



OFFICE OF THE PRIME MINISTER'S CHIEF SCIENCE ADVISOR

Science Policy Exchange

Sir Peter Gluckman

Chief Science Advisor to the Prime Minister of New Zealand

www.pmcsa.org.nz

Chair, International Network for Government Science Advice

www.ingsa.org

Science Policy Exchange

- **Objectives**
 - Future leaders at the interface
 - Building systemic diversity
 - New inputs into advice
- **Method**
 - Master-class
 - Theoretical problems
 - Projects on real issues
- **Understandings**

SPE Process

- **Review panel**
 - Dr Diane McCarthy
 - Dr Victoria Metcalf
 - Dr John Potter
 - Mr Arapata Hikawai
- **Balance**
 - By gender
 - By supply and demand sides, as possible
 - By type of science/sector, as possible

Key Topics

- The processes of science
- The processes of policy
- Science–society interactions
 - Post-normal science
 - The role of values
 - Sources of knowledge
 - Sources of evidence
 - Diversity and co-production
- Policy-science interactions
- Understandings of risk
- Innovation (including social innovation), big data
- Brokerage and advocacy
- Evidence-informed policy making
 - Its dimensions
 - Its processes
 - Its limitations
- The practice of science advice
 - Multiple roles in the advisory ecosystem

Key resources

- www.pmcsa.org.nz
- www.ingsa.org <http://www.ingsa.org/resources/>

Books:

- ‘Honest Broker’ by Roger Pielke
- ‘The politics of evidence based policy making’ by Paul Cairney
- ‘Science, policy and the value-free ideal’ by Heather Douglas



International Network for Government Science Advice

- Operates under the aegis of ICSU, as the legal entity
- A memorandum of understanding with UNESCO signed. Concerned with all dimensions and levels of science advice
- Roles
 - Forum networking
 - Promote research and resources
 - Capacity building workshops
 - Thematic workshops
 - Principles of science advice (ICSU, UNESCO, WSF 2017)
- Membership is open to academics, practitioners and policy makers



www.ingsa.org

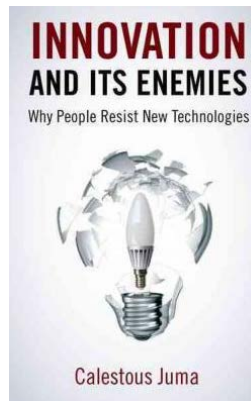


Policy Making

Most policy making occurs with a high level of uncertainty and ambiguity.

“Leaders bear a primary responsibility to muddle through uncertainty but do so with the best available evidence. It is for this reason that science advisory bodies are increasingly important to democratic government” *Calestous Juma*

But policy making is much more than just scientific evidence.



What is Science ?

