MEASURING RESILIENCE AND RECOVERY

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This paper reports attempts to measure and assess resilence and recovery after various recent earthquakes that had huge impacts in their respective countries. The examples are both quantative and qualitative.

The concept of resilience is used in disaster literature has, until recently, been imprecise (Bruneau et al., 2003). This papers reports the latest thinking on what the concept means and how to measure it. It also links resilience to the speed and quality of recovery. Recovery is variously referred to as recovery, reconstruction and long-term development. The research reported here makes no distinction between these. Recovery may involve reinstating things to the same state they were in before the disaster or 'building back better'. The focus of this paper is to measure the speed of recovery with reference to a 'base state' immediately prior to the onset of the disaster.

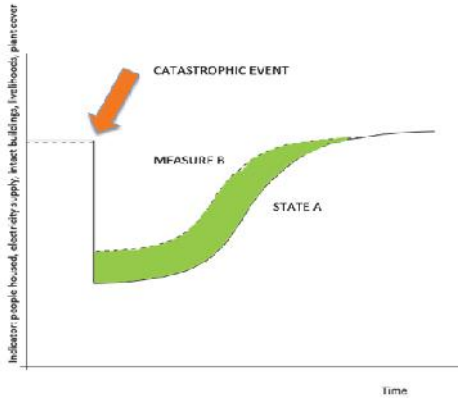

Figure 1. Recovery curve. Area in green a measure of increased resilience with mitigation measure

Data from satellite imagery and surveys are reported for case studies in Thailand after the Indian Ocean tsunami in 2004 and in Pakistan after the Kashmir earthquake in 2005 (Brown, Platt et al, 2010). Cumulative normal distribution curves are fitted to data extracted from analysing sateliite imagery. The curves show clear and distinct differences in the speed of recovery in the two countires in terms of the speed of physical reconstriuction of buildings.

Cumulative Normal Distribution (CND): $R(t) = \Phi((t - \frac{\lambda}{\zeta})$

The paper also reports research for the insurance industry to define a metric that compares the time taken to recovery for insured and uninsured properties using data from the Northridge earthquake 1994. The approach adopted was to plot data for all properties without differentiating between type of use and the paper presents an analysis of data relating to building repair after the 1994 Northridge earthquake. (Eguchi, 1998; Patak, 2000).

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Figure 2. CND curve fitted to observed data using Least Squares method (Murao, 2007)

The paper reports a simple methodology used to assess recovery qualitatively through interviews with key informants and site visits after 10 major earthquakes and tsunami over the last 20 years (Brown, 2010).

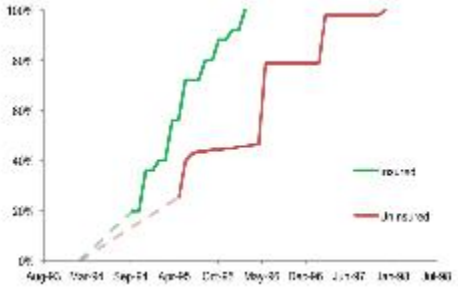

Figure 3. Estimated cumulative recovery profiles for insured and uninsured property

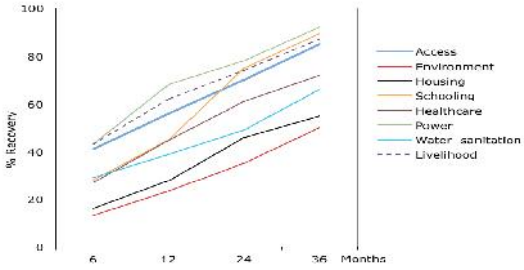

Figure 4. Estimated cumulative recovery profiles for insured and uninsured property

So it is possible to measure speed of recovery but is speed a 'good' measure of resilience? The paper finally compares the speed of recovery and the degree of deliberation after three recent earthquakes: Tohoku Japan and Van Turkey in 2011 and Chile 2010 and concludes that speed is not everything. 'Building back better' involves increasing robustness and reducing risk. People also value quality of life – the quality of new housing, of livelihoods and the environment. Should we keep our measure of resilience simple and limit it to speed of recovery and accept we will need to consider other issues. Or should our measure resilience also involve a measure of quality as well as speed.

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