Effective disaster risk reduction is founded on knowledge of the underlying risk. While methods and tools for assessing risk from specific hazards or to individual assets are generally well developed, our ability to holistically assess risk to a community across a range of hazards and elements at risk remains limited. Developing a holistic view of risk requires interdisciplinary collaboration amongst a wide range of hazard scientists, engineers and social scientists, as well as engagement of a range of stakeholders. This paper explores these challenges and explores some of the common and contrasting issues sampled from a range of applications addressing earthquake, tsunami, volcano, severe wind, flood, and sea-level rise from projects in Australia, Indonesia and the Philippines.

Key issues range from the availability of appropriate risk assessment tools and data, to the ability of communities to implement appropriate risk reduction measures. Quantifying risk requires information on the hazard, the exposure and the vulnerability. Often the knowledge of the hazard is reasonably well constrained, but exposure information (e.g., people and their assets) and measures of vulnerability (i.e., susceptibility to injury or damage) are inconsistent or unavailable. In order to fill these gaps, Geoscience Australia has developed computational models and tools which are open and freely available. As the knowledge gaps become smaller, the need is growing to go beyond the quantification of risk to the provision of tools to aid in selecting the most appropriate risk reduction strategies (e.g., evacuation plans, building retrofits, insurance, or land use) to build community resilience.