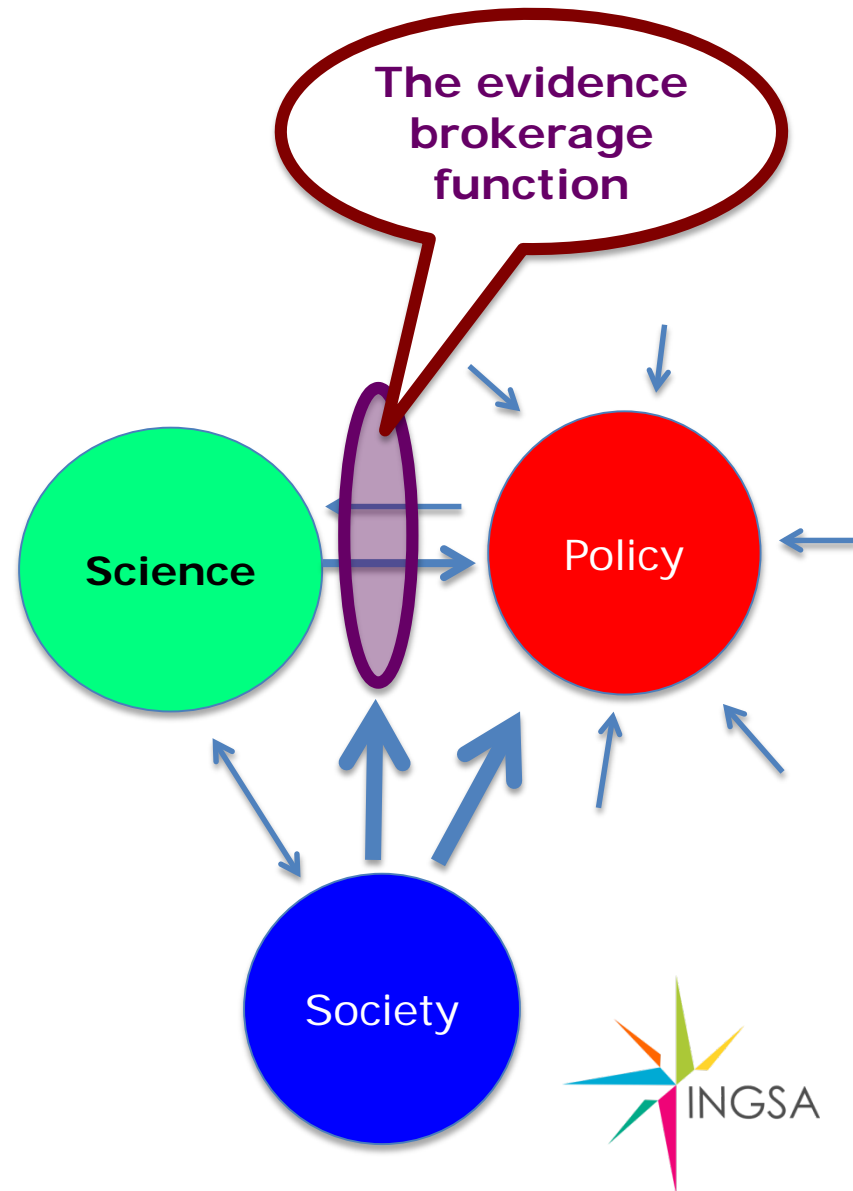
“Science is the production of convincing knowledge in modern society”

Jonathan Marks

Why I am not a scientist

Science & Policy Making

- Science and policy making are largely distinct cultures
- The nature of the interaction is influenced by context, culture and history and by the relationship between science and society
- There is increasing recognition of the need for 'evidence brokerage' at this interface
- The nature of these boundary entities is variable and evolving: there will not be a one-size-fits-all model
- The effectiveness of the science-policy nexus is interdependent with societal interactions



What is Evidence?

- Evidence is 'argument supported by information'
- Consideration of the scope and frame of the question
- Politicians and policy makers have many sources of evidence
 - Tradition
 - Prior belief
 - Anecdote and observation
 - Science
- Scientific evidence is 'argument supported by information produced according to a set of formal processes'
- Scientific processes aim to obtain objective understandings of the natural and built world. They do so because of their processes and disciplines are intentionally designed to reduce bias and enhance objectivity.



The Evolving Science-Policy Nexus

- The nature of science is changing
- The relationship between science and society is changing
- The nature of policy making is evolving
- The relationship between society and the policy process and policy 'elite' is changing
- Evidence informed policy making sits at the nexus of science, policy and society
- There is a need to consider how these interactions can be made more effective and inclusive
- Evidence brokerage is evolving into a distinct set of skills



Science in the 21st Century

- Increasingly science is embedded within societies rather than standing apart from them
- It is seen as a tool of national and international development and is placed in a more utilitarian framing by Governments
- The need for science in the policy process at both national and international levels is increasingly understood
- The explosion of knowledge and the pace of innovation is both an opportunity and a challenge for societies and governments
- The issues of social license for science and technology are growing
- And the nature of science itself has changed and continues to change



Changing Nature of Science

- From linear to non-linear
- Accepting complexity
- From reductionist to systems based
- From single discipline to trans/multi/inter-disciplinary
- From presumed certainty to probabilistic
- From *normal* to *post-normal*...
 - The science is complex
 - Facts uncertain
 - There is much which is unknown
 - Stakes are high
 - Decision making is urgent
 - There is a high societal values component and these values are in dispute



