An introduction to the “twilight zone” between science and policy: Principles, structures and pitfalls of science advice

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International Institute for Applied Systems Analysis
International Institute for Applied Systems Analysis (IIASA)

- Established in 1972 by initiative of USA and Soviet Union
- Located in Vienna, Austria
- 350 scientists doing systems research (e.g. climate change, Sustainable Development Goals, systemic risks etc.)
- 22 member countries, among which Egypt and South Africa
- www.iiasa.ac.at
Systems Analysis and Africa

Transformative uses of systems analysis to address regional challenges

Registration and Call for Posters Now Open
3 December 2019
National Research Foundation (NRF)
Pretoria, South Africa

International Institute for Applied Systems Analysis
www.iiasa.ac.at

National Research Foundation
2019

Science & Innovation
Department of Science and Innovation
Republic of South Africa

SASAC
Southern African Systems Analysis Centre
Contents

1. Introduction
2. Principles
3. Structures
4. Pitfalls
5. Tips and tricks
6. Conclusion
I just got this from the cash machine
Ethiopia is the cradle of humanity
Is Ethiopia also a cradle of science advice?

24. How the Queen Made Ready to Set Out on her Journey

“And the Queen said unto them: [...] For I desire wisdom and my heart seeks to find understanding. [...] And as for a kingdom, it cannot stand without wisdom, and riches cannot be preserved without wisdom; [...] Wisdom is the best of all treasures.”
The world has changed a lot since then – it is getting more and more complex and interdependent and so do political challenges
More and more political decisions depend on science and technology.
Knowledge and technological progress are advancing at an unprecedented speed and trigger political and ethical questions.
There is a diluge of data coming from multiple sources – how to make sense of it?
The way we do politics is changing as well.
Fake news and "alternative facts" are a major challenge for democracy – and for science.

Brazil space institute director sacked in Amazon deforestation row

Far-right leader Jair Bolsonaro calls satellite data showing rise in deforestation 'lies'
Politicians have the right to ignore the facts
(BUT: They are not entitled to their own facts)!

Science is only *one* factor in decision-making
Contents

1. Introduction
2. Principles
3. Structures
4. Pitfalls
5. Tips and tricks
6. Conclusion
10 PhD SCHOLARSHIP OPPORTUNITIES IN; HEALTH INFORMATICS, HEALTH SYSTEMS, PUBLIC HEALTH, EPIDEMIOLOGY, BIOSTATISTICS—WITH A RESEARCH CONCENTRATION IN HEALTH INFORMATION SYSTEMS

Policy for Science vs. Science for Policy
Scientific support to policy vs. science advice to politics
Science advice to government vs. science advice to parliament

The Role of Research in the UK Parliament
Solicited science advice vs. unsolicited science advice
Formal science advice vs. informal science advice
Global Warming of 1.5 °C

An IPCC special report on the impacts of global warming of 1.5 °C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty.

Direct science advice vs.
indirect science advice

ENCYCICAL LETTER

LAUDATO SI’
OF THE HOLY FATHER
FRANCIS
ON CARE FOR OUR COMMON HOME
Policy cycle: The theory
Policy cycle: The reality

Civil society → Policy formulation → Government

Priority setting → Local / Regional actors

Science? → Policy decision → Parliament

Policy evaluation → Administration

Policy implementation → Industry

Idea: John Young, Overseas Development Institute
Linking policy and science

Policy

Science

Design: Jan Marco Müller
Linking policy and science

Policy

Science
Linking policy and science

Foresight Gear

Scientific Advice Mechanism

Policy

Science

Design: Jan Marco Müller
Linking policy and science

Foresight Gear

Scientific Advice Mechanism

Policy

Science

Design: Jan Marco Müller
Linking policy and science

Policy

Scientific Advice Mechanism

Crisis Gear

Science

Design: Jan Marco Müller
Linking policy and science

Policy

Scientific Advice
Mechanism

Science

Crisis Gear
Linking policy and science

Scientific Advice
Mechanism

Policy

Reverse Gear

Science

Design: Jan Marco Müller
Linking policy and science

Scientific Advice Mechanism

Policy

Reverse Gear

Science

Design: Jan Marco Müller
Linking policy and science

Scientific Advice
Mechanism

Policy
(= integrity, transparency, personal relations)

