Princples and Structures of Science Advice

Sir Peter Gluckman ONZ FRS

Chief Science Advisor to the Prime Minister of New Zealand
Chair, International Network of Government Science Advice

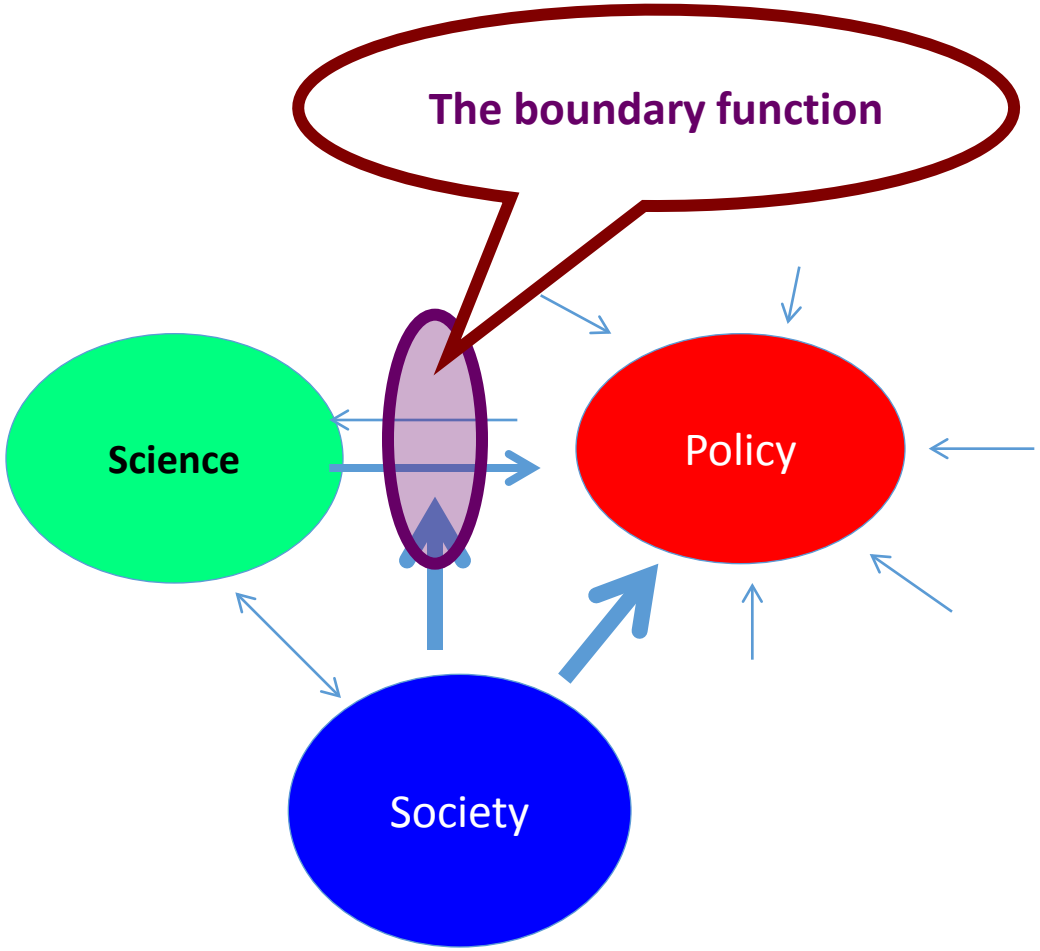
Johore: Malaysia June 2017

The science – policy nexus

- Presumption: That governments are more likely to make better decisions when they use well-developed evidence wisely
- Virtually every challenge all governments face has a scientific dimension which may or may not be recognised
- But science alone does not make policy; many values and political considerations
- Is robust science available? Will it be used, misused, manipulated or ignored?
  - The challenge of populist politics and media
  - The vilification of elites and experts
  - But science and scientists also have played a role in creating the problem
- The need for an effective and trustworthy science advisory ecosystem

