



Group of Chief Scientific Advisors

Practitioner Consultation Meeting **'Making sense of science under conditions of complexity and uncertainty'**

27 March 2019

Summary of outcomes

The context

Under President Juncker, the European Commission has committed to put better regulation principles and scientific evidence at the heart of policy-making since 'policy making requires robust evidence'. It is argued that 'high quality scientific advice, provided at the right time, greatly improves the quality of EU legislation and therefore contributes directly to the better regulation agenda'¹.

The Group of Chief Scientific Advisors ('the Group') were appointed by the European Commission to provide high quality, timely and independent scientific advice on specific policy issues where such advice is critical to the development of Union policies or legislation and we are asked to do so based on the best possible scientific evidence.

In February 2018, in response to the Group's own-initiative proposal, the European Commission asked the Group 'to provide by July 2019 guidance on the effective and transparent provision and use of science advice for informed policy-making, considering the complexity and uncertainty of contemporary issues and science'². The resulting forthcoming scientific opinion, entitled 'Making sense of science under conditions of complexity and uncertainty' addresses the following main question: 'How to provide good science advice to EC policymakers, based on available evidence, under conditions of complexity and uncertainty?'. With this opinion, the Group of Chief Scientific Advisors aims to provide input into that process as regards science for policy.

The purpose of the meeting

The purpose of the practitioner consultation meeting was to gain insights from the practical experiences of senior-level practitioners of science for policy and policymakers in a number of areas which have emerged as particularly significant for the development of the future scientific opinion 'Making sense of science under conditions of complexity and uncertainty', based on the analytical work done so far, that is:

- The scoping paper.
- The outcomes of the scoping workshop³.
- Reviews of available evidence, including by the Science Advice to Policy by European Academies (SAPEA) consortium, and discussions within the Group of Chief Scientific Advisors.

The practitioner consultation meeting was a part of the evidence-gathering process for the scientific opinion.

¹ Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on better regulation for better results - An EU agenda (COM(2015) 215 final).

² Scoping paper - Making Sense of Science under Conditions of Complexity and Uncertainty: https://ec.europa.eu/research/sam/pdf/meetings/hlg_sam_scoping_paper_science.pdf

³ https://ec.europa.eu/research/sam/pdf/topics/masos_scoping_workshop_outcome.pdf

Participants

Members of the Group of Chief Scientific Advisers

Surname	Name	Affiliation
Heuer	Rolf	Chair of the Group of Chief Scientific Advisers
Dykstra	Pearl	Vice-Chair of the Group of Chief Scientific Advisers
Bujnicki	Janusz	Member of the Group of Chief Scientific Advisers

Invited experts

Surname	Name	Affiliation
Bertolini	Roberto	World Health Organization Representation to the EU, member of the EC's Scientific Committee on Health, Environmental and Emerging Risks (SCHEER), IT
Brom	Frans	The Netherlands Scientific Council for Government Policy (WRR) and Tilburg University, NL
Ferguson	Mark	Chief Science Advisor of Ireland, IE
Gropas	Ruby	European Political Strategy Centre (EPSC), BE
Hacker	Jörg Hinrich	German National Academy of Sciences Leopoldina, DE
Hart	Andrew	University of East Anglia, UK
Hugas	Marta	European Food Safety Authority (EFSA), IT
Keizer	Anne Greet	European Science Advice Forum (ESAF), NL
Kreyza	Joachim	Joint Research Centre, European Commission, BE
Nowotny	Helga	Social Studies of Science, ETH Zurich, CH
Vargas	Rosalia	Ciência Viva, PT
Vermeier	Koen	Global Young Academy GYA and CNRS, FR
Cemma	Masha (observer)	Senior policy advisor, office of the Chief Science Advisor of Canada - by phone link, CDN

Staff of the Scientific Advice Mechanism Unit (EC)

Surname	Name	Affiliation
Klumpers	Johannes	Head of Unit
Bray	Jeremy	Deputy Head of Unit
Kwiecinski	Piotr	Policy Officer
Pottaki	Iphigenia	Policy Officer
Boavida	Dulce	Policy Officer – Seconded National Expert
Gils	Corinne	Assistant

