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STUDIES OF SOCIAL ASPECTS OF EARTHQUAKE
DISASTERS: A RESEARCH AGENDA FOR
COOPERATIVE RESEARCH BETWEEN
CHINA AND THE UNITED STATES

E. L. Quarantelli

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The key to the successful implementation of scientific and engineering seismic hazard reduction is a thorough understanding of how society---from individuals to organizations to governments --- understands the earthquake threat, what can be done about it, and what capacity is needed to undertake remedial actions. Both China and the United States have acquired some such understanding about their own societies. However, they could learn from one another and speed up the process of planning relevant measures and implementing them, if joint and cooperative studies and research efforts were undertaken by social and other involved scientists from both societies. We in the United States have already undertaken such studies with colleagues in Japan and in Mexico, so our proposal is based in the reality of something that is possible.

In what follows, we suggest a necessary joint first step, indicate a possible common, general focus, and list some research topics which might have research priority. Within such a framework, a bilateral, cooperative, long run effort could be undertaken to address important questions on the social aspects of earthquakes.

1. Prior to the formal initiation of any cooperative research effort, a joint workshop should be held between Chinese and American social scientists and other relevant participants. The spotlight of the meeting ought to be on the theoretical and methodological approaches to hazard and disaster research which prevail in both countries, with a special emphasis on studies of the social aspects of mitigating, preparing for, responding to, and recovering from earthquakes.

This workshop could produce a state-of-the-art assessment of social science research in China and the United States, highlight similarities and differences in empirical findings and research approaches, provide an occasion for experts in both countries to familiarize themselves directly with counterpart colleagues, and allow the setting by agreement of priorities for cooperative and common studies.

To maximize the usefulness of the workshop and permit the greatest amount of direct interaction, there should be no more than 10-15 participants from each country. The members should be drawn from as wide a range of disciplines and from as many different organizations as are relevant to the study of the social aspects of planning for and reacting to earthquakes in China and the United States. An intensive week long meeting should produce a set of proceedings detailing the discussions, providing the background documents, and an agreed upon agenda for future cooperative research. Such a report ought then be widely circulated to researchers in both countries, from which the particular participants for common future work would come.

2. In almost all countries, the actual implementation of most hazard and disaster planning is at the local community level, which can range from a village to a metropolitan area. This certainly appears to be true of both China and the United States. Thus, a general focus for cooperative research efforts could be comparative studies such as parallel projects on city or community earthquake hazard, preparedness, response and/or recovery planning and managing, which would exemplify the influences of respective local conditions and practices. While most of the work would necessarily have to be done in preimpact situations, the opportunity for doing field studies of the social aspects of postimpact earthquake occasions could be built into the parallel or common research design.

3. A few initial individual contacts between American and Chinese social scientists, as well as the reading of some publications produced in one another's country, indicate that there could be at least seven broad research topics salient for joint studies. Four of them have to do with the four major phases of earthquake hazard and disaster planning. That is, it would be possible to have common work on mitigation measures, preplanned emergency preparations, emergency response actions, and recovery activities. In addition, there appears to be three other topical areas in which cooperative research might interest both sides. These include the social problems associated with earthquake predictions, the special issues that are associated with a catastrophic or truly national earthquake compared to a more localized one, and the similarities that are involved in planning for and managing the social aspects of earthquakes and other kinds of natural disasters.

(1) Mitigation.

Both China and the United States have launched major attempts to mitigate ahead of time the negative effects of earthquakes. There is a particular interest in the strengthening of lifeline systems.

Many of the general mitigation measures proposed are of a structural nature, such as building earthquake resistance houses, but some are not such as mass educational programs to improve the knowledge of citizens about earthquake and safety aspects, or the use of earthquake insurance. It is generally known that there are a number of social factors which often hinder or block the implementation of almost all mitigation measures at the local level.

Empirical grounded knowledge is necessary to move towards better mitigation efforts. For example, without an understanding of the importance that citizens give to the earthquake threat, there is little basis on which to develop educational programs designed to teach people how to protect themselves during such occasions or how to reduce the threat to which they are personally exposed. Without some comprehension of why lifeline organizations, who frequently

plan for everyday emergencies, are often unwilling to commit resources and themselves to preventing or reducing disastrous consequences for occasions that go far beyond daily crises, leaves unclear the organizational incentives which might be provided for those groups and agencies who run the very physical infrastructures on which community life rests. Knowledge of how to build houses that can withstand earthquake shocks is widely known around the world, but the actual implementation of such a mitigation measure varies widely from society to society, and even from community to community within a given social system; why is this the case and what might be done to enhance the local adoption of this and other mitigation measures?

