Science Advisory Council

Defra Science Advisory Council (SAC)

Minutes of meeting, 08th June 2022

Actions arising

Action number	Action	Owner
June (22) 01	Future discussion items: The SAC suggested future discissions could cover issues around chemical pollution, how green finance layers into the Environmental Land Management (ELM), and nutrient offsetting programmes.	SAC Secretariat

1. Welcome and apologies

The Chair welcomed attendees, apologies are recorded in Annex A.

2. Chief Scientific Adviser (CSA) update

The recently proposed civil service workforce reductions (i.e., reducing the size of the civil service to 2016 levels over the next three years) will include consideration of maintaining scientific expertise. Defra is also exploring transforming its arms length bodies (ALBs) and research establishments, as trialled by the Nature Recovery green paper. The SAC noted the ALB reform could provide an opportunity for sharing key performance indicators (KPIs) on shared landscape outcomes. The SAC was concerned that large-scale restructuring could be disruptive at a time when ALBs have to focus on planned climate adaptation work.

The government has agreement to continue with three EU science programs; Horizon, Copernicus, and Euratom. There have, however, been persistent delays from the European Commission, who are not proceeding with the UK's participation in EU programmes due to disagreements over the Northern Ireland Protocol (which is unrelated to the science programs). The government's alternative plans, under preparation in case UK cannot join these EU programs within a reasonable timescale, focus on alternative programs that offer strong value for academia and industry. Plans include delivering many of the benefits of Horizon association, with additional benefits, through wider global participation, and even stronger industry and small and medium enterprise (SME) engagement.

The Genetic Technology (precision breeding) bill had its second reading on 14th June 2022. The Genetic Technology bill is politically supported in England but may

have opposition from the Scottish and Welsh administrations, while Northern Ireland cannot join the bill owing to the Northern Ireland Protocol. The biggest negative view in the media regards labelling food that has been genetically edited.

Defra is leading the government's plans on UK climate adaptation and there are plans to establish a cross-Whitehall group for climate adaptation. Furthermore, through the marine science coordination committee, there will be better link up across government departments on issues of marine science.

3. Environment and Public Health and Wastewater Monitoring update

Defra provided the SAC with an update on the Environment & Public Health and Wastewater Programmes. The COVID-19 wastewater programme in England provided a large contribution towards the national COVID-19 response and was led by the UK Health Security Agency (UKHSA). The operational aspects of the COVID-19 wastewater programme in Defra have now ceased following the implementation of the Living with Covid strategy. Defra is now in the process of applying the wider benefits of the capabilities strengthened through involvement in the wastewater programme, to a wider range of applications. For example, large scale molecular environmental monitoring for food-borne pathogens. The SAC was asked for advice on how best to apply the programmes lessons identified across Defra's remit and for help in identification of specific areas to focus on such as gaps in technology and innovation.

The SAC recognised that the delivery of the innovative COVID-19 wastewater programme had successfully established a strong collaborative relationship with the Department of Health and Social Care (DHSC) and cross-sector working. Defra officials acknowledged there are a large number of existing health and environment relationships in government which the department is keen to explore and strengthen, and the SAC was asked to suggest areas that could benefit from better join up, not limited to government policy.

The SAC agreed that wastewater monitoring has had clear public health benefits. The SAC discussed some more sensitive benefits such as the possibility of detecting illicit drug use and locating sources of combined sewer overflows (CSOs). It was noted that while monitoring for illicit drugs falls outside of Defra's policy interests. Monitoring could however be expanded to consider pharmaceuticals and chemical contaminants more generally.

Defra highlighted research into the further use of wastewater monitoring as part of the PATH-SAFE programme. Pollutant source tracking has been done before, however; the SAC suggested researching how to bring in diffuse/non-point sources as this is an area that could lead to breakthroughs in AMR tracking.

Another avenue raised by the SAC is to consider emerging health risks through farm waste; new ways of using slurry are being developed and adapted for high end products, however, understanding of AMR and pathogenic material which is going onto the fields as slurry and whether that serves as a human risk is currently an evidence gap. On open pathogen genomic analysis, the capacity to handle the data is not keeping up. The SAC suggested that the programme offers wider opportunities for Defra to lead in that area; in particular on providing an open access archive of the data compiled so that non-specialists can use it and making it more accessible.

The SAC discussed the potential that an enhanced national scale monitoring network would provide the opportunity to test the theory that reduction in a waterway's diffuse pollution leads to positive outcomes for biodiversity. Another area that would benefit from a national or large-scale monitoring network is nutrient neutrality and nutrient offsetting; which is currently based on models, assumptions, and small-scale pilot studies.

The SAC noted that a large part of wastewater (and wider environmental) monitoring costs are from both the collection and analysis of samples and thus recommended promoting innovation initiatives for in situ labs, and intelligent or real time networks. The SAC suggested Defra could learn from the major programme the Natural Environment Research Council (NERC) funded on environment and human health and the challenges those programmes faced. Defra recognises the value of further monitoring and that this should be well linked in with the Natural Capital and Ecosystem Assessment (NCEA) programme as it develops.

