

# A Royal Irish Academy Discussion Paper on Science Advice in Ireland and Europe

Discussion Paper 1 / 2020



At the Royal Irish Academy (‘the Academy’), Ireland’s leading body of experts in the sciences and the humanities, we champion research and promote awareness of how science enriches our lives and benefits society. We bring academia, government and industry together to address issues of mutual interest, and in doing so, we contribute to public debate and policy formation.

This discussion document arises from a workshop held at the Royal Irish Academy on 11 February 2020 with the support of SAPEA (Science Advice for Policy by European Academies). The workshop brought together Irish and European experts to discuss the findings of the 2019 SAPEA scientific advice report, entitled ‘Making Sense of Science for Policy under Conditions of Complexity and Uncertainty’, and its relevance to Ireland.

Presented in this discussion paper are the main discussion points of the event, both in relation to science advice more generally, and science advice specifically in the Irish context. In the words of Professor Maria Baghramian MRIA, Ireland’s contributor to the SAPEA report at the workshop:

*“The report can provide for discussion of the interface between science and policy in various EU states, including in Ireland. Today is an occasion to start this discussion.”*



Acadamh Ríoga na hÉireann  
Royal Irish Academy



Making Sense of Science for Policy  
under Conditions of Complexity  
and Uncertainty

## Background

Now more than ever, policymakers need good quality science advice to inform their decisions. Yet, the very policy issues for which scientific input is most needed are the ones in which the science itself is often complex and uncertain. This challenge is being tackled by the EU FP9 funded project, Science Advice for Policy by European Academies (SAPEA), which brings together expertise in engineering, humanities, medicine, natural and social sciences from over 100 academies – including the Royal Irish Academy – young academies and learned societies across Europe. SAPEA is part of the European Commission’s Scientific Advice Mechanism (SAM) and together with the Group of Chief Scientific Advisers provides independent scientific advice to the European Commission.

‘Making Sense of Science for Policy under Conditions of Complexity and Uncertainty’, a new Evidence Review Report by SAPEA, was written by a multidisciplinary group of leading scientists, nominated by academies across Europe. Its key findings include:

- Science advice can help to anticipate future challenges and assist in designing mitigation strategies or interventions
- Scientific advice should not prescribe but inform policies
- The purpose and significance of scientific advice depend on the issue and the context
- Science advice for policymaking involves many legitimate perspectives and insights
- Scientists, as well as policymakers, should be sensitive to various biases and interests when drawing inferences from data and information
- The relationship between science advisors and policymakers relies on mutual trust.

The SAPEA report was among the key sources of evidence for the new Scientific Opinion from the European Commission’s Group of Chief Scientific Advisers, entitled ‘Scientific Advice to European Policy in a Complex World’. Its key recommendations include:

- Engage early and regularly with policymakers and define together the boundaries of advice, as well as the best way to address it. Involvement of stakeholders or the public in the process should also be sought
- Improve the quality of scientific advice by rigorous synthesis of existing evidence and transparent debate
- Experts should analyse and communicate uncertainty and diverging views related to the scientific evidence and the policy options recommended.

The Royal Irish Academy February 2020 workshop provided an opportunity to discuss the SAPEA findings and reflect on what insights might be applied to science advice in Ireland. This Academy discussion paper recaps on some of the insights from the event.

Following an introduction by Professor Michael Peter Kennedy, President of the RIA, Professor Rolf-Dieter Heuer, Chair of the European Commission’s Group of Chief Scientific Advisers, provided an overview of the European Commission’s Scientific Advice Mechanism and the role of the Group of Chief Scientific Advisers. Session I was chaired by Dr Cliona Murphy, Dublin City University and Chair of the ALLEA (European Federation of Academies of Sciences and Humanities) Science Education Working Group. Professor Ole Petersen, Vice-President of Academia Europaea, gave an

overview of the work of SAPEA. Professor Maria Baghramian MRIA, University College Dublin and Ireland's contributor to the SAPEA report, then presented key findings from the Making Sense of Science Evidence Review report, followed by Professor Heuer's second presentation on the role of scientific advice in the current climate. Finally, Professor Peter Halligan, Chief Scientific Adviser for Wales, spoke on the topic of 'How a Chief Scientific Adviser experiences science advice', before Dr Murphy facilitated an engaging discussion between the audience and the speakers.