Science and policy making

- Science and policy making are very 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 importance of boundary roles and structures to link these cultures
- The nature of boundary entities is variable and evolving: there will not be a one-size-fits-all model



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 elite is changing
- Evidence informed policy making sits at the nexus of science, policy and society
- It is evolving into a distinct set of skills

Science in the 21st century

- Increasingly science is embedded within society rather than standing apart from it
- It is now 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 is increasingly understood
- The explosion of knowledge and the pace of innovation is both an opportunity and a challenge for society and governments
- The issues of social license for science and technology are growing
- And the nature of science itself has changed and is changing

Changing nature of science

- From linear to non-linear
- From singular to multidisciplinary
- Accepting complexity
- From reductionist to systems based

  From certainty to probabilistic
- From normal to post-normal…

Post-normal science

- Much science applied or needed in the policy space is inevitably ‘post-normal’ (especially with regards the SDGs)
    - The science is complex
    - Facts uncertain
    - There is much which is unknown
    - Stakes are high
    - Decision making is urgent
    - There is a high values component and values are in dispute
- It is these characteristics and the frequent failure of science to recognize these that can make the public, policy makers and politicians skeptical about the role and utility of science.
- Science advisory systems must be cognizant of these characteristics to be effective

International Network for Government Science Advice

‘Values’ has distinct meanings in considering post-normal science and policy making

Integral to science

- Critical thinking
- Skepticism
- Ethics
- Integrity of the processes
- Avoid in bias in collection and analysis of data
- Acknowledging the limits of data and the inferential gap
- Judging the sufficiency of evidence

Integral to individuals and society

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

The core challenges of science advice

- Science and policy making have fundamentally very different cultures and epistemologies
- The processes of science and policy making are very different
- The interaction is not independent of the relationships of each to society
- The place of societal values is very different in science and policy making
- The meaning of evidence can be very different

Scientists and policy making

- Scientists are
  - Very good at problem definition
  - Less so at finding workable, scalable and meaningful solutions
  - They often approach the policy maker with considerable hubris.
  - They often fail to consider the multiple domains that go into policy formation
- But they have a critical role in the policy process through the science advisory ecosystem