Trust

Science
Contents

1. Introduction
2. Principles
3. Structures
4. Pitfalls
5. Tips and tricks
6. Conclusion
Types of science advisory structures

EXTERNAL
a) Academies and learned societies
b) Not-for-profit research institutes, universities, and related scientific associations
c) Think tanks and scientific consultancies

MANDATED
d) Scientific advisory committees (permanent or ad-hoc)
e) State agencies

INTERNAL
f) In-house science services
g) Individual science advisors (e.g. chief scientific advisors)
Important:

• All approaches are equally valid!

• No approach provides the "golden bullet", therefore in any given science advisory system one can find a mix of approaches

• The choice of the advisory body depends on the problem at hand (e.g. technical vs. philosophical, time frame, confidentiality), and is often influenced by personal relationships

• Science advisory systems depend significantly on the institutional and cultural traditions and structures in both science and policy of the country / organization
a) Academies and learned societies

**Description:**
Institutions made up of individual academics, members are selected based on merit

**Advantages:**
- Access to top scientists and the scientific mainstream
- Highly reputed/respected (also by the public)
- Stringent procedures and quality control

**Disadvantages:**
- Somewhat disconnected from policy
- Reports are often more difficult to read (scientific jargon)
- Assessments usually take some time (> 1 year)
b) Not-for-profit research institutes, universities, and related scientific associations

**Description:**
Public or private research-performing organizations and higher education institutions (or groupings thereof)

**Advantages:**
- Access to a wide variety of experts
- Local / regional vision

**Disadvantages:**
- Call for proposals needed (by ministry or research agency)
- The results may not reflect the opinion of the wider scientific community (issue of advocacy)
- Reports end with the words: more research is needed
c) Think tanks and scientific consultancies

**Description:**
Usually private-funded, semi-scientific policy advisory bodies.

**Advantages:**
- Deep understanding of policy processes and customer demands, deliver quick and on time
- Present in the capital

**Disadvantages:**
- Often do not stand up to scientific scrutiny
- Biases and hidden agendas (e.g. party-funded think tanks)
- Tend to confirm what you would like to hear
d) Scientific advisory committees (permanent or ad-hoc)

Description:
Committees of independent scientists mandated to advise government on specific issues, either on a permanent or temporary basis.

Advantages:
• A relatively quick and cheap way to get an opinion from a range of experts
• Can serve as sounding board for ideas

Disadvantages:
• They meet only now and then
• Limited resources
e) State agencies

Description:
Legally mandated bodies set up to implement policies (e.g. Collection of data, monitoring, risk assessments, certification, accreditation)

Advantages:
• They need to act upon request of government
• Highly-skilled staff with expert knowledge
• Holders of “official” data and statistics
• Largely trusted by the public

Disadvantages:
• Very technical
• Need to follow (lengthy) procedures
f) In-house science services

Description:
A research-performing body within government (e.g. a research branch within a ministry)

Advantages:
• Ability to share confidential files
• They understand well your needs
• They cover the whole policy cycle
• Will always deliver on time

Disadvantages:
• May not ask whether your question is the right one
• May down-tone inconvenient messages
g) Individual science advisors (e.g. chief scientific advisors)

Description:
An individual science advisor employed by government to advise the Prime Minister or a Minister directly

Advantages:
• Single number to call
• Available 24/7, can react quickly (e.g. in a crisis)
• Sits in the same building or a few blocks away
• Can give you informal, confidential advice