The comparative studies required might be of two kinds. Along one line, there could be research on organizational and governmental hazard reduction policy positions and mitigation strategies. In particular, what are the social structural and situational factors that facilitate both the adoption and implementation of such policies and strategies, as well as the converse? There is reason to think that the taking of a lead role by some key local group, could be important in initiating relevant planning. What affects community adoption or nonadoption of known mitigation measures? Along another line, studies might be undertaken on mitigation measures which are appropriate for and acceptable to citizens. In this respect, it might be examined, as some researchers have suggested, whether efforts that are directed at households or collective units are far more likely to be successful than those aimed at individual citizens who often lack social support for whatever is being advocated. Would earthquake insurance more likely to be adopted if this was the orientation?

(2) Emergency Preparedness.

It has been learned that some earthquake related and specific problems especially have to be well planned for considerably ahead of time. Among these are the following. For one, earthquake in urban areas in particular create some especially difficult problems for search and rescue, e.g. the necessity of having preplanned where and how the kind of heavy equipment needed for getting under the huge debris that can result from the collapse of urban structures. Also, earthquakes often tend to produce, unlike floods, many injured victims, thus requiring stand by emergency medical service systems for handling a sudden influx of mass casualties. Finally, large scale evacuations, because of heavy damages to buildings, frequently have to be planned for by emergency organizations and community officials.

All three problem areas, if to be dealt with efficiently and effectively, require extensive preplanning, because there is a need to mesh the activities of many organizations and the needs of many individual citizens. Also, often both local and extra community

groups have to be involved because the necessary resources and personnel may be relatively distantly located from impacted localities. In addition, the planning should not only be periodically tested, but periodically revised because many of the variables involved (the capabilities available) may change somewhat almost daily.

Some of the relevant studies have already been done in both China and the United States, but comparative research would help in identifying model planning. There is also a need to see if it would be possible to generate the parameters of the needs in different scenarios (e.g., what might be the number and range of injured that could be expected in a moderate size earthquake in a city with a particular building construction, practices and structures?). Developing evacuation planning also requires establishing where evacuees might be sheltered in the short run, and perhaps housed in the long run. In many respect, in this and the other two mentioned topics, the basic question in all of them is what constellation of resources might best be preconfigured for what sets of varying demands or needs that might be created by different size disasters?

(3) Emergency Response.

Four kinds of problems in the emergency response time periods of disasters have already been noted in both countries (this does not imply that there might not be others of equal or greater importance). For one, there are frequent difficulties in mobilizing the established or traditional organizations, including the emergency oriented ones. Another area that has serious consequences for a good emergency response, is that almost always there is a lack of much interorganizational coordination for varying periods of time after impact. In addition, there often are emergent, unplanned groups which appear and carry out very important functions which as search and rescue, and sometime even decision making about community priority actions. Finally, local mass communication systems are often used by local organizations as well as community residents to obtain information about what has happened and what help is available, even though the systems may themselves have considerable difficulties in learning about the occasion.

There is a need to understand the social factors that are involved in the generation of such organizational problems. While they appear in all disasters, they frequently take an extreme negative form in major earthquakes, possibly because they frequently impact large geographic areas and affect many agencies which in turn necessitates the massive convergence of outside organizations into the stricken community. Emergent groups in turn would seem to fill in social voids or carry out functions no other social entities are capable of doing at the height of the emergency time period.

Already undertaken research indicates that local mass communication systems are often the prime information distribution channel used by local authorities, but they have as many problems as others in obtaining accurate knowledge about a disaster.

Comparative research could more clearly ascertain the factors that facilitate and those that hinder the mobilization of organizations very important in the emergency time period. In particular, studies might be able to distinguish different possible patterns of coordination between agencies which could be planned ahead of time, and which patterns might be most appropriate for managing the various crisis time problems (e.g., providing temporary sheltering for example seems to require a different set of organizational arrangements than burying the dead). It would also be important to see how and what kind of planning could help to integrate better the activities of emergent groups and established organizations. Actually, many of the problems involved in all these situations are more management (tactical) issues than they are planning (strategical) ones. Overall, the role that the local mass communication system can play, and how it might obtain better and more relevant information for distribution, can be further explored.

(4) Recovery.

