

Key Role for Geoscientists in Providing “Early Warning System” on Environmental Crises

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MOST would agree that it is much better to be warned about an impending tsunami when it is many kilometres offshore — and have time to take life-saving action — than to find out about it once it looms large on the horizon.

While environmental crises such as salinity, water shortages, land degradation and climate change tend to develop more slowly over the years than the relative immediacy of tsunamis, they nevertheless have just as much capacity to wreak serious environmental and economic damage.

And what of other environmental problems that are not yet immediately evident to the naked eye, but which could develop into major crises in future years? Remember that, not many decades ago, issues such as salinity and erosion were quietly developing as future problems but they were yet to ring political alarm bells.

In short, the more informed our governments (and communities) are about environmental issues before they become full blown crises, the more cost-effective and politically palatable it will be for governments to take early action.

This means taking a futuristic perspective to the management of our environment — that is, looking ahead 25 to 50 years and assessing through scientifically-based evidence and evaluation what potentially dangerous roads we may only just be starting to travel down.

To this end, the Geological Society of Australia (GSA) is proposing the establishment by the federal and state governments of a National Geoscience Expert Panel, an independent advisory panel of key geoscientists to

provide a high-level “early warning system” on future environmental problems.

Australia has been instrumental in developing an early warning system for tsunami risk along the Australian coastline — and this has been a terrific initiative — but the same level of attention has not been given to the need for an overarching early warning system for many other environmental issues.

Some of the key environmental problems which are plaguing Australia at present — such as salinity, drought, water contamination, water shortages, climate change, loss of productive land and the impact of urban development on land health — have been on the radar of geoscientists for many years, long before these issues became hot political topics. But there has been no real mechanism for the geoscientific community *as a whole* — that is, our universities, government agencies, private research organizations and others — to collectively feed “early warning research” back to governments, or for this research to be treated seriously by governments, at such an early stage in the development of the problems.

It is really only once the rivers have stopped running, the lakes have salted up or turned acidic, productive land has been degraded beyond repair and the wildlife has started dying that governments have begun to take notice.

A National Geoscience Expert Panel would serve as an independent voice to provide scientifically-based warnings and recommendations on future environmental problems collectively to governments many years before they hatch into full-blown environmental crises, thus giving governments a

much earlier timeframe to respond and a much better chance of implementing workable and successful solutions.

In the immediacy of today's world, this type of early warning system could be shrugged off as simply being crystal ball gazing and a luxury we cannot afford. But forewarned is forearmed, and as long as the advice provided by the Panel to governments is based on proper, scientifically-based research and evidence, it would be an extremely valuable body in notifying the federal and state governments of potential environmental problems before these problems have gained momentum.

Given the scope of their work, geoscientists are well placed to pick up on minute markers of environmental change long before they become visible to the naked eye. In a sense, their research can often track the very beginnings of environmental problems way before they come to light, much as ocean-based buoys can provide an early warning of potential tsunamis.

While GSA's formal policy recommendation on a National Geoscience Expert Panel is still being fully developed, our initial deliberations suggest that the Panel should comprise about 20 to 30 geoscientists from across government, industry, academia, the research sector and elsewhere, each of whom are respected for their particular area of geoscientific expertise.

The Panel ideally would be funded by the federal and state governments, would meet each quarter and would take advice from the wider geoscientific community through a regular and open consultation and submissions process. It would then

develop and feed independent advice to our governments — and the Australian community — on environmental and other geoscientific concerns which could potentially reach crisis point in 25 to 50 years, and recommend appropriate early action to avert or minimize these crises.

As a secondary objective, the Panel could also be used to assess how our current environmental crises might develop in future years in response to solutions being implemented today — and also highlight “sub crises” that might develop because political attention is being applied to only one aspect of a particular problem. For example, while much political attention currently (and quite rightly) is being given to the state of the Murray River, are there other struggling river systems where an equivalent amount of political attention should also be urgently directed?

Australia is very fortunate that we have highly respected organizations like Geoscience Australia, CSIRO and the state geological survey agencies, which provide valuable advice to government on a wide range of geoscientific issues.

Working as an independent, non-government advisory body, a National Geoscience Expert Panel would seek to complement the role of these organizations by gathering and consolidating scientific input from them — as well as from other federal and state government organizations, and geoscientists working in industry, universities, private research organizations and elsewhere — before feeding recommendations collectively to our governments.

We recognize there are already a number of expert panels in place to provide advice to government on specific and current environmental issues. We see that a National Geoscience Expert Panel would complement these committees by providing early advice on *future* environmental crises and acting as a whole-of-sector clearing house for geoscientific research being undertaken on future environmental problems.

In this way, a National Geoscience Expert Panel would add significant value to a National Geoscience Research Strategy also being proposed by the GSA, which would (among other things) aim to ensure that all commercially-focused and academic geoscientific research into issues including clean and reliable future energy, salinity management, climate change, geo-hazards, groundwater exploration and contamination, land use and land degradation is available in one central online point so all sectors of geoscience and governments can benefit from it.

Interestingly, Australia is not the only country where geoscience will play an increasingly crucial role in helping society meet its future environmental and economic challenges — unarguably, it will need to happen on a global scale. In September, the American Geological Institute (AGI), in conjunction with its member societies, released a policy document entitled *Critical Needs for the Twenty First Century: The Role of the Geosciences*. This document suggests policy directions for the next U.S. President, his administration, federal agencies and the United States Congress. The document identifies seven key issues and the role that geosciences can play in addressing them — energy and climate, water, waste disposal, natural hazards, infrastructure and raw materials, as well as workforce and education needs.

In the document, the AGI makes 3 key recommendations (reprinted here in full):

- Establish a Natural Resource Advisor within the White House Office of Science and Technology Policy to advise the President on stewardship of natural resources based on scientific understanding and technological advances. The advisor will highlight connections between the different resources; improve integration between research, development, technology and demand of all resources; and advise the government on policy, management and risk reduction — all in a global context.
- Invest in mapping, monitoring, assessments and state and federal

surveys of natural resources. Ensure that data are integrated to provide the context for understanding climate change, supply and demand scenarios on global to local scales and risks from hazards.

- Invest in research and development to understand Earth processes because sustainable consumption and conservation of resources, enhancement of environmental quality and resilience from risk depend on living *with* our dynamic planet.

In a media release announcing publication of the policy document, the AGI stated: “With energy, natural hazards and climate change in the news, the geosciences are more visible today than ever before. The geosciences have never been more central to the major pressing issues facing the nation. *Critical Needs for the Twenty First Century* intends to unite the geosciences so they are heard in the policy-making decisions of the next administration.”

The AGI’s Executive Director, Dr Pat Leahy, was also quoted as saying: “This document highlights the most prevalent issues facing the earth sciences and the nation’s policy challenges for tomorrow. By distributing this document, we are ensuring that the needs of the nation will be met by the next administration and in turn the efforts of the geosciences community will be recognized as key contributions to tackling society’s needs. As we struggle to balance energy and economic and environmental wellbeing, the geosciences will become increasingly important.”

Further information on the Geological Society of Australia can be found at www.gsa.org.au.

The American Geological Institute’s policy document, “Critical Needs for the Twenty First Century: The Role of the Geosciences”, can be found at www.agiweb.org/gap/trans08.html.