1st Arab Leadership Dialogue on Science Advice to Governments

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The principles of science advice

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International Network for Government Science Advice

Science in the 21st century

- Increasingly understood as a tool of national development
- Governments face the explosion of knowledge and the increased pace of technological innovation
- Science increasingly embedded within society than standing apart from it

Science and policy making

There are few areas of government policy formation and evaluation in which evidence, knowledge and science cannot assist:

- Infrastructure
- Primary production
- Manufacturing
- Resource management and environmental protection
- Social issues
- Health, education, justice
- Security and defense
- Decisions over technologies
- Trade
- Diplomacy

‘Evidence informed’ rather than ‘evidence-based’

- Policy is rarely *determined* by evidence but policy can be and should be informed by evidence
- Inputs into policy
  - The science

    Evidence of need, possible solutions, impact
  - Public opinion
  - Political ideology
  - Electoral contract
  - Fiscal objectives and obligations
  - Diplomatic issues and any international obligations

Sources of knowledge

- There are different sources of knowledge and different types of evidence
  - Belief, religion and dogma
  - Tradition and traditional knowledge
  - Anecdote and observation
  - Science
- Science is a set of processes designed to develop relatively reliable knowledge about the universe around and within us. It is an iterative set of processes subject to revision and testing.
- The positioning of values is different for science than for other sources of knowledge

Science and values

- Science is not values-free: scientists make values-based decisions all the time: what to study; what methodology; what is considered sufficient evidence for conclusions…
- But the scientific method is designed to limit (or identify and mitigate) the influence of human values on the collection and analysis of data

- How science is *used* by society is intimately and inherently values-rich
- Policy is inherently values-rich

Science and societal values

- Individuals and societies have deeply held values based on culture, tradition, religion, societal arrangements, individual social and economic positioning.

- Science cannot resolve fundamentally different world views

- Policy making is inevitably involves some tradeoffs.
- All decision making involves some uncertainty and therefore some risk
- And perceptions of risk vary…

The understanding of risk: implications for science, policy and society

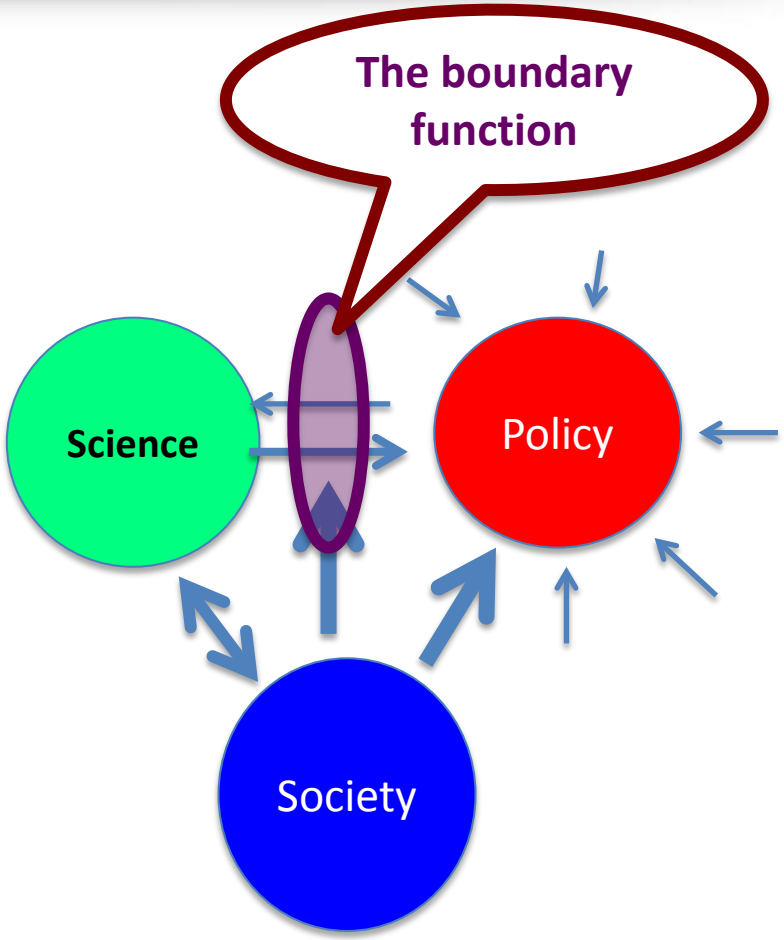
- Actuarial (probabilistic calculation of risk)
- Perceptional
  - The role of cognitive biases
    - Availability
    - Representational
    - Confirmational
    - Anchoring
    - Asymmetry
  - Perception of gains and losses, benefits and burdens
- Political

The science-policy nexus must be alert to science being used as a proxy for values debates

- Values discussions are difficult
- Science has frequently been misused as a proxy for what are primarily values debates:
  - Climate change
  - GMOs
  - Reproductive technologies
  - Stem cells
  - Water fluoridation