Questions discussed and a summary of observations

1. In science advice, how can one engage with policymakers in a consultative manner?

- Advisors should seek to understand policymaking and the context in which it takes place.
- It is important to speak early, and engage early, with policy makers. The initial dialogue about the question to be addressed is very important. Too often, the advice given without consultation misses the point, which may involve a lot of work that is not subsequently used.
- Building relationships matters. Advisors should ask: 'How can I help you? What is important for you?'
- There are formal and informal ways of engaging with policymakers. One needs to ensure that the formal ways are properly followed. Some thought that carving out informal safe spaces, 'sanctuaries' to talk to policy makers, where be free of other pressures and where an abstract problem can be made tangible for them, can be helpful. Others pointed out to the fact that, while the idea is good, it may raise concerns about transparency – procedures should give the advisors safe space to work, while steering clear of the advice falling into the trap of advocacy.

- A lot depends on the institutional context. Some types of institutions (such as 'arm's length' advisory councils) can engage early and closely without their independence being questioned.
- Engaging does not always imply simply taking what is said at the point of departure. Reworking the question that is on the table is very important. Participatory methodologies may be helpful in defining the question
- Engagement *during* the process is important too: it is good to test the initial options with policy makers. New insights emerge after the initial evidence-gathering work which may lead to reframing of the initial problem.
- At the other end dialogue is important again – to make sure that what is communicated by the advice is understood as intended
- It is important to remember that complexity and uncertainty are also a part of the policymakers discourse and thinking.
- In presenting policies informed by the advice, especially for those which may be controversial or upset a segment of the public, it is important for policymakers to get the advising experts to stand behind them and support them publicly by confirming that what is being proposed is consistent with the best international evidence and practice.

2. In science advice, how can one engage with the public in a consultative manner, including for the definition of the question?

- Translating from a societal issue to a policy issue to a science issue may go wrong; therefore, science advisers may choose to discuss with the public directly about a societal issues, which may lead to better ways of advising with these issues scientifically.
- Engaging with the public helps to understand the questions and the society in its cultural, historical, linguistic context.
- Much depends on the purpose: is it to mobilise the public for a policy that has already been decided, to test choices, or to find out which issues the public finds to be the most pressing. A positive example comes from Austria, where an online consultation in a biomedical field asked the public what they find the most pressing issues to be addressed by research and policy – interestingly the answer was an aspect that had been neglected, i.e. mental health of adolescents.
- Engaging with the public for 'toxic' topics (for which there are solidly engrained misperceptions) may be tricky because doing so may reinforce the misperceptions and give them additional legitimisation ('if you are discussing this with the public, there must be something scientifically wrong with the evidence'). On the other hand, it is a part of the right attitude of advisors to listen to the public concerns, even if they are irrational from the public point of view. As an example, not the entire anti-vaccination movement is irrational and anti-scientific; some proponents are motivated by their concepts of public good, individual liberty etc.
- It is crucial to avoid the impression of scientists' arrogance. A message may be factually correct but lack compassion and understanding.
- Deliberative processes are worth studying. One example comes from Ireland's 'citizen assemblies' which have been used for very contentious value-laden issues (such as abortion, gay marriage) and where scientific perspectives were also presented. For some other topics such as climate change, they led to interesting new insights for policy (e.g. people protested against there not being a carbon tax).
- It important to gain the trust of the public concerning the methodology applied. Once the public accepts the methodology and sees that the process is fair, they may be more willing to accept the results even if these go against their initial expectations.

3. How important is independence and distance of science advisers?

- The question is related to Q1 and connected to the 'adviser's dilemma' which needs to be addressed: being too close to the policy makers creates a risk that the advice will repeat what they know already; being too far risks the advisers being 'on another planet' and thus not understood.