Policy making informed by scientific evidence

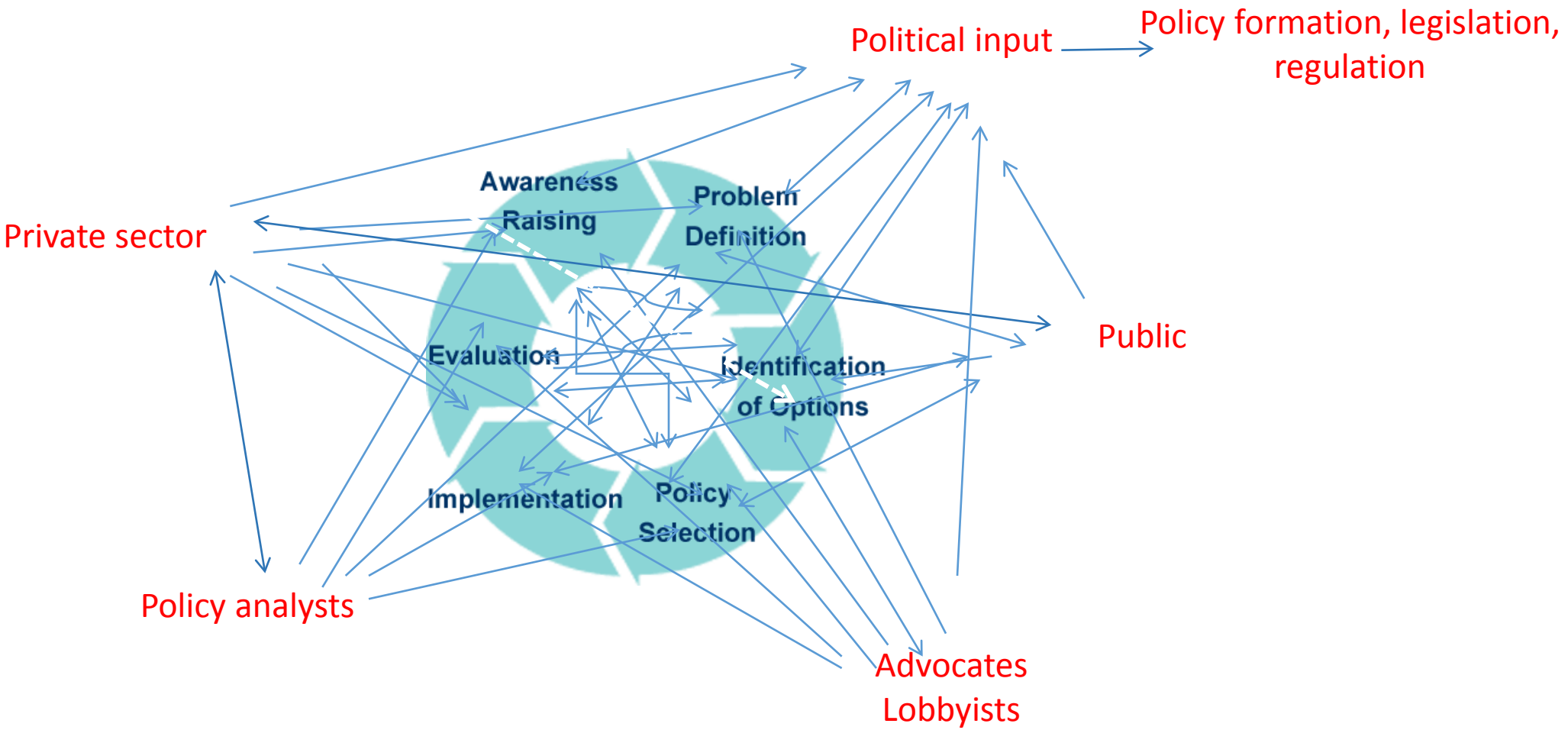
~~Evidence based policy making~~

What is evidence ?

