "internal" flaws within the social system.
5. The view of disasters as social phenomena allows such happenings to be incorporated as a part of the nation's development process. In fact, what is often called the "recovery" process after a disaster is development in and of itself. That is, the recovery process is a process in which the population improves its level of adaptation to its environment and also lowers its future vulnerabilities.

The social nature of the concept of disaster is reflected in the conventional definition that "disasters are events in which societies or their larger subunits incur physical damages and losses and/or disruption of their routine functioning. Both the causes and effects of these events are related to the social structure and processes of societies and their subunits." (Kreps, 1989, building on Fritz, 1961) An even more clearly sociological definition has been suggested by Dynes that "a disaster is a normatively defined occasion in a community when extraordinary efforts are taken to protect and benefit some social resource whose existence is perceived as threatened." (1989)

If "disasters" are social occurrences, then any effort to enhance disaster reduction involves planning and action by various social units. The direction of that planning effort will depend on the nature of the social unit, not on the nature of the physical

agent. One discussion of research results (Drabek, 1986) orders those findings in terms of social units with increasing structural complexity -- from individual, group, organizational community, society and international. Such a classification suggests that planning efforts would have a different focus depending on the social unit. On the other hand, it will be argued here that the focus of planning which would have the greatest potential impact would be the local community. Local communities are those social units where there is the greatest potential for impact. In addition, the local community as a collectivity has greater resources to respond to the social disruption than do individuals, groups and organizations. In particular, local communities are likely to become involved in responding to disasters prior to the involvement of social units in the larger society or from the international system. In other words, the success or failure of planning effort is more likely to be revealed at the local community level. In addition, the local community is a generic form of social organization in every society, since it has a territorial base and is organized to "solve" certain problems for that population.

If one adds the four disaster phases -- preparedness, response, recovery and mitigation -- and then cross classifies with the various system levels, the following system responses can be illustrated:

Disaster Phase	System Level			
	<u>Ind.</u>	<u>Group</u>	<u>Organizational</u>	<u>Community Society International</u>
Preparedness			Key Social Unit	
Response		links		links
Recovery				
Mitigation				

On Planning

It is useful to briefly elaborate the nature of disaster "planning." For most people, these words evoke images of dusty notebooks created by some bureaucrat which no one can find and, if it is found, it is completely useless in dealing with the problems at hand. Unfortunately, that description is more accurate than not of most planning around the world. As understood here, however, planning is a process, not a product. What needs to be created is not compendium of useless papers, but an accepted series of ways of approaching problems dealing with preparedness, response, recovery and/or mitigation.

Such planning should recognize that disasters are qualitatively as well as quantitatively different from accidents and everyday emergencies. But also, planning measures should be integrated in behaviors and structures which follow as closely as possible everyday expectations and routines.

Disaster planning should be generic, rather than agent specific, especially with respect to the more human, social aspects of disasters. (Quarantelli, 1991) Whatever the specific agent, the same general activities have to be undertaken, whether the tasks be warning, evacuation, sheltering, feeding, search and rescue, handling of the dead and injured, the mobilization of resources, communications among organizations, public information, etc. The importance of a generic approach may be less so for engineering and technical solutions to specific techniques of mitigation. Mitigation, however, is the social attempt to reduce the occurrence of a disaster, to reduce the vulnerability of certain populations and to more equitably distribute the costs within the society.

Planning must focus on general principles rather than on specific details. The concentration on details is one reason for the size and lack of use of most disaster planning. Of course, good disaster planning should be both vertically and horizontally integrated. That is, vertical planning at different governmental and also non-governmental levels need to be linked with planning at other levels. National planning needs to reinforce local and regional planning efforts. (It is likely that most national planning currently does little to reinforce local community level planning.) In addition, the planning in the different time phases need to be linked. For example, if evacuees are sheltered in a flood plain, this will be a disincentive for the implementation of a plan to restrict future occupancy.

Perhaps most important here is that planning will be no better than the assumptions and understandings about human behavior in disaster. In effect, disaster planning should not be oriented to the specific agent but directed toward "people" in dealing with new sets of problems. Now, there are a series of common assumptions about behavior which continually impede adequate planning efforts. For example, since it is widely assumed that people will panic with a knowledge of threat; warnings are withheld so that realistic protective actions cannot be taken. It is assumed that disasters make people helpless so planning assumes that governmental agencies must care for dependent people. This is a common assumption by national bureaucrats in both governmental and non-governmental agencies. Furthermore, disaster planning is often an attempt on the part of various organizations to make the disaster most convenient for the activities of their own organization. Many disaster plans spend an inordinate amount of effort to deal with questions of "authority," usually in the attempt to enhance their own authority in the emergency. Much current disaster planning also assumes that the addition of new technology is the key to

future effectiveness. Dependence on technology is simply one of newer problems to be solved by adequate disaster planning.