The science-policy interface

- 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 in linking these cultures
- The nature of these boundary entities is still evolving; there will not be a one-size-fits-all model
- The interface is multi-dimensional



Science in the 21st century

- Increasingly science is embedded within society rather than standing apart from it
- The need for evidence in the policy process is increasingly understood
- But the explosion of information and knowledge of variable import and quality is a huge challenge
- The pace of innovation is both an opportunity and a challenge for society and governments
- The issues of social license for science, technology and innovation are growing
- And the nature of science itself has changed and is changing

Changing nature of science

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

  From 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 values component and values are in dispute

The science-policy interface

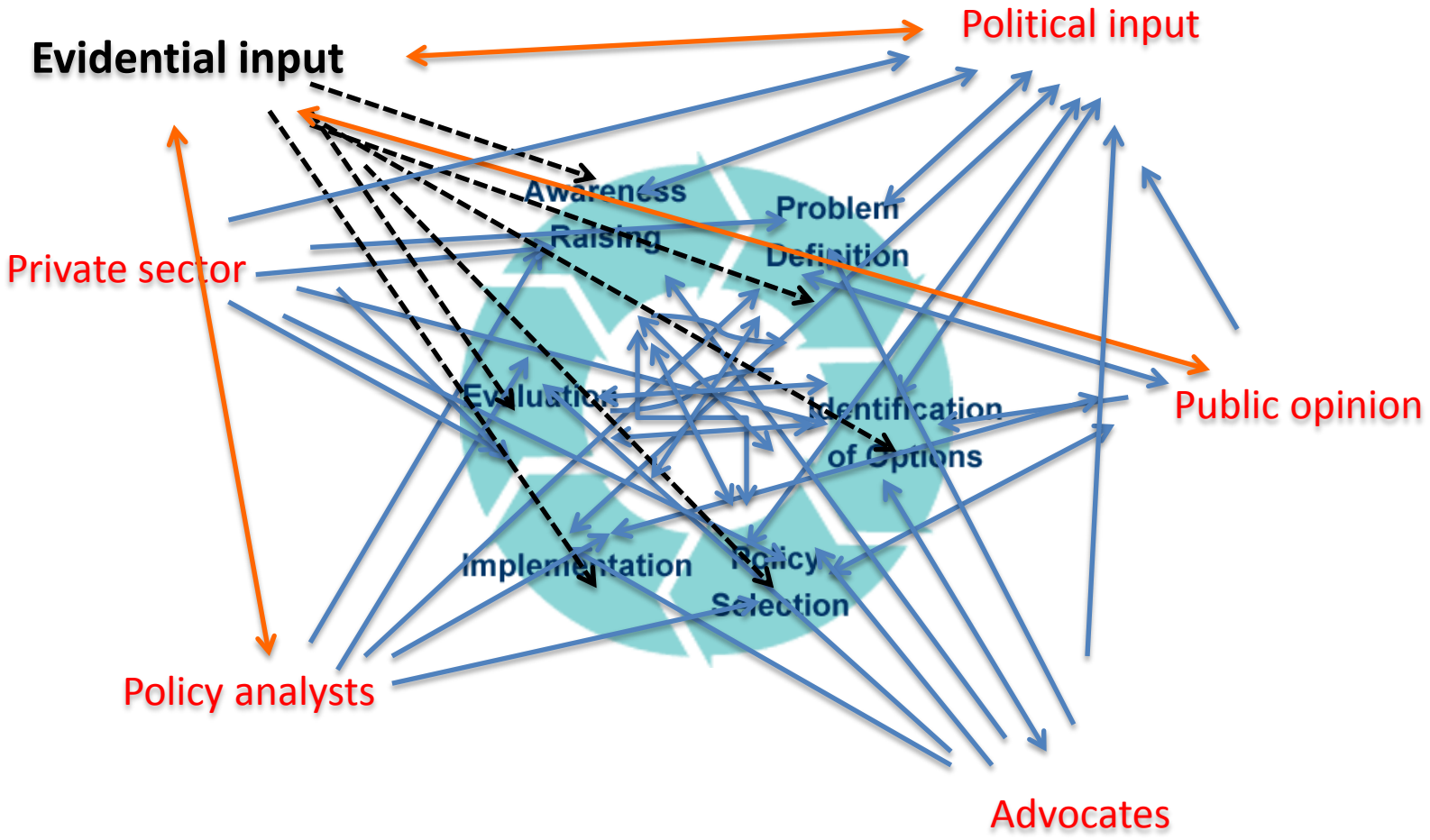
- The science applied or needed in the policy space is almost inevitably ‘post-normal’
- It is almost inevitably incomplete and often ambiguous
- Science advisory systems must be cognizant of these characteristics to be effective and of value
- When the science community exhibits hubris and fails to recognize these characteristics, it can induce skepticism amongst policy makers and politicians about the role and utility of science.
- A science advisory ecosystem has the goal of assisting the policy community through this complexity