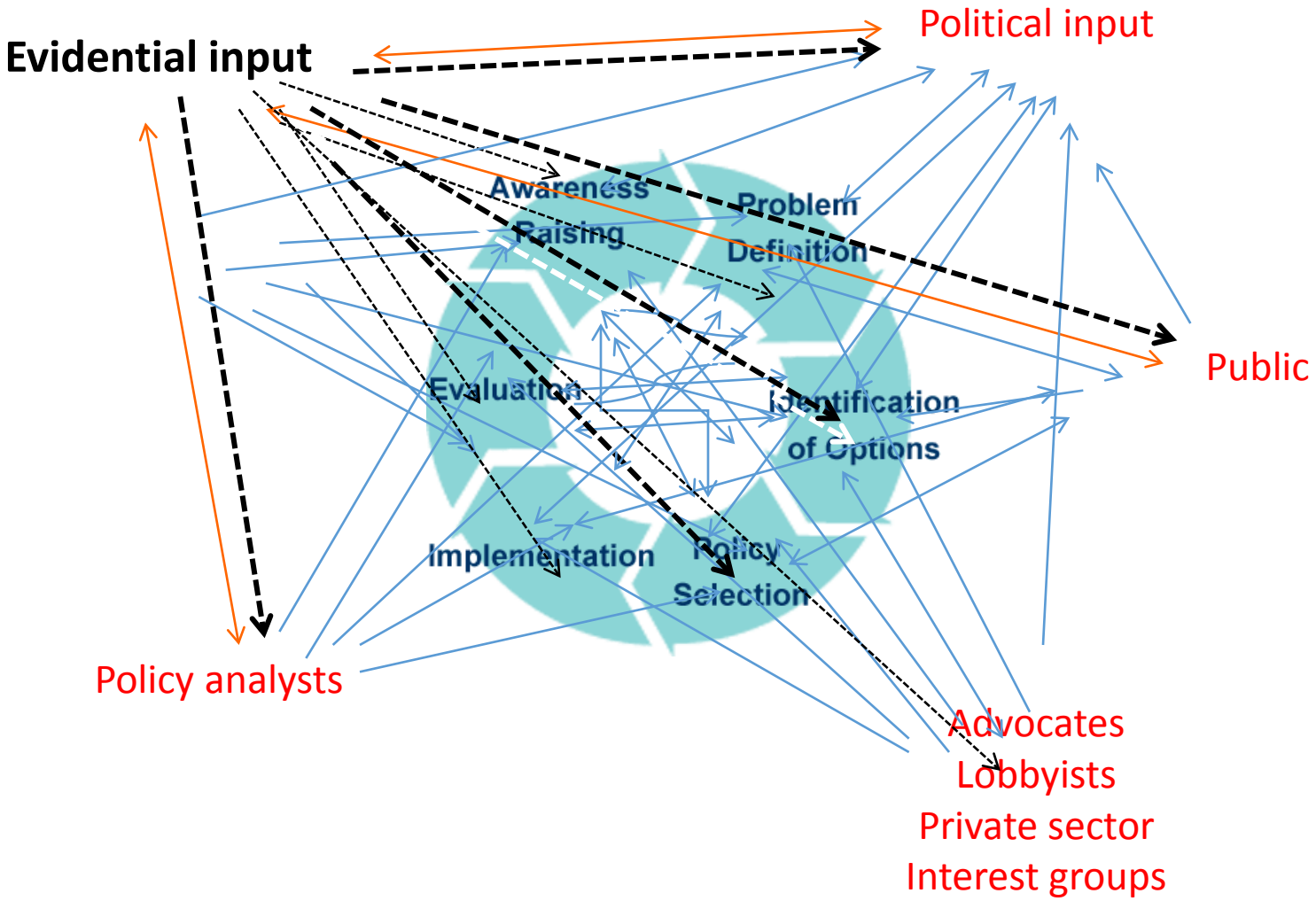
- Politicians and policy makers have many sources of evidence
  - Tradition
  - Prior belief
  - Anecdote and observation
  - Science
- Scientific evidence is argument supported by information produced according to a set of formal processes
- Scientific processes aim to obtain relatively objective understandings of the natural and built world. Science is defined by its processes which are designed to reduce bias and enhance objectivity.
  - But important value judgments lie within science especially over what question and how to study it. But the most important in the context of policy is the sufficiency and quality of evidence.

- The policy process is rarely as described in textbooks

Policy making is messy



So what is the value of science advice in the ‘post-trust context?



More important than ever

But it matters how it is done

It needs sensitivity to the complex dynamics

It needs to work with this complex entanglement of formal and informal actors

Policy makers

- Have limited bandwidth and often limited manouvrability
- They lurch to problems
- The policy cycle is generally very short and getting shorter
- Most relevant science incomplete and much is ambiguous
- They cannot be expected to be scientific referees
    - The need for translation and brokerage
- Policy makers see evidence is one of a number of inputs
    - In what sense is it privileged and how is that privilege maintained? The role of the broker.