To increase efficiency and effectiveness, disaster planning needs to be built into the culture and social structure to insure that habits and social mechanisms allow a community to mobilize the human and materials resources. That mobilization is intended to reduce the current risks within the environment, to respond to emergency situations and to restore and enhance those adaptations for the future. Much of current disaster planning, however, attempts to "fit" people into plans and view "people" as the major problem, rather than major resources. It is common for those who propose technological solutions for mitigation to blame the "people" for the lack of acceptance of such "innovations." Too, the expectation that only governments need to plan, but people need to be cared for, reinforces the stereotype of dependency and is self-fulfilling. By contrast, we know that almost all search and rescue in disaster is done by victims and their neighbors, so rather than enhancing the equipment of national search and rescue professionals who will arrive after the process is complete, planning should enhance that local, non-professional but effective response. (For example, information could be disseminated as to how search and rescue might best be approached to minimize additional medical problems and by providing a supply of "community" shovels, rather than by purchasing technology to be located at some distant provincial headquarters.)

Most disaster plans assume that "victims" are dependent, forgetting that "people" may have their own plans and also may also make intelligent adaptations. When people take individual and independent actions, government officials often claim that the plan would be effective if it had just been followed. But if a plan is not "followed," that is the fault of the plan, not the "people." Rather than forcing people to fit some artificial plan, it is always more effective to fit plans to people, using as the planning base the patterns of existing behavior which can be adapted to the "new" situation.

On the Knowledge Base and Its Application to Developing Societies

Systematic and extensive social science research on various aspects of disasters has been undertaken since the late 1950's. But given the origins and larger history of the social sciences, it is also not surprising that disaster related research also has been carried out primarily by Western social scientists and, only somewhat less so, undertaken mostly in Western social settings; in fact, primarily in the larger industrialized and urbanized societies. (see Dynes, 1988) Thus, there is a question of the applicability of findings from disaster research done mostly in certain developed countries with large urban populations to circumstances found in many developing countries with mostly rural populations.

While there is no easy answer to the question, certain judgements can be made. First, at the individual system level, there seems to be considerable universality to a response to a disaster. Flight behavior is rare among disaster victims in any society. Search and rescue is carried out by survivors, neighbors and others, not by formal groups in all major disasters. Emergency needs are generally met by the victims and survivors themselves in cooperation with kin and community groups, not by governmental aid. On the other hand, there seems to be more variability in organized mitigation and recovery efforts. It would be true that, in most developing societies, organized groups relating to specific disaster tasks will not exist to the same extent as in industrialized societies. On the other hand, disaster functions may be carried out by a variety of social structures. For example, Schware (1984) has reported on the existence in India of a wide variety of early indicators of floods which are used to inform an informal warning message system which operates quite independently of the "official" and the mass communications systems. Certainly, it should not be assumed that patterns in Western societies are the only structural mechanisms to deal with a specific problem.

It is possible to argue that the extensive experience of developing countries might enhance their ability to respond effectively to disaster. It is known from research in developed countries that there is no direct connection between disaster experiences and good disaster planning. Nonetheless, studies do suggest that there is likely to be some correlation. For the reoccurrence of disasters raise the probability of the creation of what has been called a disaster subculture. Such a subculture involves an interrelated set of attitudes and practices among local people and groups that make them better prepared to respond to a new disaster. (Wenger, 1978) As a whole, developing nations are considerably more at risk to disasters than developed countries. One would therefore expect developing nations to have many disaster subcultures, although no solid data exists on this point. That being the case, such cultures ought to have improved capabilities, including those at all social levels, to cope with familiar types of disasters.

The point is mentioned here in part to question an implicit assumption that, in almost all respects, developing countries as a whole are worse off in disaster planning than developed societies, especially given that few or no organizations are specifically oriented to disaster problems, be they mitigation, preparedness, response or recovery. But if disaster subcultures exist, this would not be the case. In addition, if in existence, they clearly provide a well rooted social base on which new disaster planning could be grafted.

Even given the fact that most of the social science research has been derived from western industrialized society does not necessarily present a problem. If theories are properly stated,

they should have general applicability. For example, if a theory on warning is stated in terms of communications theory, that would not be dependent on a particular form of technology. Nor would a general theory of community action be dependent on where the community is located.