Disadvantages:
• Is not an expert on all matters (but knows whom to ask)
That's how the science advisory ecosystem in the European Commission looks like.
Contents

1. Introduction
2. Principles
3. Structures
4. Pitfalls
5. Tips and tricks
6. Conclusion
In December 2008 EU Member States adopted the 20-20-20 targets to be reached by 2020:

- 20% reduction in CO₂ emissions
- 20% of the energy consumption coming from renewables
- 20% increase in energy efficiency compared to 1990 levels

Pitfalls of science advice: The example of the EU Ecodesign Directive


establishing a framework for the setting of ecodesign requirements for energy-related products
Article 16 (2)

The Commission shall, as appropriate, introduce by anticipation:
(a) implementing measures starting with those products which have been identified as offering a high potential for cost-effective reduction of greenhouse gas emissions, such as heating and water heating equipment, electric motor systems, lighting in both the domestic and tertiary sectors, domestic appliances, office equipment in both the domestic and tertiary sectors, consumer electronics and HVAC (heating ventilating air conditioning) systems.
Work on Preparatory Studies for Eco-Design Requirements of EuPs (II)
Lot 17 Vacuum Cleaners
TREN/D3/390-2006
Final Report
COMMISSION REGULATION (EU) No 666/2013
of 8 July 2013
ecodesign requirements for vacuum cleaners

After light bulbs and TVs... now EU officials BAN our vacuum cleaners

Opinion: This vacuum cleaner ban is a reason to leave EU

Meddling eurocrats to ban supercharged hoovers as Brussels lays down new rules

Brits say 'EU sucks' over vacuum cleaner ban

NOW KETTLES FACE EU BAN

Brussels meddlers in another assault on our way of life

After vacuum cleaner ban, the EU targets hairdryers, kettles and even smartphones
The great vacuum cleaner stampede: Panic buying hits shops as deadline looms for Brussels ban on high-powered machines

- Shoppers are panic-buying powerful vacuum cleaners to beat European Union ban that comes into force next week.
- Last night, retailers reported that sales had soared by nearly 50 per cent, with many running out of powerful models.
- Brussels diktat will prohibit companies from manufacturing or importing vacuum cleaners that are above 1,600 watts.
- EU is now considering measures to ban most powerful hairdryers, lawn mowers and electric kettles, it was revealed.

All Of Europe Is Panic-Buying High-Powered Vacuum Cleaners Before They Become Illegal

Which? accused of encouraging the stampede by panicking its readers.

Vacuum cleaner manufacturers urge Cameron to back EU ban

EXCLUSIVE: Chief executive of Miele tells Prime Minister that the Ecodesign Directive provides a welcome boost to innovation.

Sir James Dyson backs EU directive on vacuum power rated above 1,600 watts

Panic buying has swept through Britain after consumer watchdog Which? warned Brits to "act quickly" if they wanted an appliance that is 1,600-2,200 watts.
### EU regulations with regard to ecodesign requirements for...