Post-normal Science

- Much science applied or needed in the policy space is inevitably 'post-normal'
- These characteristics, and the frequent failure of the science community to recognize them, can make publics, policy makers and politicians skeptical about the role and utility of science.
- Science advisory and evidence brokerage systems must be cognizant of these characteristics to be effective
- The problem of silos
- This has important implications for inclusive considerations of knowledge generation and inputs into the nexus



The role of values in considering the science - policy nexus

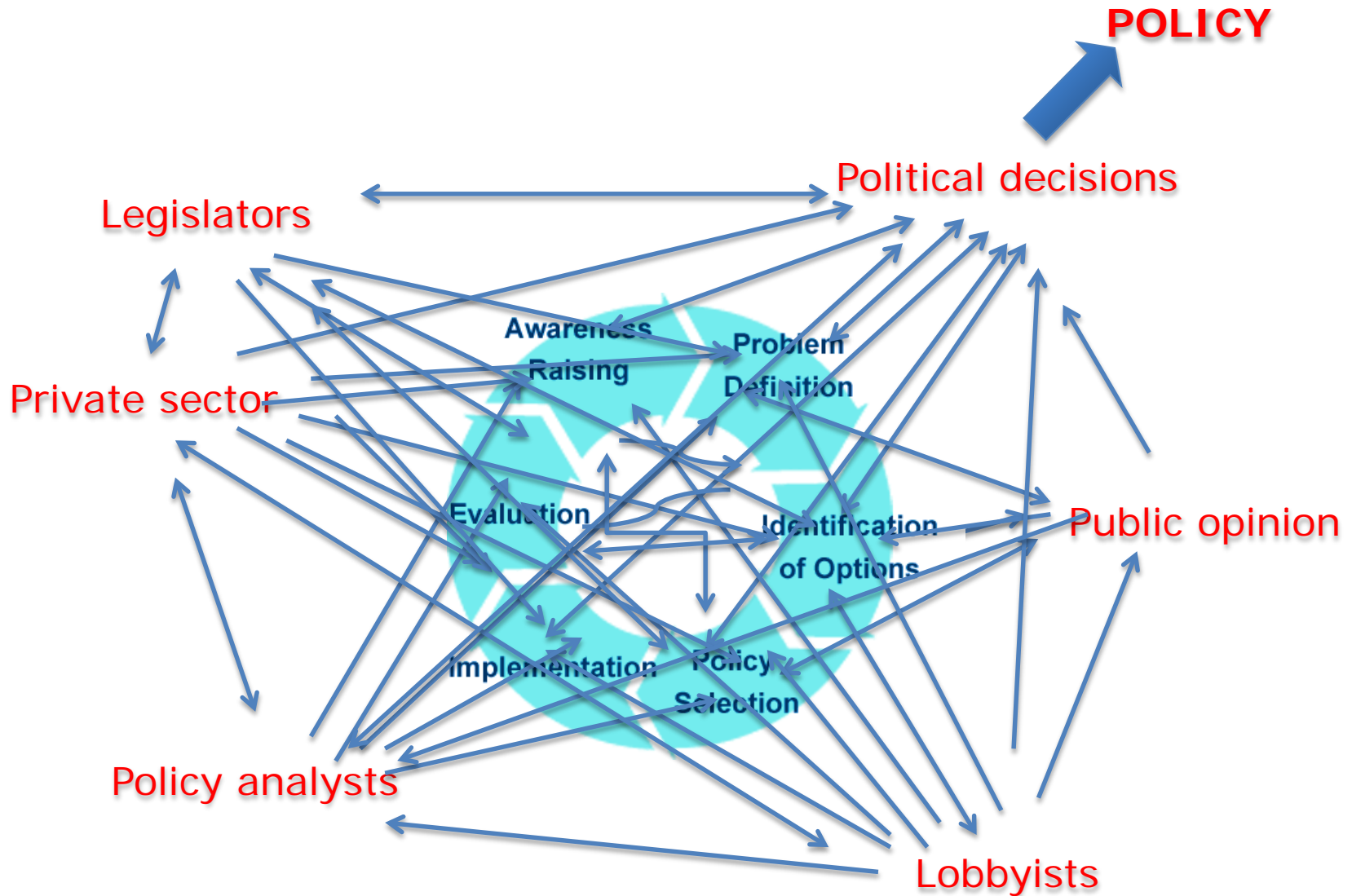
Integral to the scientific process

- Critical thinking
- Skepticism
- Choice of question
- Research ethics
- Integrity of the processes
- Avoid bias in collection and analysis of data
- Acknowledging the limits of data and the inferential gap
- Judging the sufficiency and standards of evidence