Of all the phases of disasters, the recovery period, appears to be the one about which there is the least knowledge of and in which there are many problems. This is particular true regarding the long term recovery of households and communities from higher magnitude earthquakes. There are in particular questions about the most appropriate mix of help from relatives/friends, and from the various relief agencies that typically get involved in the recovery and reconstruction phases of disasters. In part, this has to do with the policies which ought to guide recovery planning. In turn, this is related to both the social and economic effects of disasters, and the social and economic changes desired at both the local and national levels, and its connection to general developmental policies.

The issues that need to be examined in this time phase of disaster planning range from the best practical mechanisms for providing recovery assistance to the basic policies a country may have regarding the housing of its population. In this respect, the questions here deal not only with the planning and managing of the recovery phases of disasters, but also how they relate to community and social values regarding the levels of living and housing being provided and/or planned by non-disaster factors and programs.

Comparative research would allow an examination of the factors leading to different programs and policies, as well as the consequences of instituting such programs and policies.

In particular, it might be possible to establish what connections exist between planning for disaster recovery and the more general social planning and social change that is present in the larger society. Some have argued that particular disaster recovery planning in a community cannot be too far from the general planning and changes occurring in the larger social system, if it is to be successful; studies of a comparative nature would put this proposition to a good test.

While we have for expositional purposes discussed the four hazard or disaster planning phases separately, they are of course interconnected and linked. What might be done in a preceding stage can effect what can be done in later ones. Thus, it is important to know the linkages between them.

An implication of this is that some attention should be paid to how the linkages might be similar and different in a Chinese and American social context. Equally as important, there might be a connection in one society which might not be as obvious in the other. This has been found true of the situation in Japan and the United States.

(5) Earthquake Predictions.

Earthquake predictions are issued in both China and the United States (and we include both scientific and pseudoscientific ones). There is considerable debate around the world concerning the issuance of earthquake prediction announcements to citizens, with much of the controversy centering around how people react to warnings about danger. There is also the question of how to deal with pseudoscientific "predictions." Some evidence exists that different sectors and segments of a population have varying beliefs about the validity of prediction sources, as well as the veracity of mass media information through which many such predictions are learned about. In addition, there is the matter of the social consequences of predictions which turn out to be incorrect or false; how will that effect response to later predictions? Additionally, there are questions of the consequences of predictions for organizations and social institutions; what will those planning for industrial expansion in a community do particularly in the face of long term predictions of earthquakes?

The above indicates that it would be rather useful to initiate comparative studies about existing knowledge of and response to earthquake predictions. This research topic would provide information to governments and scientists on the most appropriate ways to issue predictions and forecasts. It would also yield information on what the public expects from their major social institutions with respect to what and how they will communicate to citizens about hazards and dangers.

(6) Catastrophic Disasters.

Among some disaster researchers there has grown the conviction that there are both quantitative and qualitative differences between even a major disaster and a truly catastrophic one. They argue that a community that has only been partly impacted by an earthquake disaster, such as San Francisco in the recent Loma Prieta one in California, is faced with a rather different situation than one which has been totally devastated such as what occurred at Tangshan, which was truly catastrophic (and which along certain lines can be considered because of the ramifications throughout the society, a national level disaster). As such, even the community level planning as well as the eventual managing of such occasions, have to be somewhat different from what can be in place even for a major but nonetheless limited earthquake.

Given that both China and the United States are clearly both vulnerable to catastrophic earthquakes, joint studies on such a problem would seem warranted.

(7) Earthquakes and Other Disasters.

Finally, in recent times the cost ineffectiveness, unnecessary duplication of resources and inefficiency of planning for only one kind of disaster agent, is a question that has come increasingly to the fore. Certainly both China and the United States are vulnerable to and impacted by a variety of different natural and technological disaster agents. To some, this would suggest at least the partial taking of a unified multiple hazard approach in both research and disaster planning. It could save substantial money and resources. Also, the current planning for and managing of different kinds of disasters have different strengths and weaknesses in both societies. As such a move towards a multiple or generic approach to disasters could make for greater efficiency and effectiveness in the planning for and managing of all disasters, whatever the agent involved. It should also be noted that approaching disasters generically is much easier for social scientists than for physical scientists and engineers who tend to be agent specific in their thinking and work.

Since the general concept of a generic approach to disasters is also consistent with the goals of the United Nations International Decade of Natural Disaster Reduction (IDNDR), to which both China and the United States are officially committed, some initial joint exploration of the possibilities and limitations should be considered.