The challenge of science at the policy-societal nexus

- Too much science
- The changed nature of science
- The challenge of values within and beyond science
- The post-normal nature of much science
- Different perceptions of risk
- Different perceptions of expertise
- The behavior and reciprocal perceptions of scientists and policy makers
- The utilitarian poistioning of science
- Implications for the future of public science

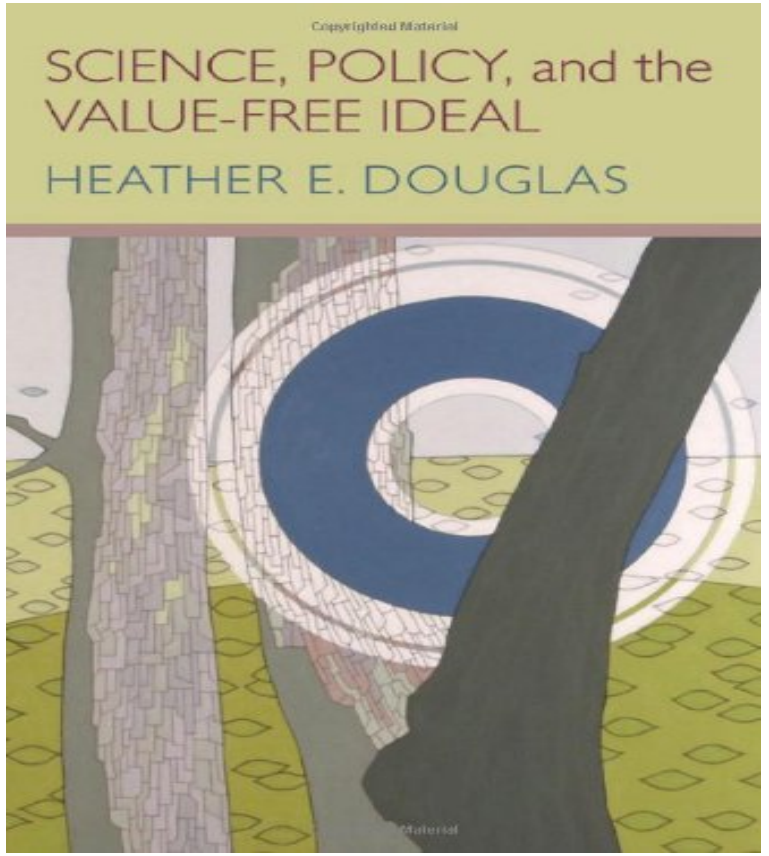
The construct of science advice: the concept of brokerage

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

- Science does not make policy, it informs policy by elucidating options.

The inferential gap

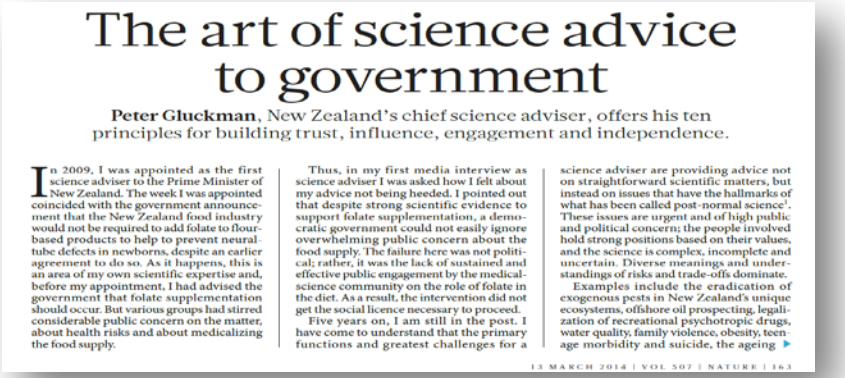
- The biggest challenge in scientific advice is the “inferential gap”
- This is the gap between what is not is known and what is concluded by the advisory process.
- What are the consequences of getting it wrong?



Heather Douglas (2009)
Science, Policy and the Value Free Ideal

Principles and guidelines for science advising

- Trust
- Humility/Avoidance of hubris
- Distinguish *science for policy* from *policy for science*
- Understand science informs and does not make policy
- Protect the privilege of science
- Recognize the limits of science
- **Brokerage not advocacy**
  - What is known, what is the expert consensus
  - What is not known and other caveats
  - The inferential gap, risk management
  - How it relates to other considerations, alertness to social implications
  - Options and tradeoffs



The art of science advice to government

Peter Gluckman, New Zealand's chief science adviser, offers his ten principles for building trust, influence, engagement and independence.