<table>
<thead>
<tr>
<th>Regulation</th>
<th>Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>107/2009</td>
<td>Set-Top Boxes</td>
</tr>
<tr>
<td>244/2009</td>
<td>Non-directional household lamps</td>
</tr>
<tr>
<td>245/2009</td>
<td>Fluorescent lamps and high intensity discharge lamps</td>
</tr>
<tr>
<td>278/2009</td>
<td>No-load condition electric power consumption and external power supplies</td>
</tr>
<tr>
<td>640/2009</td>
<td>Electric motors</td>
</tr>
<tr>
<td>641/2009</td>
<td>Glandless circulators</td>
</tr>
<tr>
<td>642/2009</td>
<td>Televisions</td>
</tr>
<tr>
<td>643/2009</td>
<td>Household refrigerating appliances</td>
</tr>
<tr>
<td>1015/2010</td>
<td>Household washing machines</td>
</tr>
<tr>
<td>1016/2010</td>
<td>Household dish washers</td>
</tr>
<tr>
<td>327/2011</td>
<td>Fans</td>
</tr>
<tr>
<td>206/2012</td>
<td>Air conditioners</td>
</tr>
<tr>
<td>932/2012</td>
<td>Household tumble driers</td>
</tr>
<tr>
<td>1194/2012</td>
<td>Directional lamps and LED lamps</td>
</tr>
<tr>
<td>617/2013</td>
<td>Computers and Servers</td>
</tr>
<tr>
<td>666/2013</td>
<td>Vacuum cleaners</td>
</tr>
<tr>
<td>813/2013</td>
<td>Space heaters and combination heaters</td>
</tr>
<tr>
<td>814/2013</td>
<td>Water heaters and hot water storage tanks</td>
</tr>
<tr>
<td>66/2014</td>
<td>Domestic ovens, hobs and range hoods</td>
</tr>
<tr>
<td>548/2014</td>
<td>Small, medium and large power transformers</td>
</tr>
<tr>
<td>1253/2014</td>
<td>Ventilation units</td>
</tr>
<tr>
<td>1095/2015</td>
<td>Professional refrigerated storage cabinets, blast cabinets, condensing units and process chillers</td>
</tr>
<tr>
<td>1185/2015</td>
<td>Solid fuel local space heaters</td>
</tr>
<tr>
<td>1188/2015</td>
<td>Local space heaters</td>
</tr>
<tr>
<td>1189/2015</td>
<td>Solid fuel boilers</td>
</tr>
<tr>
<td>2281/2016</td>
<td>Air heating products, cooling products, high temperature process chillers and fan coil units</td>
</tr>
</tbody>
</table>
Such stories feed the agendas of populists...
...and science becomes a casualty in the political debate

“The people in this country have had enough of experts“

Michael Gove, 3 June 2016
In other words:
One of the reasons for Brexit was the ecological design of vacuum cleaners.
Lessons learnt from the ecodesign case

- The science-policy interface is messy
- Even the best science advisory system will not save you from political trouble
- Scientists need to understand the dynamics of politics
- Political decisions need to be informed by science, but cannot be “outsourced” to scientists
- Behavioral science and engagement with the public are needed
Contents

1. Introduction
2. Principles
3. Structures
4. Pitfalls
5. Tips and tricks
6. Conclusion
Some practical tips and tricks on how to improve the impact of science on policy
We need to enthuse people for science and technology
Which scientist would you trust?
We need to communicate, otherwise the void will be filled by the uninformed.
Greta Thunberg may not be an expert, but she makes the voices of experts heard.

“I don’t want you to listen to me, I want you to listen to science”
We need to use a language everybody understands!
Narratives are very powerful

Mauna Loa Monthly Mean Carbon Dioxide
(NOAA ESRL GMD Carbon Cycle)
If the other side comes with anecdotes, then we should have the better anecdotes.
The elevator pitch:
You have 3 minutes to get the message across
Timing is extremely important in politics
Communicate uncertainty – and what it means
Be aware of cognitive biases on both sides

Source: Paul Leonard
Politicians don’t like to be told what to do – scientists need to provide options that are implementable in a real world
Equip the politician with the arguments to defend the evidence in public
Most politicians are open to listen to science, but they struggle to engage with it.

- Politicians who hate science
- Politicians who have not discovered how science can help them or have not found an easy access to science
- Politicians who love science
Scientists need to show empathy for public concerns and ethical issues.
We have to engage with citizens
(there is no point in preaching to the converted)
Contents

1. Introduction
2. Principles
3. Structures
4. Pitfalls
5. Tips and tricks
6. Conclusion
Policies based on robust scientific evidence are more sustainable than those that are not.

Lake Chad 1972

Lake Chad 2007
When science and policy work together, great things can be achieved.
Haile Gebrselassie

“When you run the marathon, you run against the distance, not against the other runners and not against the time.”