

Community vulnerability to natural hazards: Contributing to total risk assessment

Australian communities are at risk

The impact of natural hazards on Australian communities can be devastating. Cyclone Tracey, the 1989 Newcastle Earthquake, the Thredbo landslide and many NSW floods are embedded in Australia's history as events that destroyed many lives and homes.

After such events, the devastation is commonly measured in terms of costs to property, businesses and infrastructure. However, the total effects are much greater than damages to buildings, especially for those who have access to fewer resources and less capacity for recovery. Due to various social factors, there are people within the community that are more vulnerable to the effects of a natural hazard than others.

The challenge is to better understand our communities so that a more comprehensive management of total risk can be taken. Such a task requires a multi-disciplinary approach, and Geoscience Australia is collaborating with the Bureau of Meteorology, Emergency Management Australia, Local Government Agencies and Universities to develop a better understanding of how natural hazards affect communities.

Understanding our communities contributes to reducing overall risk

Geoscience Australia acknowledges that an integrated approach to understanding natural hazard impacts is essential to a total understanding of risk. The inclusion of community vulnerability studies in Geoscience Australia's Cities Project is based on an understanding that total risk is the outcome of the interaction between a hazard phenomenon, the elements at risk in the community, and the vulnerability of those elements, as can be demonstrated by the expression:

$$\text{Total Risk} = \text{Hazard} * \text{Elements at Risk} * \text{Vulnerability}$$

The Cities Project has developed a series of indexes, based on individual social indicators, that reflect the relative level of hazard exposure and the relative level of community vulnerability. Approximately 32 social indicators were used to model community vulnerability in the South-East Queensland Cities Project, some of which included:

- households with access to a car
- single-parent households
- those aged over 65 and under 5 years
- people from different cultural/language backgrounds

By drawing the social indicators together, a 'risk index' has been produced that is used to create 'risk surface' maps to illustrate the spatial relationship between levels of exposure and vulnerability, as shown in Figure 1.

Better equipping those involved in making emergency management decisions

The visual representation of a community's vulnerability to natural hazards is a unique, powerful tool. Emergency managers, town planners and emergency services are able to identify who in their community may require more assistance after a natural hazard impact. More importantly, community vulnerability information allows leaders to better mitigate against natural hazards by preparing their communities now.

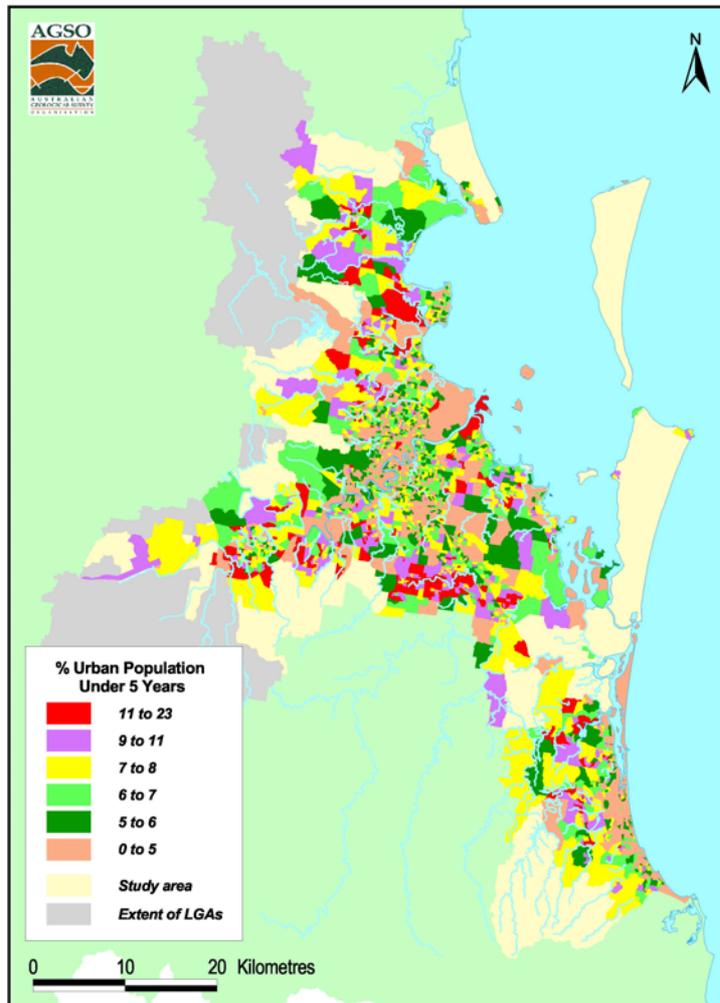


Figure 1. The community vulnerability index of South-East Queensland is an indication of the relative contribution made to overall community risk across the study area. That is, the lower the number, the greater the vulnerability to a natural hazard event. The index highlights the importance of understanding communities in a spatial context.