In 2009, I was appointed as the first science adviser to the Prime Minister of New Zealand. The week I was appointed coincided with the government announcement that the New Zealand food industry would not be required to add folate to flour-based products to help to prevent neural-tube defects in newborns, despite an earlier agreement to do so. As it happens, this is an area of my own scientific expertise and, before my appointment, I had advised the government that folate supplementation should occur. But various groups had stirred considerable public concern on the matter, about health risks and about medicalizing the food supply.

Thus, in my first media interview as science adviser I was asked how I felt about my advice not being heeded. I pointed out that despite strong scientific evidence to support folate supplementation, a democratic government could not easily ignore overwhelming public concern about the food supply. The failure here was not political; rather, it was the lack of sustained and effective public engagement by the medical-science community on the role of folate in the diet. As a result, the intervention did not get the social licence necessary to proceed.

Five years on, I am still in the post. I have come to understand that the primary functions and greatest challenges for a science adviser are providing advice not on straightforward scientific matters, but instead on issues that have the hallmarks of what has been called post-normal science'. These issues are urgent and of high public and political concern; the people involved hold strong positions based on their values, and the science is complex, incomplete and uncertain. Diverse meanings and understandings of risks and trade-offs dominate.

Examples include the eradication of exogenous pests in New Zealand's unique ecosystems, offshore oil prospecting, legalization of recreational psychotropic drugs, water quality, family violence, obesity, teenage morbidity and suicide, the ageing ▸

