

## IMPROVING THE RESPONSE TO EARTHQUAKE HAZARDS AND DISASTERS BY EVALUATING CIVIL PROTECTION PROGRAMS

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In order to provide a good response to earthquake disasters, it is necessary that civil protection be present as a developed system that is properly articulated at all levels, from national to local, and across relevant organizations in the public, private and voluntary sectors. The reality is that most countries have a civil protection system that is either poorly articulated or is a mosaic of authorities at different levels of development. One municipality may be well prepared, having invested time and resources in the development of its civil protection service, while a neighboring one may be at a much lower level of development.

This paper reports on a procedure designed to assess the capabilities of a civil protection system at whichever level of government it exists. The emphasis, however, is on assessing services offered by local authorities, as the municipality is the “bedrock level” of emergency response and disaster risk reduction, and, no matter how large they are, all disasters require a local response in terms of search and rescue, medical care, evacuation, shelter, and so on.

Research for this paper was conducted in the central Mexican State of Puebla, and in particular in the town of Teziutlán, which has a population of about 90,000 and is threatened by landslide, hurricane, flood and earthquake hazards. In Teziutlán, a major landslide disaster in 1999 set off a process of development of the local civil protection system. This has grown from negligible proportions to a point at which it can now offer a viable service to local citizens when disaster threatens or impacts occur. However, the service is still only partially developed, and there are large gaps in its capabilities.

In order to assess the capabilities of a civil protection system, I developed a methodology, and tested it in Teziutlán. It involves using expert judgment and a comprehensive set of indicators with which to judge the capabilities of 13 different aspects of the system. For example, the indicators cover emergency planning, warning, evacuation, situation management, co-ordination, communications, public information management, training, recovery management and a variety of other essential aspects of the system. The indicators are accompanied by a series of criteria for judging the development of the system. Relevant questions include the following. Does the system achieve its stated goals? Is it fully articulated and implemented, at all appropriate levels and for all organizations that are significant involved in emergency operations? Can communication, command and collaboration take place seamlessly and with minimum effort? Are staff and organizations comfortable with the system and do they know and understand it thoroughly?

A civil protection system needs actively to be designed, rather than coming into existence spontaneously. The design process needs to have clear goals and objectives, and it requires a steady stream of resources, including information and expertise. Plans, procedures and the competencies of personnel need to be developed steadily as the system grows.

Teziutlán’s emergency management and response system can be classed as “emerging”. This means that it has limited capabilities, many of its long-term objectives have yet to be realized, and it is short of essential aspects, such as a good training program. Nevertheless, it has grown and reached a threshold beyond which it can be regarded as established and with good potential to grow further. The point of emergence of a civil protection system is a critical one, as it embodies the process of transition from an essentially unviable system to one that is now a recognized and functional local service.

The indicators developed for this study provide 42 different indices of development spread across 11 categories: development, planning, warning, evacuation, facilities, communications, command, public involvement, training, recovery and resources. It would probably be misleading to create a single overall index to represent the development of the system. However, the individual indices can be used in a comparative manner and this may help to show, first, where the system is least developed, and secondly where it would be best to invest resources in the future. For example, the Teziutlán civil protection system is short of emergency plans, physical facilities, public involvement and plans for recovery from disaster.

In the light of the dominant hazards in a particular area, and politically-determined priorities, the indices may indicate the best strategy for future investments in the civil protection system; in other words, into which categories it would be best to put resources of time, money and expertise.

The civil protection system evaluation methodology is not intended to be used in the total absence of other criteria. One question is the relative importance of particular hazards, such as earthquakes, and the likely consequences of these according to local scenarios of impact and possible response. For instance, post-earthquake evacuation and shelter may be top priorities, and hence these may need to be developed as a priority among the elements of the civil protection system. Nevertheless, the methodology enables the user to see where the greatest impact can be obtained from investment of resources in the system.

The improvement of a civil protection system over time is rarely a smooth, linear process. Instead, it tends to occur in sudden increments in response to particular disasters. This was the case in Teziutlán after particular landslides, floods, hurricanes and earthquake events. It was the case in Iran after the Manjil and Bam earthquakes. However, the patient work carried out to improve the system during times of quiescence is not to be underestimated: it tends to be catalyzed by disasters, as, although improvements may appear to be sudden, they depend on the ground-work of mitigation, planning and preparedness carried out during the quiet periods (Fig. 1).

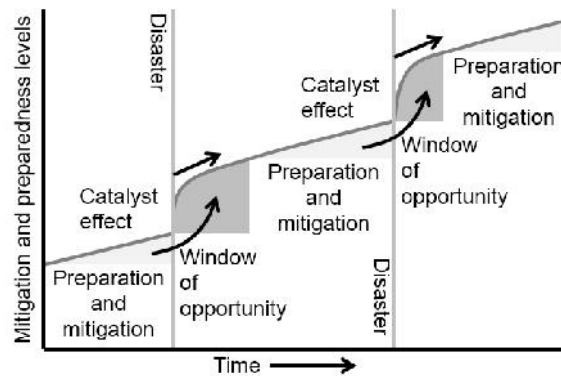


Figure 1. Catalytic effect of disaster preparedness during times of emergency

Further details of the civil protection assessment methodology, and its possible applications in cases dominated by earthquake hazards, can be found in the full version of this paper. The Teziutlán case study is described in Alexander (2015).

## REFERENCES

Alexander DE (2015) Evaluating civil protection systems, *Disaster Prevention and Management*, 24

