

The judicial system was used after the L’Aquila earthquake in 2009. Despite the known difficulties in predicting earthquakes, six scientists and an ex-government official were convicted of involuntary manslaughter, after a year-long trial ending in October 2012, and each was sentenced to six years of imprisonment.

They were judged to have provided “an assessment of the risks that was incomplete, inept, unsuitable, and criminally mistaken”, having said in the six days before the earthquake, when there were seismic swarms in the general region (although not at L’Aquila itself), that an event was “unlikely (although not impossible)” and that there was “no danger”. It was decided that the foreshocks were typical of seismic activity ahead of a major tectonic event but that the scientists had interpreted them incorrectly as “normal geological phenomena”. Two years later, the sentences were quashed under appeal, except for the government official.

Insurance is another way of increasing societal resilience to natural hazards. However, in Italy the uptake of earthquake insurance is extremely low (1%), especially when one considers the high frequency of earthquakes. Italians generally expect the national government to bear the costs of such events.

It is estimated that the 2016 event will cost less than L’Aquila in 2009 (€505m), which caused >€10bn of economic damage, representing a significant 0.6% of Italy’s GDP. Italy could increase the uptake of insurance by making it compulsory, and national or local governments could provide not-for-profit schemes for private insurance. A further incentive could be that premiums are made tax deductible. Figure 6 shows how some tectonically active countries approach insurance for earthquake risk.

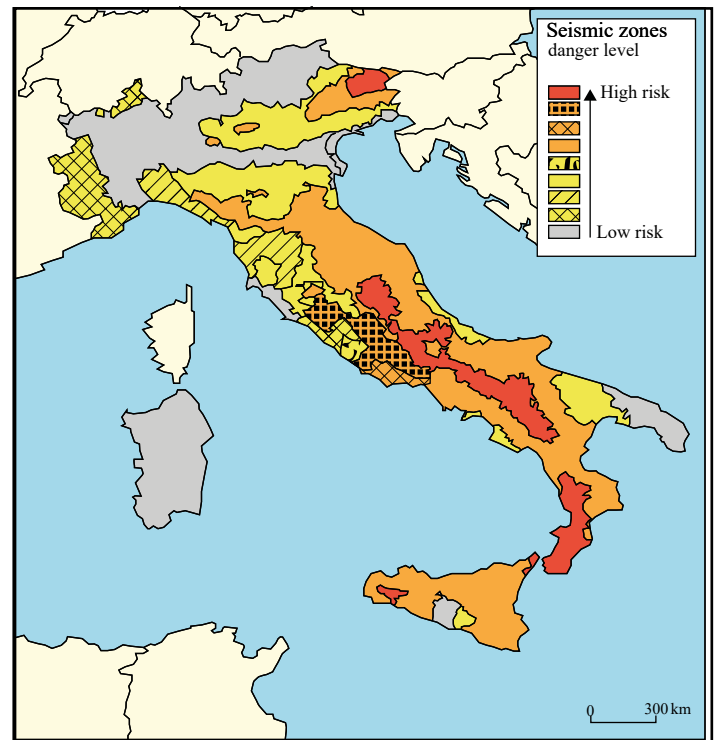
Figure 6. Comparison of insurance uptake in tectonically active countries

Country	Residential earthquake insurance take-up rate %	Basis for cover
Italy	1%	Voluntary
Japan	60%	Voluntary
New Zealand	80-85%	Compulsory, added to domestic insurance policies
Turkey	40%	Compulsory, but no sanctions; incentive is additional value when the property is sold

A detailed national seismic hazard map is available (Figure 7). It is based on past records of earthquakes, the location of active faults, and crustal strain measurements from GPS receivers. It clearly shows the areas needing priority in preventative measures, but scientists who created the map believe that public authorities do not give it enough attention in their planning processes. The 2009 and 2016 events occurred in the highest risk zone.

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Figure 7. Map of seismic risk zones. The red central zone has the highest risk of earthquakes



Early warning systems are not deployed in this region, but they would not have been effective in these recent earthquakes. The distances from the epicentre to the settlements was so short that there would not have been time for alarms to reach mobile phones or public sirens. At best, had there been a dense network of gauges, people in Amatrice could have got under a table, but not out of the houses. Also, there had not been a swarm of foreshocks to alert scientists, as had been the case in L’Aquila, and these are rare anyway.

Conclusion

Resilience could be improved by compliance with building codes, as it is estimated that 64% of Italy’s population live in areas where buildings are vulnerable to earthquakes. Insurance would be a very effective measure to increase societal resilience, especially as it would reflect the global move towards disaster risk reduction, rather than paying for damage after the event. *Casa Italia* is the latest national preparedness plan and needs to include up-to-date approaches to managing disaster risk. All measures possible need to be taken, as the Central Apennines remains at high risk of destructive earthquakes, due to the shallow faulting pattern along the mountain crests, where historic towns and villages were originally sited for defence purposes. They are a major tourist attraction of Italy, which alone can partly justify the need to spend heavily on strengthening buildings at risk.

References

- Seismic gap theory and overview of 2016 earthquake: <http://tinyurl.com/h23mgeh>
- Useful links: <http://geography.org.uk/resources/earthquake-and-tsunami-resources/italy-earthquake-2016-geography-resources/>

Further Research

Research other associated tectonic hazards within Italy including the active volcanoes of Stromboli and Etna and the semi-dormant volcano of Vesuvius. You should explore how these volcanoes are being managed. www.rgs.org/ Tectonic case studies pdf