- Being too close also creates another risk of preconceptions being transferred without any notice to policymakers. An example given was that of the reactions to the influenza epidemic in the 1970s in the US (the swine flu variant). The reactions were guided by an unexamined analogy to the 1918 pandemic, which was false.
- Independence of the advisors can be misunderstood. It should not mean working in isolation, since relevant issues come up all the time during the process. Independence is the freedom to consult whomever it is important to consult. Not picking up the phone when the policy maker calls is not a proper interpretation of independence. Independence is largely about ensuring that the science advisors do not have a stake, a vested interest, in what they are advising on and how. However a question arises on government-employed advisers: can you be independent from those who pay you. A test of independence in that case is whether the advisor can give advice contradicting the opinion of those who finance them.
- Science advisors should have no vested interests, but it is hard to find genuine topic experts to advise the advisors who do not have an interest in the topic at hand. They should thus not be automatically dismissed because of that – instead the interest should be clearly laid out on the table
- It can also be helpful to have a trusted organisational buffer between the advisors and the policymakers – e.g. a secretariat, which can e.g. keep track of the forthcoming issues – since policymakers do not always have the time to be very strategic.
- Distance is already created by the fact of science advisors being an intermediary between topic experts and policymakers.
- For addressing dilemma or tension between distance/transparency and engagement/trust, the type of use of the advice can be important: if the advice advocates a specific policy it needs to be very transparent and formal; on the other hand, if the advice is for orientation or 'enlightenment', it can afford to be informal.

4. What is important in assessing the comprehensiveness and quality of evidence underlying the science advice?

- Evidence sources should not be limited to what is digitally available.
- Some existing guidelines for evidence synthesis, such as those by the UK Royal society, already provide an excellent guide.
- Consistency and coherence should be looked for. Plural evidence may be somewhat inconsistent but at least it should be coherent.
- In today's world, the public value carefully curated data.

5. In science advice, how to help policymakers deal with precaution and innovation?

- There is not always necessarily a tension between precaution and innovation, as precaution may drive innovation – as it encourages scientists to develop alternatives.
- There may be unintended effects of not taking a decision (in the name of precaution). An example is climate change: doing nothing would have very adverse effects. Hence, it is very important to be clear on what we need to protect with precaution – if a lot of action is needed to achieve this, precaution may be setting us on the wrong path.
- Policymakers and industry often have a restrictive definition of innovation (restricted to certain topics), whereas it is important to bring in innovation also into the advisory processes.
- The contribution of science is to provide information about the uncertainty of outcomes (quantified, it is quantifiable) and a range of possible outcomes; to identify the benefits and the probability of attaining them.
- Science advisers can ask the following: what do we know with certainty and how, what do we need to know, when do we need to know it, and how much it will cost to find out. Answering this may trigger a pragmatic response.

- A response by policy making recommended by some is to embrace provisional regulation – on the analogy to the process of clinical trials. Another response may be policy experimental spaces. One positive example is the UK Human Embryo Fertility Act, where decisions are taken on a case-by-case basis by a trusted agency; evidence is gathered and evaluated over time so that regulation can become less provisional (it gets stopped, or scaled up)

However, others have pointed out that this may create a risk of regulatory uncertainty, which is the least favoured situation by businesses.

- To be effective, advisors should be aware of the values debate. Most people do understand the evidence, but use it selectively to support and promote their values. There are two questions which unfortunately get mixed up: 'What is the evidence?' and 'Do I support it?'
- An important point to not about value is that they are not immutable. As an example, it was still considered immoral in the second half of the 19th century in the US to have life insurance for coal miners (as it was considered 'playing God').

6. In science advice, what works for questions involving high complexity⁴?

- Humility to recognise complexity.
- Interdisciplinary, deliberative and participatory approaches.
- Mapping the issue in a structured way to find parts that are amenable to be managed with the input from science (technical) and those which concern social values and thus require other approaches. 'Science' is to be understood broadly though, to include social sciences and humanities. One needs to define what is known or unknown, and what the uncertainties are; use conceptual or quantitative models to integrate the 'managed' parts into the overall model.

A systems-oriented approach may help – looking more broadly than just the immediate effect. It is important to recognise cultural, historical, genealogical perspectives too: how did the issue come about?

One way is also to break up a multidimensional issue into a series of two-dimensional ones – while being aware that these two-dimensional sub-parts of a complex issue interact with each other.

