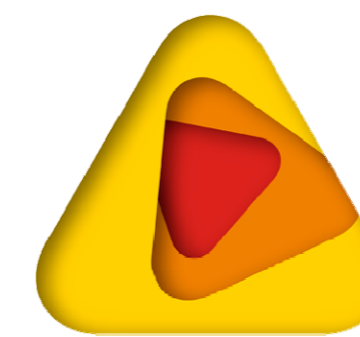


# SCIENTIFIC KNOWLEDGE QANDA



bushfire&natural  
**HAZARDS**CRC

Jessica Weir<sup>1,2</sup>, Timothy Neale<sup>3</sup>, and Liz Clarke<sup>1,2,4</sup>

<sup>1</sup> Institute of Culture and Society, Western Sydney University, New South Wales; <sup>2</sup> The Australian National University; <sup>3</sup> Alfred Deakin Institute for Citizenship and Globalisation, Deakin University, Victoria; <sup>4</sup> Leuphana Universität, Germany

## *Does science create certain knowledge about the world?*

**No**, the scientific method is inherently uncertain. Scientific methods may limit some established uncertainties but will always create new ones. Dealing with complexity inevitably means uncertainty. Science can help by creating a systematic approach and rigorous data collection and analysis, but practice-based and local knowledge is also needed.

## *Do great scientific results and methods inevitably lead to great policy and practice?*

**No**, what happens depends on the people, values and institutions that engage with scientific research and methods. In complex problems, science can only be effective when science, policy and practice make sense of the problems in partnership.

## *Are the natural and physical sciences better at generating 'hard-evidence' than the social sciences?*

**No**, this privileging of the natural and physical sciences as 'hard science' ignores their inherent uncertainties and that they are subjective methodologies produced by their socio-cultural context. All evidenced-based research methods can only ever achieve a partial-objectivity about the world. **However**, the extraordinary knowledge generated by the natural and physical sciences has meant that these knowledge traditions are highly valued in our society – including by governments, practitioners and the public.

## *Why quibble over this language of certainty?*

Because assuming that science produces certainty puts unrealistic expectations on risk mitigation practitioners in their daily work, and in the cycles of blame and responsibility that follow catastrophic events. A focus on how the natural and physical sciences can 'make things count' also limits the natural hazard sector's access to other evidenced-based research and ways of knowing.

## *So what is the best science for natural hazard risk mitigation?*

Instead of privileging one knowledge tradition over another, we need to first look at the problem and then match the research skills and approaches to what is needed by the sector. Different kinds of science need to work together not in silos.

## *What does that involve?*

1. We need to lose the emphasis on certainty in research, policy, practice, operations, inquiries, the media and so on. New language and conceptual approaches such as 'resilience' are doing this.
2. We need to understand that there will be multiple perspectives about what the problem is, what the possible solutions are, that consensus will likely not be reached, that solutions may not even be identified, and that decisions will still have to be made.
3. We need to accept complexity instead of glossing over or avoiding it. The world is not just more complex than we think, it is more complex than we *can* think. Let's embrace uncertainty!
4. We need to be aware that being upfront about scientific uncertainty decreases the risk that important scientific results and methods are dismissed or manipulated by other agendas.
5. We need to keep interrogating how different knowledge sources are judged and evaluated in society, to ensure that we have the best information at hand.



There is scientific consensus about the fire-weed Gamba Grass, but the policy response is woefully insufficient



The staggering complexity of flood risk in the Hawkesbury-Nepean Valley demands innovative approaches to knowledge sourcing and generation

**Interested?** Check out our case study research on how practitioners use science in their work:

- Fire risk in the Barwon-Otways, Victoria
- Flood risk in the Hawkesbury-Nepean Valley, NSW
- Fire risk in the Greater Darwin Area, NT

Our results on this and more are available on the BNHCRC website under the 'Scientific Diversity, Scientific Uncertainty' project

**SCIENCE**  
IS NOT AN  
**ALTERNATIVE**  
**FACT**



Scientific knowledge is not an objective 'truth' that provides answers for risk mitigation. Many other knowledge sources are required, including how scientific knowledge is used and contested by diverse groups in society.