Integral to individuals (incl scientists) and society

- Cultural, political and religious
- Egoistic, social-altruistic or biospheric
- Hierarchical vs individualistic
- Past experience
- Indigenous and local knowledge
- Cognitive biases

Policy Making is Messy



The Realities of the Interface

- Policy making is rarely determined by the evidence alone but well brokered evidence can and should enhance the policy process
- Interpreting the place and meaning of different forms of evidence is a key part of brokerage
- But policy makers often lurch to problems
- Policy makers generally see the science community as being good at problem definition but not great at finding real-world and policy-acceptable solutions
- Evidence brokerage has to be cognisant of these realities



Overlapping Dimensions of Science Advice

- From technical to regulatory to policy advice
- Time scales from immediate (crisis) to deliberative to foresighting
- Informal/formal
- Internal to the policy system (e.g. science advisors) to external to the policy system (most academies)
- From local to national to international



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Further Challenges for National Advisory Mechanisms Are Created By...

- The degree of national development and science system development
 - Governance
 - National institutions
 - National science capacities
- Context, culture, constitution of a country
- Nature of public engagement and policy discourse within a country
- Attitude to experts and 'elites' within society

The Understanding of Risk

Implications for Science and Innovation

- Actuarial (probabilistic calculation of risk)
- Perceptual
 - The role of cognitive biases
 - Availability
 - Representational
 - Confirmational
 - Anchoring
 - Asymmetry
 - Perception of gains and losses, benefits and burdens
- Political



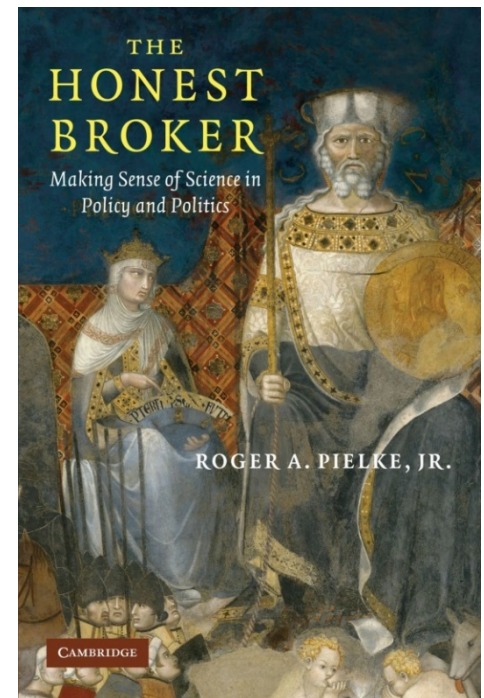
Some Principles and Guidelines for Science Advising

- Distinguish *science for policy* from *policy for science*
- Understand science informs and does not make policy
- Recognize the limits of science
- Brokerage not advocacy
- Be cognisant of the different roles, levels and structures of evidence brokerage



Advocacy Versus Brokerage

- **The Issue Advocate** is the scientist who collects and presents data with a view to servicing a cause.
- **The Honest Broker** tries to identify and overcome biases the scientific consensus and what are the implications for policy
- Individual scientists often switch between these roles but clarity as to role is important.
- Science advisory systems are most effective when acting as brokers.



*Roger Pielke, Jr (2009)
The Honest Broker*

The Practice of Brokerage

- What is known, what is the expert consensus (need, impact, alternatives, monitoring etc.)
- What is not known
- Other caveats
- The inferential gap, risk management
- How it relates to other considerations, alertness to social implications
- Options and tradeoffs



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