- The output of the model should not be taken too uncritically, though, as there are always external uncertainties and simplifications. We need to ask ourselves about the likelihood of the model being wrong.

7. In which cases does it help to communicate uncertainty? What are the appropriate ways to communicate uncertainty⁵?

8. Under conditions of high complexity and uncertainty, how should science advice respond to policymakers when scientific evidence does not offer clear conclusions?

- Uncertainty should always be communicated. Uncertainty may affect the policy outcome: concealing it may lead (and in fact has led in some historical instances) to suboptimal policy choices, and it would also have other severe consequences such as a loss of credibility
- When possible, probabilities should be used – expressed as a range of outcomes and how likely they are to occur. However, probabilities can only be used for very well defined questions, and do not work e.g. for epistemic uncertainty. In addition, for highly emotive issues (e.g. animal suffering

⁴ The scoping workshop defined the following kinds of complexity to be considered: (a) complexity arising from **complex, ambiguous, conflicting, plural or contested scientific evidence**, or conflicting interpretations of the same evidence; (b) complexity arising from **different styles of reasoning** (e.g. the different ways in which diverse sciences address the same policy question); (c) the **complexity of policy questions (e.g. complex causality)**, and multiple ways to frame the same issue through policy questions; (d) the **complexity of societal and political context**, including: societal opinion, ideologies, political priorities, and sources of evidence outside science.

⁵ The scoping workshop recommended considering the following types of uncertainty: (a) **technical** uncertainty (e.g. missing data); (b) **methodological** uncertainty (e.g. uncertainty about how to study an issue); (c) **epistemic** uncertainty (e.g. as to what kinds of knowledge should be brought in to study an issue and reasons for doing so; uncertainty about what is at stake).

at slaughter) experts are often unable to provide a clear answer, even though it may be able to be defined some proxy factors.

- Frequentist probability has a very restricted application.
- Subjective uncertainty is a good measure, and with proper training scientific experts can learn how to use it as a tool.
- When in the regulatory area policymakers request firm binary conclusions (e.g. safe/ not safe) – science needs to be defined the threshold of what 'safe' means and be clear about it.
- For science advice to be useful, two questions need to be asked: 'how does the uncertainty matter?' and 'what are the consequences of taking or not taking action?'. The purpose of the advice is to help the decision-making. As brokers, science advisers are well placed to state the uncertainty of knowledge – as topic experts may tend to defend or overstate uncertainties.
- It is important to distinguish how uncertainties are communicated, to whom and when. Communication to the broad public is a policy decision, and it belongs to the policymaker, not to the adviser. The relevance of the uncertainty for the recipient of the advice needs to be communicated.
- We need to be mindful of the subjective perceptions of adverse consequences, e.g. high adverse effects but small uncertainty may be perceived as less dangerous than moderate adverse effects but high uncertainty. The general public and policymakers may look more at the 'error bars' than the actual values.
- Uncertainties may often be used to advocate a position.
- Scientific uncertainties may be compounded by policy uncertainties. Coming back to the example of the swine flu in the US in the 1970s, there was not only uncertainty about the flu risk, but also about policy implementation (e.g. how to vaccinate the entire population).

9. Under conditions of high complexity and uncertainty, is it appropriate to provide advice as a range of policy options?

- When the evidence clearly points to a specific recommendation, it should be formulated. It should be accepted by advisors that policymakers have other factors to consider, but their decision should be justified. Policymakers may choose to deviate from the science advice for other reasons but must not challenge the scientific evidence as an excuse.
- Straightforward prescriptions are normally not liked by policymakers. People normally like to develop their own conclusions. However, a pure menu of options may create a risk of them being ignored. Listing options should therefore at least be supported by naming the different consequences of these options, and the likelihood of them occurring.
- There can also be intermediate variants: a straightforward recommendation, but with an offer to policymakers to assess other options if they are put forward. For strategic advice, the best is to give a specific direction, but not very specific implementation suggestions (at which civil servants are better at)
- The choice between options or recommendations should take into account how politically charged the issue is.