The Importance of Adequate Assumptions

Unfortunately, much of the planning activity around the world and the materials which are generated to support it elaborate with considerable detail the characteristics of certain disaster agents followed by prescriptive details about what everyone should do and who should be able to tell others what to do. Reading such prescriptions conveys the impression that "people" are the major problem and that social life as it was constituted prior to the disaster, will become threatened unless strong authority is emphasized.

Three areas are given closer examination here. The first area is the assumptions on which much current emergency planning is based. The second area centers on the assumptions which guide mitigation activities in certain flood situations. The third area is resettlement, which is often suggested during the recovery phase and justified on the basis of its contribution to mitigation. In each of these areas, there has been enough confirming research to develop policy direction which more closely fit expected social behavior.

A. Emergency Preparedness

The dominant planning model around the world for emergency response is what can be called the "military" model. It is predicated on the notion that disasters create "chaos" and such chaos can only be eliminated by establishing "command and control." It is based on an assumption that military organizations can deal effectively with threat and civilian organizations cannot. On the basis of observations of behavior in emergencies, there are a number of inadequate assumption in the military model and a number of unanticipated consequences. Building on such findings, an alternative planning model -- called here the problem solving model -- is detailed and the consequences for planning are indicated. The problem solving model assumes social continuity, coordination and cooperation.

Charts 1 and 2 summarize some of the differences between the two models, although some of the research evidence on which the distinctions are based are not included. (For a more extensive discussion, see Dynes, 1991). The problem solving model is much more effective since it is based on research on organized behavior in the emergency period, rather than derived from analogical thinking derived from military assumptions about "enemy attack" by

the disaster. The notion of problem solving suggests that an emergency constitutes a set of problems which have to be solved with some degree of efficiency and effectiveness by the existing resources -- that of the local community. It does not assume that what is needed is a top down rigidly controlled and highly centralized pattern of social organization, but instead what is needed is to develop social mechanisms necessary to solve the problems created. With the expectation of cooperation, mechanisms of coordinating those activities are needed. The latent capacity for problem solving exists in every form of social organization -- families, organizations, communities and nations. The goals of emergency planning should be in the direction of mobilizing those problem solving skills in the most effective way, not to create an inflexible structure incapable of adapting to unexpected problems.

B. On Flood Mitigation -- Living with Floods

Cuny (1991) has recently pointed out that efforts to reduce the effects of floods has traditionally concentrated on such structural measures as the construction of dams and embankments. In more recent years, these large scale capital-intensive projects have been questioned on technical and environmental grounds. Indeed, some of the projects have been found not only to be expensive, but to be counterproductive. Embankments create the illusion of safety and encourage people to move into floodplains areas. Consequently, he suggests that a key strategy would be to encourage people, especially in rural areas and in small communities, to adapt to the floods and to capture the benefits for development.

He notes that, over the centuries, many societies have developed complex adjustment to floods. The adaptations are evident in the form of houses and in siting. For example, in the lower Delta of Thailand, houses are built on stilts, roads are built parallel to the river and culverts allow the flood waters to pass through. In addition, in riverine communities, crops often demand water and fishing provides supplemental protein. Primary forms of transport, e.g. boats, are well adapted to floods. In addition, in flood prone areas, warning systems have developed and adaptive techniques have emerged and become institutionalized. For example, new technology to enhance communication and the building of flood shelters probably will not speed evacuation since people are reluctant to leave until the last minute and are unlikely to go to shelters.

Cuny argues that attempts at flood preparedness and mitigation must be selective and rely on self help and local initiative.

To adapt traditional responses to official strategy means reorienting the planning process, to plan flood mitigation measures from the perspective of the communities most likely to be affected, and to involve

villagers in local plans. Planning should be initiated at the village level and priority should be given to activities that stimulate self-reliance, promote cooperation and community involvement, and contribute to community development. Community development groups can play a major role in planning. Efforts should be made to involve local community development agencies and NGO's in the planning process, to improve coordination between these agencies and the government. (Cuny, p. 69)

He also suggests that such a program would need two thrusts -- one from the community level and another from the national level. He indicates that plans for community action should develop first, and then later national plans could be developed to support community plans. At the village level, he suggests to:

(1) Identify traditional mitigation and preparedness measures

- * Study perceptions of risk
- * Determine who is at risk
- * Study range of local responses