The day's second session, chaired by the Academy's Science Secretary, Professor Pat Guiry MRIA, consisted of a panel discussion about science advice in Ireland with contributions from Jasmina Behan, Head of the Irish Government Economic and Evaluation Service (IGEES), who outlined the role of the IGEES and the use and value of evidence, Dr Charles Larkin, Director of Research, Institute for Policy Research, University of Bath, who spoke about the science-policy interface in action, and Luke Drury MRIA, Professor Emeritus, Dublin Institute for Advanced Studies, who described the function of academies in science advice.

## The European dimension of evidence-informed policymaking

### The Scientific Advice Mechanism and the work of the Group of Chief Scientific Advisers

Professor Heuer introduced the Scientific Advice Mechanism (SAM) and the work of the Group of Chief Scientific Advisors, which form a key part of the European Commission's Scientific Advice Mechanism, established to provide independent and transparent scientific advice to inform its policy discussions. The Group of Chief Scientific Advisors is completely independent of the European Commission but there is a support unit within the European Commission that scopes the policy landscape. The Group of Chief Scientific Advisors gives advice to not just one Commissioner but to the Council of Commissioners.

The Group of Chief Scientific Advisors does not generate scientific evidence, but provides scientific advice based on the best available evidence to policymakers. Essentially, it is scientific advice to policy and not advice on policy for science. This science advice is done either upon request, or on the Group's own initiative. The benefit of such a system is that it works in a consultative way and provides a dual-layer system. It is not set up for urgent interventions but focused on longer term issues – short term responses are not possible, and a typical project lasts for one year. As a part of SAM, the SAPEA consortium undertakes evidence reviews that inform the scientific opinion of the Group of Chief Scientific Advisors.

Features of the Group of Chief Scientific Advisors that are considered key to its successful operation include its emphasis on:

- Consultation – the group may be consulted at any time on any policy field, defining the timespan in which advice is needed
- Ensuring it has access to the best available evidence
- Reliance upon a ‘dual layer system’ of evidence review reports (generated through SAPEA) and scientific advice (Group of Chief Scientific Advisors)
- Direct access to the College of European Commissioners
- Targeted recommendations to relevant legislation.

## Two Models of Policy Advice

In her contribution, Professor Baghramian pointed out that scientific advice is essential to facilitate decision making in technologically and economically complex societies. Science advice has become increasingly prominent and policymakers often have unrealistic expectations from science advice and may make unwarranted assumptions about the nature of evidence. When we consider the function of scientific evidence and advice in policymaking, it is important to pay attention to how the role of scientific advice in modern democracies is typically represented.

Professor Baghramian outlined two models of policy advice that dominate: the ‘linear-rational’ model and the ‘strategic’ model. The linear model has the following characteristics:

- Authoritative advisors aim to present a factual analysis of data for use by policymakers
- Advisors may be called upon at various points in policy formation to delineate a problem and/or to advise on the likely efficacy of potential policy solutions
- Advisors may be asked to inform decision-making in a crisis
- Some advisors and advisory bodies offer opinion in an ongoing way, while others are consulted on a ‘one-off’ basis
- Scientific advisors and other experts are seen as offering disinterested, objective advice.

On the other hand, the strategic model:

- Frequently calls upon experts to give advice but their input is used selectively and/or strategically to legitimise political choices or depoliticise contentious issues
- Facilitates use of evidence in support of particular policies, particularly for contested issues
- Uses advice selectively, turning to particular advisors, or cherry-picks findings and recommendations.

While these two models do retain a degree of validity, both are problematic. The linear model has unrealistic assumptions about the rationality of the policy process, the neutrality of experts, and the function (and construction) of evidence and advice, while the strategic model is one of the sources of the general public’s lack of trust in expert advice and cynicism about expert panels. Perhaps a hybrid model is needed.