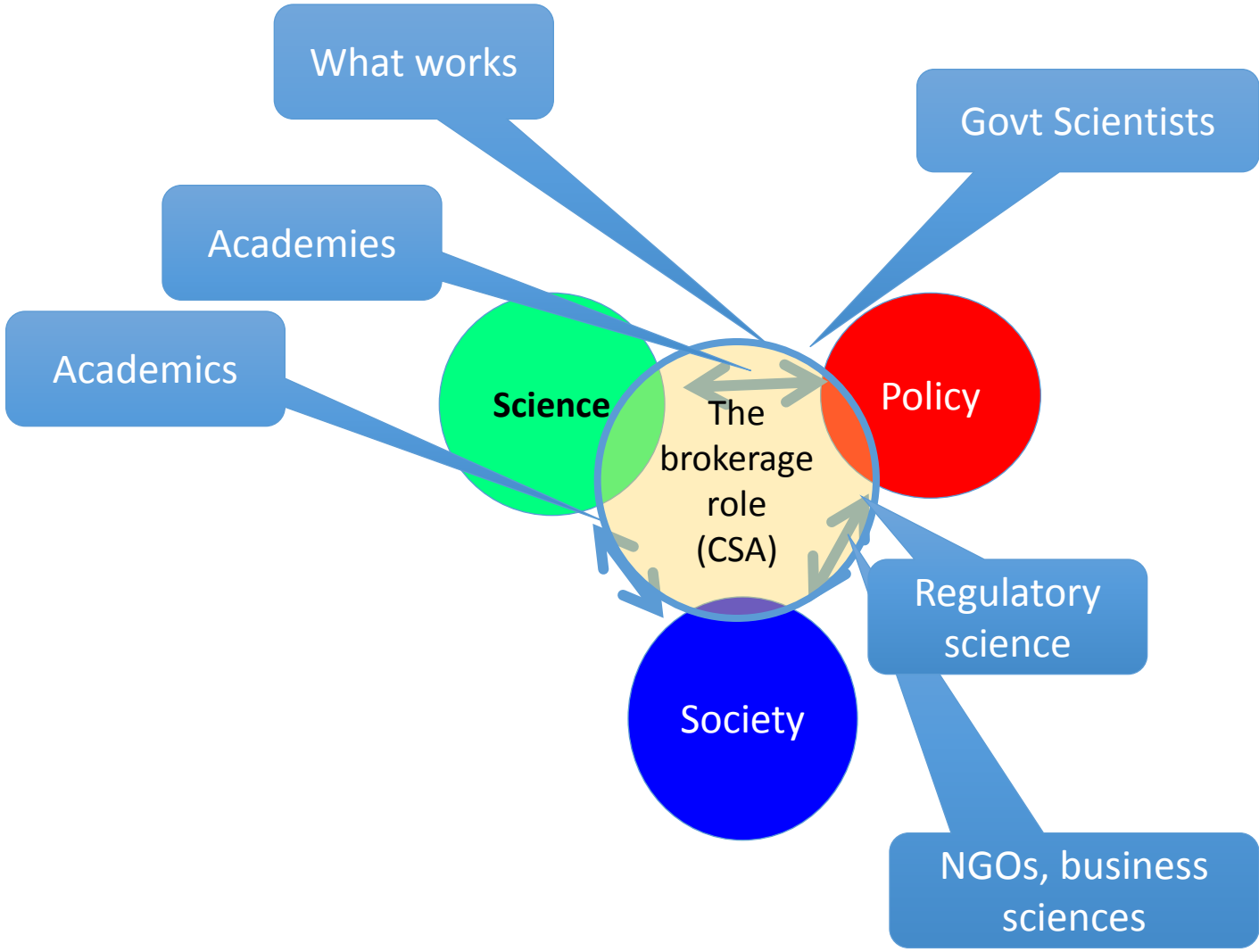
13 MARCH 2014 | VOL 507 | NATURE | 163

Peter Gluckman
Nature, 13 March 2014

Enhancing the uptake of scientifically developed knowledge into public policy

The four audiences

- Politician
- Policy maker
- Media and public
- The science community



Five overlapping dimensions of science advice

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

International Network for Government Science Advice

Five overlapping dimensions of science advice

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

International Network for Government Science Advice

Five overlapping dimensions of science advice

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

International Network for Government Science Advice

Five overlapping dimensions of science advice

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

International Network for Government Science Advice

Five overlapping dimensions of science advice

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

International Network for Government Science Advice

From national to international

- The SDGs will require a more evidence informed approach to policy making
- Because most international decision making is made not by agencies but by member states, in general effective international science advice cannot operate without well developed domestic science advisory systems
  - These can promote enlightened self interest by nation states.
  - These must be well connected to diplomatic and related systems
  - These can be supported by transnational mechanisms
    - Agency advisory boards
    - Better a priori liaison between advisory systems
    - Scientific input into diplomatic mechanisms
- Internationally linked national science advisory networks can assist
  - INGSA

Further challenges are created by ..

- State of national development
  - Governance
  - National institutions
  - National science capacities

- Context, culture, constitution
- Nature of public and policy discourse

- Attitude to experts

Different perceptions in a science advisory ecosystem

	Advocate	Broker
Individual academics	+++	
Academic societies/professional bodies	+++	+
Government employed practicing scientists		+
Scientists within regulatory agency		+++
Independent think tanks	+	++
What works units etc	++	++
National academies	+++	++
Government advisory boards/science councils	+	++
Science advisors		+++

Types of advice

	Informal but external	Deliberative (unsolicited)	Deliberative (requested)	Informal and internal
Individual academics	++			
Academic societies/professional bodies		++		
Government employed practicing scientists			+	
Scientists within regulatory agency			++	
Independent think tanks	+	++	+	
What works units etc		++	++	
National academies		+++	++	
Government advisory boards/science councils			+	+
Science advisors			++ (conduit)	+++

Different roles in a science advisory ecosystem

	Knowledge generators	Knowledge synthesizers	Knowledge brokers
Individual academics	+++	++	
Academic societies/professional bodies		+	
Government employed practicing scientists	+++	+	
Scientist within regulatory agency		++	++
Independent think tanks		++	
What works units etc		+++	+
National academies		+++	+
Government advisory boards/science councils		++	+
Science advisors		+	+++