(2) Initiate village level activities

- * Village-based warning and evacuation systems
- * Small-scale protective structures (such as village plinths and evacuation platforms)
- * Protective measures for housing (such as water-resistant mud construction and treatment of structural timbers)
- * Specific flood season agricultural practices
- * Planting bamboos or fast-growing trees that can be used for disaster-related purposes (such as rafts and components for temporary shelters)

(3) Promote economic development strategies that reduce vulnerability

(Cuny suggests that this is not often explored. Risk reduction is more likely to be accepted if tied to other activities, especially those which result in greater yields and profits)

Cuny indicates that a community level activity needs to be supported by a national and district level program which might evaluate past emergency responses, engage in risk and vulnerability mapping, developing warning and evacuation systems as well as communications systems and perhaps the development of model programs and plans for initiating such activities in other locations.

Of course, the approach suggested by Cuny represents a significant departure from the engineering/construction model of flood control which has been predominant in the West. In addition, it also runs counter to many of the directions of development encouraged in developing countries by governmental officials who think of development in terms of construction and technology. On the other hand, a number of the ideas suggested by Cuny are supported by a considerable body of research in flood prone developing countries. (For example, see Alam's analysis of Bangladesh, 1991).

C. Resettlement of Populations -- Recovery and Mitigation

History is filled with examples of populations being relocated, usually with the combined rationale of "helping them recover from a past disaster" and "helping them avoid a future disaster." Most of those examples are illustrations of failures but, on occasion, those failures might also be counted as successes.

After falling once to an attack by Indians, weathering a series of 8 serious earthquakes and suffering a huge landslide, all between the 16th and 18th centuries, the Spanish Captain General of Santiago de Guatemala gave the order in 1773 for the site to be abandoned and the city to be relocated for the third time to safer terrain. The citizenry objected to the decision, but the relocation began nonetheless in 1775 and a new capital, Nueva Guatemala de la Asuncion, was founded. Many people, however, still refused to abandon the old site, now known as Antigua, and refused to move, whereupon the authorities forcibly closed the city's remaining stores in 1779. All these efforts notwithstanding, the old site was almost immediately repopulated and continues to exist today as one of Guatemala's major tourist attractions. (Tobriner, 1980, quoted in Oliver-Smith, 1991).

It would be safe to say that decisions to relocate communities are usually made by government officials who seek the opportunity to design houses and use the occasion of a disaster to implement that desire. Populations scheduled to be relocated usually are marginal or powerless groups in the society. I would argue that it is difficult to find any case of "successful" resettlement for mitigation purposes, although "official" accounts illustrated with advanced construction data often give that impression. Fortunately, now there is a growing literature on the issues of resettlement, which is beginning to provide ideas of the complex issues involved. One stream of research is reflected by Anthony Oliver-Smith's summary of the research literature (1991), as well as the overlapping discussion of Michael Cerea's (1990) development of a World Bank policy to guide resettlement attempts as a

consequence of development efforts. Both of these efforts emphasize the "obvious" points that the reasons people live in communities involve more complex motives than simply avoiding risk and that building houses is not the same as constructing communities.

It is assumed here that the desire of government officials to build new communities will be stronger than the desire of people in communities in high risk areas to avoid those risks. Such an assumption is warranted by the simple observation of relative power between those categories. Consequently, one needs to develop sets of guidelines which might enhance the possibilities of "success" of such efforts in the future. The following set of "propositions" might constitute a small beginning.

1. People live in communities which exist for some reason, even though those reasons may be ancient and not known by present governmental officials. Those reasons still persist even if the community is in a risky location.
2. While both individuals and families may move without too much difficulty, moving a community is more than the simple aggregation of individuals and families.
3. Rebuilding housing is not the same as rebuilding a community.
4. People are reluctant to move after a disaster, since there is a strong desire to get settled again quickly. Relocation disrupts that healing process by delaying reconstruction.
5. If relocation is actually the "only" position, that decision should be made by those who will be asked to relocate, not by representatives of government bureaus who claim to be acting in the interests of those who should relocate.
6. Such decisions should be arrived at utilizing the usual decision making processes which are "traditional" within the community.
7. Relocation should not be focused only on rehousing, but on understanding the dimensions of overall community life. This would include understanding the economic dimensions of the community, including present access to transportation, etc as well as attention given to the symbolic aspects of the present community. The best judgement of the importance of such issues can be determined by asking the residents (and utilizing the traditional decision making modes).