In order to make a more tangible design for the interplay between science and policymaking, it is useful to distinguish five functions that reflect the needs of policymakers with respect to scientific input:

- Enlightenment: informing about the state-of-the-art of issues (e.g. the relationship between CO2 emissions and climate change)
- Orientation: provide an understanding of a challenge (e.g. the problem of water scarcity due to climate change)
- Strategic planning: providing strategies for reaching predefined objectives (e.g. strategies to reach 80% renewable energy in the year 2050)
- Integration: bringing together various forms of knowledge, (e.g. scientific, experiential, anecdotal, indigenous)
- Co-creation of knowledge: engaging representatives of science, civil society, politics, private sector and the affected public in formulating solutions to a given problem or challenge.

## Science advice: a perspective from government

Professor Halligan explored science advice as ‘an emerging field of academic study, generating new theories and conceptual models to explain the complex relationships between science and policymaking’. All societal challenges can benefit from science advice, including, inter alia, climate change, food security, ageing populations, poverty, terrorism. Statistics from public surveys from around the world show how the need for science to be embedded in the policy process is increasingly understood:

- 82% agree that politicians should rely more on the advice of expert scientists (Australia)
- 68% agree that it is important for scientific findings to inform government policy (Ireland)
- 90% consider science important for improving human health (New Zealand and Ireland)
- 91% consider young people’s interest in science to be essential for future prosperity (United Kingdom).

It is important, however, that advisory bodies have a realistic understanding of how policymaking processes work, and see the pressures and constraints under which politicians, officials and decision makers operate. For example, most politicians are not science graduates and have ‘limited bandwidth’ and often limited maneuverability, while much day-to-day advice tends to represent an informal use of evidence rather than formally commissioned reports. Professor Halligan offered some practical observations on science advice:

- Some advice will be ignored; it is only advice and not policy
- The advice can inform policy but not make it; Chief Scientific Advisors do not make policy decisions
- Trust can be earned and maintained only if the science advisor or advisory committee acts as a knowledge broker, rather than as an advocate
- It is important to maintain scientific credibility with politicians, scientists and the public
- Effective advice increasingly relies on interdisciplinary expertise: it is now generally accepted that solutions to cross-cutting policy problems require the input of a variety of disciplines and knowledge.

## What does 'good' science advice look like?

According to Professor Baghramian MRIA, good expert advice is:

- Trustworthy
- Independent
- Transparent
- Inclusive (which also means being accessible and responsive)
- Rigorous
- Responsible

Professor Heuer offered the following fundamental principles of science advice:

- High-quality science is the bedrock of good scientific advice.
- Relevant evidence should come from all disciplines (interdisciplinary and multidisciplinary).
- Information should be publicly available.
- Scientific advisors need to demonstrate their trustworthiness as a prerequisite for doing their work well.
- There has to be a clear mandate to ensure that science is separate from politics.
- Scientific advice needs to be a transparent and impartial process.

Thus, Professor Heuer made three recommendations:

1. Engage early and regularly
  - Clarify boundaries between science, scientific advice, and politics
2. Define together the questions for scientific advice (iterative process)  
Ensure the quality of the scientific evidence
  - Use the full scope of good science
  - Ensure rigorous synthesis of scientific evidence
  - Ensure rigour in expert consultation
  - Refine the approach to conflicts of interest
3. Codify good scientific advice and consider oversight of its implementation  
Analyse, assess and communicate uncertainties
  - Technical
  - Methodological
  - Epistemic
  - Societal

## The Irish dimension of evidence-informed policymaking

Questions and comments from audience members during the panel discussion on 'Science Advice in Ireland' suggested that the Irish science advice system could be further enhanced. As one audience member reflected during the Q&A session:

*"There is a lack of a mechanism for scientific leaders to properly influence policy in an independent way akin to the European Commission's Scientific Advice Mechanism. We know*

*there are government consultations, lone academic experts, can we learn from other European countries to bridge this gap?"*

Throughout the workshop there were frequent references to how science advice functions in other countries. In the United Kingdom, for example, there is a large network of Chief Scientific Advisers that come from different parts of the government and the devolved administrations, i.e. each government department, has a Chief Scientific Advisor. It was pointed out that Norway ‘has very strong mechanisms in place for science advice’, that in the United States three academies were ‘explicitly set up to provide advice to administration’ and that the idea of civic society ‘being involved in policy formation is engrained in Swiss society’. The mechanisms that operate in other countries from around the world were juxtaposed with Ireland’s case, which was a ‘terrible weakness’, as one panelist described it. More information about science advice in Norway, Switzerland, the United Kingdom and the United States is available in Table I.