The policy process

- The policy process is rarely as described in textbooks

- The policy cycle is an idealized view of a much more complex and iterative process

The policy process



The science – policy interface

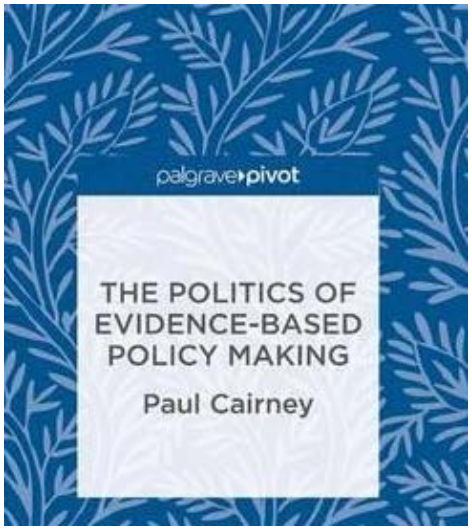
- Policy makers are dealing with situations where there are often multiple aims, limited information and unclear choices.
- Policy makers have limited bandwidth.
- Policy makers are drowned in information; they use heuristic shortcuts (trusted actors, adapting information to prior beliefs) to reach decisions.
- Policy makers have to make decisions between competing aims and worldviews
- BUT they still have to make decisions despite competition between actors to interpret information and draw conclusions for them.

The science-policy interface

- The issues governments want input on at a policy level are rarely purely technical, almost inevitably involve high public interest and societal values that are in dispute
  - Social issues
  - Environmental issues
  - Public health issues
  - Technological innovation
  - Risk management
- The science is always incomplete, often ambiguous

Policy making and evidence

- Evidence informed policy making is often seen through a naïve lens by scientists who assume a direct evidence to policy relationship
- Policy makers will seek and want information beyond scientific evidence (eg anecdote)
- Too often debates confuse and conflate issues of the size of the problem and the effectiveness of the solution;
- Science tends to address problem definition better that the effectiveness question



Should science have privilege in the policy process?

- How does science differ from other epistemologies?
- How science is undertaken and presented will impact on whether it is trusted
- Integrity and trust at the interface are essential to any claim of privilege.

Some core principles

- Integrity of evidence brokerage
- Avoiding technical and issues bias
- Maintaining trust
- Independence
- Understand science informs and does not make policy
- Recognize the limits of science

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[1]. 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 ▸

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Peter Gluckman
Nature, 13 March 2014

The practice of brokerage

- What is known, what is the expert consensus
  - The challenge of too much science – how to digest it
- What is not known
- Other caveats
- The inferential gap, risk management
- How it relates to other considerations, alertness to social implications
- Options and tradeoffs
- Avoiding hubris

Policy for science *vs.* science for policy

- Policy for the science system is a distinct set of considerations/practices from science to inform broad public policy (science for policy)

- There are some overlaps
  - The same people are often involved

- There is a risk that being perceived as having a primary role as an advocate for the public research system can undermine the reception of science advice for broader policy

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

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Five overlapping dimensions of science advice

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Scientific advice in emergencies

- Advisors become intimately associated with decision making
- Has become a big focus of UNISDR, APEC, GSF etc
- Integrated and multidisciplinary
- Conduit to informed experts

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Informal mechanisms of scientific advice

- Is a key need of leaders and governments
- Brain storming
- Critical challenge to the policy maker
- Instant and responsive
- Can impact very early in policy cycle and repeatedly
- Requires a high level of integrity and trust
- Relies on individuals (eg science advisors)
- Is a conduit to deliberative science advice

Deliberative mechanisms of scientific advice

- Offers key opportunity for inclusiveness and legitimacy
- Usually provided by academies or panels
- But can extend to include hybrid forums, consultations etc

- Academies
  - Much depends how the question is framed and by whom (supply side or demand side)
  - Can usually only input at a single point in policy process (not sufficiently supple and iterative)
  - Hard to be timely or responsive

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

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Science Diplomacy

- **Global interest**
  - Common and global challenges (SDGs)
  - Ungoverned spaces
- **Common interest**
  - Standards and definitions
  - Shared technical services
  - Transnational resource and environmental management
  - Crisis and disaster management
  - Social license for new technologies
  - Big science
- **National interest**
  - Voice/influence /soft power/reputation
    - Track 2 diplomacy
    - Bilateral relations
    - National Projection
    - Development assistance
  - Security
    - Crisis, emergencies, disasters
    - Threats (eg cyber)
  - Economic
    - Trade
    - Innovation
    - Standards and definitions
  - National need and capability
    - Technical capabilities
    - Access to knowhow, knowledge
    - Develop domestic STI

Scientific evidence rarely alone makes policy, but better policy is likely to be made when it is appropriately informed by appropriate evidence properly brokered

International Network for Government Science Advice

- INGSA founded in 2014 under the aegis of ICSU
- 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)
- Regional chapters
- Membership is free: open to academics, practitioners, policy makers

www.ingsa.org

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