



Science & Technology AUSTRALIA

**Submission to the Rural and
Regional Affairs and Transport
References Committee inquiry into
the identification of leading
practices in ensuring evidence-
based regulation of farm practices
that impact water quality
outcomes in the Great Barrier Reef**

8 November 19

To the Senate Standing Committee on Rural and Regional Affairs, and Transport,

Science & Technology Australia (STA) thanks you for the opportunity to provide a statement to the inquiry. STA is the national peak body, representing more than 77,000 science and technology professionals through its 85 member organisations.

STA is a strong advocate for the scientific method, for independent peer-review that ensures research integrity and quality, and for the inclusion of the best available and most appropriate evidence in policy- and decision-making.

STA is concerned that the parameters of this inquiry are not aimed at addressing a policy decision, but rather designed to question the integrity of the evidence upon which this decision has been made. The scientific process is rigorous and incorporates many independent checks and balances; scientific findings are constantly subjected to interrogation. To suggest that evidence built through such a rigorous interrogative process ought to be subjected to political scrutiny has enormous potential to damage the future development of sound policy.

In this instance, the Queensland Government has undertaken an appropriate process to build evidence-based policy. The reviewed, tested, and verified evidence that has been considered by the Queensland Government and incorporated into the policy-making process clearly demonstrates the need to regulate nutrient and sediment run-off to protect the health of the Great Barrier Reef ecosystem.

STA wishes the committee to consider the following:

1. Australia's science and research sectors provide high quality research outcomes and act with integrity, protected by rigorous checks and balances; and
2. All policy should be informed by the most appropriate and best available evidence.

Kind Regards,



Professor Emma Johnston AO
President, STA



Kylie Walker
Chief Executive Officer, STA

Research Integrity and Quality

Doubts have recently been cast, by some political representatives, over the quality and integrity of Australian research. We begin by stating the obvious, there is no quality or integrity ‘crisis’ in Australian research.

The scientific process is built around academic rigour, objective interrogation, peer review, and replication. The work of scientists and other researchers is constantly under scrutiny by independent experts. Indeed, this scrutiny is fundamentally incorporated throughout the process of conducting research, from initial proposal to funding, and publishing results.

This level of scrutiny is not infallible. But, on the rare occasion that flawed research is published, academic and other peer-reviewed processes also provide checks and balances to correct the record. A report earlier this year highlighted that of the hundreds and thousands of Australian research publications in Australia over 20 years¹, just 247 had been subsequently found to be substantially flawed and therefore were retracted². This low error rate, paired with a culture of transparent contestability, is a clear indication that the research sector is self-reflective and self-correcting.

The research sector is also constantly re-examining the quality and integrity of its work and its professionals. Both the National Health and Medical Research Council (NHMRC)³ and the Australian Research Council (ARC)⁴ regularly review and update the codes for responsible research. Potential breaches of these codes are investigated by research organisations and the entire process of investigation can be reviewed by an independent body; the Australian Research Integrity Committee which is jointly formed by the ARC and NHMRC⁵. Methods for evaluating what research is funded have also recently changed with the introduction of a national interest test for ARC grants⁶.

The science and research sectors are also working towards becoming even more transparent to both government and public scrutiny. For example, the adoption of the Findable, Accessible, Interoperable, and Reusable (F.A.I.R) principles ensure that publicly funded research, as well as the data that underpins it, will become more accessible to the public⁷.

¹ “Compendium of Bibliometric Science Indicators” OECD 2015

² [“Bad Science’: Australian studies found to be unreliable, compromised”](#) Sydney Morning Herald, July 22, 2019

³ [“Australian code for the responsible conduct of research”](#) National Health and Medical Research Council, 2018

⁴ [“ARC Research Integrity Policy”](#) Australian Research Council, 2019

⁵ [“Australian Research Integrity Committee”](#) Australian Research Council, Accessed November 2019

⁶ [“Funding World-leading Research”](#) Minister for Education, The Hon Dan Tehan MP 2018

⁷ [“Fair, affordable & open access to knowledge”](#) Council of Australian University Librarians, Accessed October, 2019

The science and research sectors consistently endeavour to use the best available evidence to adapt their behaviours to ensure higher quality research, increased scrutiny and greater transparency to both the public and government⁸.

Developing policy informed with the most appropriate available evidence

STA is a strong advocate for the practice of evidence-informed policy. Much like the scientific method, evidence-informed policy considers⁹:

- The causes and nature of a policy problem or ‘issue’;
- The relative merits and trade-offs in different options for dealing with it; and
- Whether the chosen policy option turns out as intended.

This approach ensures the most effective policy response to a problem can be identified and potential negative side-effects can be examined, and, even offset, during implementation. When evidence-informed policy is well executed, the result is transformational policy that remains effective for decades without the need for serious reform. The Reserve Bank of Australia’s practice of targeting interest rates to control inflation, and the HECS/HELP programs are two examples of evidence-informed policies that have withstood the test of time with minimal need for alteration¹⁰.

Unfortunately, too often it is not evidence that is used to develop the foundations of policy but rather political motivations, vocal special interests, or ideology. In this approach to policy-making, evidence is subsequently sought to justify an already selected policy, a process known as policy-based-evidence¹¹. There are two major downsides to this approach.

Firstly, evidence can be cherry picked to best suit the policy decisions that have already been made. Other evidence can then be ignored or public efforts to discredit conflicting evidence occurs¹². Behaviours such as this result in a lack of trust in decision-makers and are important factors in the widening trust deficit between the public and decision-makers.

Secondly, ideologically-based policy is only effective until it fails catastrophically and/or the ideology of the decision makers changes (either through elections or

⁸ [“Australia cannot afford to compromise the principles underpinning scientific research”](#) The National Research and Innovation Alliance, September 2019

⁹ [“Whatever happened to ‘evidence-based policymaking?’”](#) Gary Banks, The Mandarin, November, 2018

¹⁰ [“Challenges of evidence-based policy-making”](#) Gary Banks AO, Australian Public Service Commission 2018

¹¹ [“Evidence-based policy or policy-based evidence? Higher education policies and policymaking 1987-2012”](#) R. Brown, Perspectives: Policy and Practice in Higher Education January 2014

¹² [“Integrating evidence, politics and society: a methodology for the science-policy interface”](#) P. Horton & G.W. Brown, Palgrave Communications, 2018

political discord). Ideological-based policy also resists evaluation, and when it is evaluated, is often ineffective. This type of policy making results in short-termism and unexpected negative side-effects including economic, social and environmental costs.

Science & Technology Australia contends that the legislation that this inquiry is aimed at examining ([The Environmental Protection \(Great Barrier Reef Protection Measures\) and Other Legislation Amendment Bill](#)) was developed using the most appropriate evidence available. The problem was addressed based on a need to protect the reef from poor water quality. A need that was identified by overwhelming, reviewed and robust evidence developed and tested by reef scientists over many years. The policy itself was developed over three years based on appropriate evidence and recommendations of multiple expert working groups who vigorously reviewed that evidence¹³. The legislation was then evaluated by members of the public, industry groups, and reef experts¹⁴. And while policy decisions may change, the evidence which informed the development of this legislation is sound, as was the process by which it was considered and incorporated into the final policy.

¹³ [“The Scientific consensus statement”](#) Queensland Government, 2017

¹⁴ [“Report No. 16, 56th Parliament”](#) Innovation, Tourism Development and Environment Committee, April 2019