**Table I: Science advice in Norway, Switzerland, United Kingdom and United States**

Norway	Norway has a strong tradition and formalised procedures for involving citizens in priority-setting and assessment activities, and formalised procedures for science-based knowledge and scientific advice are deeply rooted in Norwegian policymaking and administration. There is no Science Advisor to the Norwegian government or parliament, but research institutes, universities, and other institutions report directly to government departments.
Switzerland	The role of scientific advisors in Switzerland is to provide advanced scientific knowledge on specific areas for governmental decisions, legislation or other societal issues. The Swiss Academy of Sciences is tasked with providing science advice to the Swiss government and has a number of organisations that focus on science policy.
United Kingdom	The UK has a network of Chief Scientific Advisers with most government departments having a Chief Scientific Adviser to provide scientific advice. Departmental advisers work together under the leadership of the Government Chief Scientific Adviser to support each other and to resolve cross departmental problems through the network. This network advises the Government Chief Scientific Adviser on all aspects of policy on science and technology, and the Government Chief Scientific Adviser is responsible for providing the Prime Minister and members of cabinet with scientific advice and ensuring and improving the quality and use of scientific evidence and advice in government.
United States	Three national academies of science, engineering, and medicine work together as the US National Academies of Sciences, Engineering, and Medicine to provide independent, objective analysis and advice, solve complex problems, and inform public policy decisions. Predominantly requested by the US government, over 200 expert studies are produced per annum.

Attendees commonly remarked that there is a ‘serious hole in the middle of the system in Ireland’, that the ‘existing system is opaque’, and that there is currently ‘no transparency’. An appetite for a mechanism like SAPEA was evident. One guest posed the question:



*“Could a mini SAPEA be better? What is the appetite for creating translators for science? Where can we have this debate on how to do this? No transparency in terms of advice at present.”*

The panel of experts agreed, as can be seen in the following comment:

*“SAPEA is a very interesting mechanism. Having only one Chief Scientific Advisor is not really a terribly good idea as no one individual can have all the expertise. A group of seven Chief Scientific Advisors, a pool of expertise, supported by a structure that allows the science community to feed into it is a good model. This would enormously increase the ability for government departments and the Parliament to tap into these resources. A mini SAPEA could be a good way of doing it.”*

In terms of resources, scientific expertise was considered to be plentiful in the Irish context. It was pointed out by panellists that ‘there is an enormous pool of scientists willing to work pro bono to help’ and that ‘approximately 2,000 documents are put in front of TDs on a weekly basis’. On the other hand, however, there is a no pool of scientific expertise in the Irish government that politicians can draw on, and it is here that challenges can arise. Politicians do not have sufficient time to absorb the data, and it is often the case that good science is not presented in a way that it is easily consumable for them. Furthermore, advisors in government departments and the parliament often do not have the resources and skills to provide rapid evidence reviews or perform data synthesis. Consequently, politicians in Ireland are often not aware of the evidence that exists in a given area.

## The future of science advice in Ireland

Many of today’s policy challenges are characterised by a mixture of complexity, uncertainty and ambiguity. Policymakers are increasingly confronted with highly complex policy issues requiring multiple forms of knowledge including scientific insights, experiential knowledge and local perspectives. In this context, appropriate, high-level, credible, objective scientific insights can help policymakers to more completely understand the policy problem, to generate and evaluate options and provide meaning to the discussion around critical topics within society. Scientific knowledge from all disciplines – the humanities, social sciences and sciences – is therefore an essential element in Ireland, and Europe’s, future development of policy.

