

Lessons from the Italian court verdict on earthquake risk assessment

The historically significant decision of an Italian court to imprison six scientists and one government official for false assessments of earthquake risk¹ has raised two serious issues regarding earth sciences: the manner in which significant scientific findings can be effectively communicated to administrative and common people and an urgent need to make earth sciences education easily accessible to all.

The lack of proper communication among the scientists, the administration and the public has been cited as a primary basis on which the Italian case was registered against the alleged offenders who were unable to warn and prepare people about a looming disaster². The charges alleged that members of the National Commission for Forecasting and Predicting Great Risks provided 'incomplete, imprecise and contradictory information' to a public that had experienced months of persistent panic through low-level tremors² and 'failed to adequately evaluate and communicate the risk to the local population'³. Further, unfortunately and negligently, no formal minutes of the meeting were prepared.

What this instils is that scientifically critical meetings should be seriously managed and the outcome properly communicated to the stakeholders. To avert disaster in the future, scientists and other stakeholders may have to be properly

trained in disseminating information to the public and media, which can be achieved by introduction of a core short course during a Ph D programme for academic fraternity and by organizing training workshops for non-academics.

Although a recent book on earthquake prediction by Hough⁴ presents a critical analysis of current earthquake prediction as an impossibility, effective ways of prevention of earthquake disasters remain the strict construction standards, careful geological evaluation of building sites and public education. Unfortunately, these techniques remain out of reach for the developing world. Thus, even if scientists are able to predict a major earthquake with great accuracy, what will that change on the ground in most of countries around the world? The bitter reality is that people might still die as there are only a handful of countries which abide and follow the building regulations to withstand a major earthquake, for example, Japan. The recent major earthquake there in 2011, that was followed by a tsunami has had minimal effect on buildings⁵. However, in most of the developing countries the earthquake-resistant building regulations are not strictly followed. It would be absurd to blame the scientists or the people for this negligent attitude, because to minimize any risk, a major role needs to be played by the administration. Thus, administra-

tive power of a country can make a great difference in this regard. The proper role for scientists lies in offering consultation to the country's administrative body; in extreme cases the scientists may have to make sure that their advice is practised on the ground.

One way to achieve this would be introduction of earth sciences as a core field in the academic curricula. Also, an increase in the earth sciences outreach activities will greatly help one understand it better. Organizing special workshops or training courses for people with administrative responsibilities, like government officials, will provide them with an updated knowledge and understanding about various earth processes.

1. *Nature*, 2012; <http://doi.org/jkp>
2. Hall, S. S., *Nature*, 2011, **477**, 264–269.
3. http://www.earthquakes.bgs.ac.uk/news/laquila_verdict.html
4. Hough, S., *Predicting the Unpredictable*, Princeton University Press, 2010, pp. 222.
5. <http://www.nytimes.com/2011/03/12/world/asia/12codes.html?pagewanted=all&r=0>

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A response on intellectual plagiarism

A letter published recently in *Current Science* on plagiarism¹ brought to my memory a woeful event that occurred a couple of years ago.

A lecturer in a Madras University college repeatedly approached me via e-mail to examine a thesis of his Ph D student. With reluctance – mainly for want of time – I agreed to read the thesis. In 3–4 days, it was on my desk with a postal marking worthy of Rs 3000 spent on it for shipping the thesis copy to me. This meant that the University was willing to spend exorbitant monies on postage, if it wanted, but never wanted to honour its commitment of paying the

promised honoraria for marking the thesis! I have given up reminding them on this matter and have started ruthlessly declining offers. Anyhow, coming back to the point I am writing on: because the lecturer needed my report swiftly, I started reading the thesis in earnest. The introduction was brilliant. I could not scribble any notes on the margins of that chapter with my pencil. I was about to start writing my report as 'excellent introduction', but for some unexplainable reason, I decided to do a random check on the web. When I typed a few keywords from the title of the thesis, several thousands of references appeared on that

theme. I selected the first two articles for reading: one was in a professional journal in Europe and the second was a book chapter, both appearing just a year before the thesis came to me. The introduction in the thesis I was reading was a verbatim reproduction from those two articles! The only smart thing the author of the thesis had done was to write one sentence from the paper and the second from the book chapter; thus the entire introductory chapter was a clever manipulation of sentences from both articles. The punctuation error in one of the published articles was reproduced without change as well.