The audience for science advice

	Public	Unsolicited Policy input	Requested policy advice	Politician
Individual academics	+	+++	+	±
Academic societies/professional bodies	±	++	+	±
Government employed practicing scientists		±	+	
Scientist within regulatory agency			++	
Independent think tanks	+	++	+	
What works units etc		+	++	
National academies	±	+++	++	
Government advisory boards/science councils		+	++	+
Science advisors	++	++	+++	+++

The nature of advice

	Policy for science	Evidence for policy: options (strategic)	Evidence for policy: Implementation (operational and tactical)	Evidence for policy: Evaluation (strategic and tactical)	Horizon scanning	Crises
Individual academics	+	±	±	±	±	
Academic societies/profess'l bodies	+++	+	+	±	±	
Gov't employed scientists		+	++	+	+	+
Scientists within regulatory agencies		+	++	++		
Independent think tanks		++	±	±	+	
What works units etc			++	±		
National academies	+++	+			+	
Gov' t advisory bds/science councils	++	+	+		+	
Science advisors	+	++++	++	++	++	+++

The skillset for effective external input

- Understanding of the complexities of science
- Get beyond single disciplines (natural and social sciences)
- Understanding the policy ‘cycle’
- Being timely
- Understanding the limits of advocacy versus brokerage

- Understanding brokerage
  - What is known, what is the expert consensus
  - What is not known
  - Other caveats
  - The inferential gap, risk management
  - How it relates to other considerations, alertness to social implications
  - Options and tradeoffs

- Remembering there are multiple audiences
- Avoiding hubris
- Maintaining integrity and trust

The skillset for effective internal brokerage

- Understanding of the complexities of science
- Get beyond single disciplines (natural and social sciences)

- Understanding the policy ‘cycle’
- Being linked to the key players in the policy ‘cycle’

- Understanding brokerage

- Excellent diplomatic skills
- Good communication skills to the four audiences,
- Understanding of the post-trust environment
- Avoiding hubris
- Maintaining integrity and trust with the four audiences

Academies and science advice

- A source of deliberative advice (solicited or unsolicited)

- Many academy reports have little impact on policy – why?
  - Not timely, not requested, not needed
  - Do not answering policy relevant questions directly
  - Often not well equipped to deal with post-normal issues
  - Do not always appreciate the policy space and assume a linear model from evidence to policy
  - Do not understand the nature of brokerage
  - Language not accessible
  - Focused on showing academic standing

- Many academies need to rebuild and represent themselves to have greater impact (*and deal with issues of elitism, post-expert, post-trust, post-truth, post-fact etc*)

INGSA

INGSA founded in 2014 under the aegis of ICSU
Memorandum of understanding with UNESCO
Concerned with all dimensions of science advice

- Networking
- Research
- Forum, resources, networking
- Capacity building workshops –academies (Auckland April 2017), small nations (Apia April 2017) Copenhagen April 2017, Johore June 2017, Nigeria Nov 2017) institutions, demand side
- Thematic workshops (eg foreign ministries, environment)
- Partnerships (eg with JRC)
- Principles of science advice (WSF 2017)

Membership : academics, practitioners, policy makers (>1000 members, 75 countries)
African chapter, Arab chapter under development, foreign ministry chapter under development

www.ingsa.org

International Network for Government Science Advice

International Network for Government Science Advice

- INGSA founded in 2014 under the aegis of ICSU
- Has a memorandum of understanding with UNESCO
- Concerned with all dimensions of science advice
- Roles
  - Forum, resources, networking
  - Capacity building workshops
  - Thematic workshops
  - Principles of science advice (ICSU, UNESCO, WSF 2017)
- Membership is free: open to academics, practitioners, policy makers

www.ingsa.org

International Network for Government Science Advice