As the Academy-SAPEA workshop noted, there is no universally applicable model for structuring scientific advice for policymaking, The European Commission’s Scientific Advice Mechanism, however, supported by a Group of Chief Scientific Advisors with systematic input from Europe’s academies and higher education institutions, offers a high-level, high-functioning arrangement that was well received by audience members at the Academy’s workshop. Many saw the merit in having a group of multidisciplinary scientific advisors, and the consensus was that a similar arrangement would be of value to Ireland and address the limitations of the current system.

The next iteration of Ireland’s national research and innovation strategy, led by the Department of Business, Enterprise and Innovation and scheduled for completion in 2020, offers a suitable opportunity to prioritise the development of governmental structures to enhance the contribution

of science to policymaking. Suggested actions arising from the workshop discussions which could be considered include:

- The establishment of an independent multidisciplinary Group of Scientific/Research Advisors under the aegis of the Department of the Taoiseach. This Group would assist in assessing the quality of scientific insights and the robustness of available evidence including its limits, and support greater cross-governmental department integration of scientific evidence in decision-making
- Specialist training in science advice skills for researchers and scientists to equip them to provide rigorous, accessible critical reviews of evidence and its implications for policymaking
- Specialist training to build research capacity and research skills within the civil and public service.

There is currently some controversy surrounding the perceived opacity of the membership and operations of the UK's Scientific Advisory Group for Emergencies during the COVID-19 pandemic. The break in public trust provides a stark illustration of the vital need for a distinct separation between the remit and roles of those charged with providing scientific advice and those charged as policymakers and politicians, interpreting and applying such advice for the good of society. It equally illustrates the importance of a diverse representation of disciplines and expertise within the membership of such groups to provide the necessary depth and breadth of knowledge and perspectives to avoid challenges to the legitimacy and credibility of the advice provided. Scientists involved in the provision of science advice must also be very clear that such advice as they provide is one input, and by no means the sole defining input, that governments should rely upon. Science advice needs to be weighed up amongst many other considerations including economic, societal and the realpolitik of contemporary government.

## Further information

The Royal Irish Academy/Acadamh Ríoga na hÉireann is Ireland's leading body of experts in the sciences, humanities and social sciences. The Academy champions research and identifies and recognises Ireland's world class researchers. It supports scholarship and promotes awareness of how science and the humanities enrich our lives and benefit society. Membership of the Academy is by election and is considered the highest Academic honour in Ireland.

For further information on this submission please contact [policy@ria.ie](mailto:policy@ria.ie)

# Appendix one

## Programme

- 11:00 Welcome and introduction by Professor Michael Peter Kennedy MRIA, President of the Royal Irish Academy
- 11.05 Presentations  
*Chair: Dr Cliona Murphy, Chair of the ALLEA (European Federation of Academies of Sciences and Humanities) Science Education Working Group*
- Introduction to the Scientific Advice Mechanism and the Group of Chief Scientific Advisors – Professor Rolf-Dieter Heuer, Chair of the European Commission’s Group of Chief Scientific Advisors
  - Introduction to SAPEA – Professor Ole Petersen, Vice-President of Academia Europaea
  - Presentation of SAPEA evidence review on ‘Making Sense of Science for Policy under Conditions of Complexity and Uncertainty’ – Professor Maria Baghramian MRIA, University College Dublin and Ireland’s contributor to the SAPEA report
  - Presentation of Scientific Opinion on ‘Scientific Advice to European Policy in a Complex World’ – Professor Rolf-Dieter Heuer, Chair of the European Commission’s Group of Chief Scientific Advisors
  - How a Chief Scientific Adviser experiences science advice – Professor Peter Halligan, Chief Scientific Adviser for Wales  
*Followed by Q&A and group discussion*
- 13.00 Lunch
- 13.30 Panel discussion: Science Advice in Ireland  
*Chair: Professor Pat Guiry MRIA, Science Secretary, Royal Irish Academy*
- Jasmina Behan, Head of Irish Government Economic and Evaluation Service, Department of Public Expenditure and Reform
  - Luke Drury MRIA, Professor Emeritus, Dublin Institute for Advanced Studies
  - Dr Charles Larkin, Director of Research, Institute for Policy Research, University of Bath, Bath, UK  
*Followed by Q&A and group discussion*
- 14.30 Closing remarks – Professor Ole Petersen, Vice-President of Academia Europaea