Depressed, I returned the thesis without examining it with a remark to the Registrar of the University. I had no response from the University and have no clue as to what was done with the thesis. My guess is that it would have been sent to another naive examiner elsewhere and

probably the author of the thesis is currently – gleefully – perpetuating this behaviour through his Ph D students!

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1. Foster, K. R. and Chopra, K. L., *Curr. Sci.*, 2012, **103**, 1258–1259.
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Bio-toilets for Indian Railways

Bio-toilets are projected to improve sanitation in the trains to solve the problem of open defecation^{1,2}. Bio-toilets are based on continuous anaerobic microbial digestion of human excreta to biogas. Typical composition of biogas is 55–75% methane and 25–50% carbon dioxide. In these bio-toilets, gases escape into the atmosphere and treated waste water is discharged after chlorination. Bio-toilets welded to passenger coaches have an inlet for human excreta and outlet for biogas. They are an economically viable solution, with one bio-toilet costing Indian rupees 15,000 (US\$ 280). There is also a plan of installing these toilets in over 100,000 Gram Panchayats in the next five years. This will help solve the problem of open defecation in rural India. Although this is a good beginning, the concept of bio-toilets in trains will be

entirely different from those in Gram Panchayats (houses, schools, institutes, etc.). In the latter case, trapped methane will most probably be used as a cooking gas, whereas in the case of trains it will be released to the atmosphere. The Indian Railways carries 20 million passengers daily and once bio-toilets are equipped in all 53,000 coaches by 2022 as projected, methane emissions will be substantially increased. Methane as a greenhouse gas had a global warming potential of 25 compared to carbon dioxide over a 100-year-period³. The Indian Railways may look for engineering solutions to capture and store methane released from the bio-toilets. Vehicles including trains which are successfully fuelled with compressed and concentrated biogas may be taken for case studies⁴. Also, rail-toilets are generally small and care

should be taken to divert methane out, because it is an asphyxiant and may displace oxygen in an enclosed space.

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1. Narain, S., *Nature*, 2012, **486**, 185.
 2. Sharma, A. *et al.*, *Nature*, 2012, **489**, 33.
 3. Shindell, D. T. *et al.*, *Science*, 2009, **326**, 716.
 4. US Department of Energy, What is biogas? April 2010, p. 13.
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German Bundesrat proposes second usage of publicly funded research

On 12 October 2012, the German Bundesrat (Federal Council of Germany) has passed a resolution to clearly change several paragraphs of the UrhG (German Copyright Act; GCA) in favour of the scientific dissemination principle. We have observed a series of changes to the GCA over the last few years. Many of them were highly problematic for scientists in terms of free and wide-area circulation of their research outputs. For instance, on 1 January 2008, the ‘Second Act Governing Copyright in the Information Society’ (Second Basket) took effect strictly limiting the distribution of PDF reprints, even if authorized and issued by the author herself/himself¹. GCA is now to be reformed in clear direction to open access properties for research that is

(mostly) publicly funded. Particularly, the Bundesrat, the legislative body representing Germany’s 16 federal states, proposes to change §38 UrhG in order to permit open access of such material by six months after initial publication. Importantly, the according right to give unrestricted access to own publications would also apply for works for which authors have subrogated their exclusive legal right of use.

This important step would finally put an end to the paradoxical situation that national research foundations pay scientists to write papers and that the copyrights for these publications are transferred to the publishers from whom scientist colleagues will have to buy back reprints to be able to read or use them. It

seems that the scientific community and now also political forces have realized that we have to allow free access to any material the international community has created and generated to really enable everyone to benefit from a globalized world².

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1. Carbon, C. C., *Science*, 2008, **319**, 1483.
 2. Seadle, M., *Libr. Hi Tech.*, 2007, **25**, 298.
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