8. In general, the inhabitants of communities will make a more successful transition if they feel that the effort will benefit them in some way, rather than seeing relocation as a punishment. This is particularly true of lower class communities. Therefore, the more incentives that can be built into the plan, the better. Collective gains will be more important than individual gains. Thus, considerable thought should be given to ways that the collective and symbolic life of the community can be enhanced.

9. Any relocation plan needs to take into account the symbiotic relationship of the present community to other communities. It is likely that nearby communities are closely tied economically and by kinship. That context needs to be continued in the new location.

10. The whole process can be enhanced if the responsibility is located in one government agency which in turn will act as a broker to other government agencies. It will be sufficiently traumatic for people to go through the relocation process dealing with one agency, not multiple bureaucracies.

11. It would seem that the most successful relocations have been those which emerged from the consideration of those who would be located that such a decision is merited and that the advantages to the community would be greater than the losses which would be incurred by leaving their traditional location.

Criteria for Evaluation

The emphasis here has been on developing adequate assumptions about the nature of disaster planning in a variety of different social systems. Sometimes, the concentration on cross-societal differences will preclude the understanding that there are many communalities which will always be present. In that context, it might be possible to identify certain general principles of evaluation. The following can be suggested:

Specific criteria for mitigation:

To be accepted mitigation measures: need to be close as possible to everyday practices, have to be politically realistic, and should be economically viable.

Specific criteria for preparedness:

There is good preparedness for disasters when there is: anticipation of possible problems, different solutions or options for dealing with them, and allowance for possible emergent behaviors.

Specific criteria for response:

Management of a disaster response is good if there is: efficient mobilization of personnel and resources, adequate processing of information, and an adequate development of coordination.

Specific criteria for recovery:

Recovery measures will be most accepted if they: preplanned into the development planning of a society, not too grandiose or ambitious, and involve as many sectors of the community possible in the decision making.

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CHART 1

Military Model

1. It assumes social chaos and dramatic disjunctures during the emergency.
2. It assumes the reduced capacity of individuals and social structures to cope.
3. It creates artificial social structures to deal with that reduced capacity.
4. It expresses a deep distrust of individuals and structures to make intelligent decisions in emergencies.
5. It places responsibility in a top down authority structure to make the right decisions and to communicate those "right" decisions in official information to insure action.
6. It creates a closed system intended to overcome the inherent weakness of "civil" society to deal with important emergencies.

Problem-Solving Model

1. That emergencies may create some degree of confusion and disorganization at the level of routine organizational patterns, but to describe that as social chaos is incorrect.
2. That emergencies do not reduce the capacities of individuals or social structures to cope. They may present new and unexpected problems to solve.
3. That existing social structure is the most effective way to solve those problems. To create an artificial emergency-specific authority structure is neither possible nor effective.
4. That planning efforts should be built around the capacity of social units to make rational and informed decisions. These social units need to be seen as resources for problem solving, rather than as the problems themselves.
5. That an emergency by its very nature is characterized by decentralized and pluralistic decision making, so autonomy of decision making should be valued, rather than the centralization of authority.
6. That an open system be created in which the premium is placed on flexibility and initiative among the various social units, then, and those efforts are coordinated. The goals should be oriented toward problem solving, rather than avoiding chaos.

CHART II

Assumptions and Consequences of Different Models of Emergency Planning

Assumptions about:	MILITARY MODEL	PROBLEM-SOLVING MODEL
characteristics of emergency behavior	Chaos	Continuity
Character of emergency response	Command	Coordination
Character of involvement	Control	Cooperation
	Plan for dramatic change	Plan for (and with) continuity
	Plan for reduced social capacity	Plan for unexpected problems
	Create new structures	Utilize existing structures
	Predetermine new authority	Utilize pre-emergency authority
	Create centralized decision making	Utilize decentralized decision making and coordinate
Consequences for Planning	Anticipate loss of emergency workers	Anticipate extensive helping behavior
	Expect problems of role abandonment	Anticipate importance of family support systems
	Emphasis on providing authoritative public announcements	Emphasis on organizational intelligence and keeping public informed
	Emphasis on agent generated demands	Emphasis on response generated demands as well as agent generated demands

Emphasis on standardized scenarios and operating procedures

Emphasis on improvisation based on preparedness and on alternative solutions

Emphasis on creating a para military structure

Emphasis on mobilizing social resources

Primary dependence on established organizations (Type I)

Utilization of a wide variety of organization forms, including emergent groups

Emphasis on minimizing volunteer assistance

Emphasis on effectively utilizing "volunteers"

Emphasis on maintaining a closed system

Emphasis on maintaining a flexible open system