The SAC emphasised the need for both monitoring and modelling to be part of future investment. The wastewater programme has successfully demonstrated the ability to gather data and analyse it quickly. The SAC thought that the learning from the programme should be transferred to other projects such as Environmental Land Management (ELM) which is a long way from achieving this level of data quality. Natural Capital and Ecosystems Assessment (NCEA) and ELM programmes are relying on data that is being gathered by many different programmes, therefore, the challenges are about bringing the legacy issues together before identifying what the gaps are and how to fill them. There are lessons to be learnt from translating the rapid evidence gathering of the COVID-19 wastewater programme into policy

decision making during emergencies and how this could be implemented in other situations.

The two areas of focus for Defra going forward are how to apply the delivery mechanism to something else and identifying where there are existing policy connections to further develop. Defra will develop a proposal of work and the SAC offered to review any such proposal once drafted.

4. Science Leads working lunch

Each policy-facing Directorate has a designated Lead Scientist, who works closely with the Lead Analyst and policy colleagues within their Directorate. The Lead Scientist is a recognised point of contact on scientific issues for that Directorate; communicates about science and scientists with the CSA's Office; and ensures that science and scientists are represented in the Directorate. In the Civil Service, scientists differ from analysts as analysts includes social scientists, statisticians, and economists who focus on analytical methods compared to scientific expertise.

The SAC noted that the informal and in-person meeting format was beneficial as it provided an opportunity to engage with Defra officials beyond Policy leads and facilitated a more in-depth understanding of some key Defra projects. Although the SAC members acknowledged that owing to meeting time constrains conversations were limited it was agreed that such networking events should be considered as part of future principal meetings.

5. Social Science Expert Group (SSEG) update

Professor Susan Owens (the current SSEG Chair) advised that following independent peer review the SSEG Public Engagement Review is close to formal publication. Reviewer comments of the report were positive and constructive. Once finalised the report will be published on the Defra SAC website. Plans are being developed to facilitate the dissemination of the report's findings across relevant Defra science and analysis teams.

The SSEG is now reviewing the format of future meetings, with agreement to continue with in-person meetings where possible. Furthermore, the group aims to be more proactive in their engagement across Defra's remit, identifying areas which would benefit from social science expertise/input, whilst remaining reactive to Defra's and SAC's asks. The SSEG would welcome wider engagement across government where Defra works with other Departments; for example, the Department for

Business Energy and Industrial Strategy (BEIS) on their Net Zero strategy or the Department of Health and Social Care (DHSC) on environment /health synergies.

At their most recent meeting in March 2022, the SSEG provided feedback on the Blue Planet Fund approach to monitoring, evaluation and learning. The SSEG also discussed Defra's qualitative impact assessment of land management intervention on ecosystem services in relation to beauty, heritage and public engagement. Future topics for SSEG discussion include; lessons learnt from the Public Engagement Review, highly protected marine areas, Defra's chemical strategy, gene editing (secondary legislation on animal welfare collaborating with the SAC Exotic Diseases subgroup), and the national Food Strategy. Prof. Owens added that a further aspect to consider is how Defra's social science aspects mesh with the natural sciences within the departments remit and how this integration is best served by the SAC and the SSEG.

Prof. Owens advised that several SSEG members are due to retire from the committee. The recruitment process for replacing these members will be more formal than previous recruitments. All the current SSEG members were asked to state what they enjoyed about being on the subgroup and highlights included; having an impact on policy, learning about the inner workings of government and Defra, a feeling of public service, interface between research and policy, and intellectual stimulation.

6. Defra's research and innovation (R&I) plan

Defra shared its R&I Plan for 22/23-24/25 which sets out how Defra plans to spend the SR21 settlement. Although this is initially for a Defra group audience, the SAC was asked for views on the usefulness of the document to the wider Defra community. The Welsh Observer has contributed views outside of the meeting and the Scottish Observer has not provided comment.

The SAC made several observations that the CSA's Office will consider including:

- Setting out the context for this document, which is a plan for research to inform policy rather than a policy strategy.
- Defining what we mean by innovation in this context.
- Being clearer about the links between Defra's priorities and the flagship research programmes.
- Include examples of where social science is specifically important to delivery of programmes.
- The need for systems thinking and consideration of trade-offs between the programmes

7. Defra's future science needs

Defra CSAO are looking at whether Defra has access to the science needed to address its key research and development (R&D) challenges over the next 10 years, with a particular focus on terrestrial and freshwater policy challenges. This work will be taken forward by CSAO with some independent expert support. The SAC was asked for input to identify;

- the key challenges that Defra faces that need science (R&D) input;
- for views on focussing the review on terrestrial and freshwater policy areas;
- for views on where Defra can source the R&D that it needs (including whether the available R&D capability across Public Sector Research Establishments (PSREs) and the broader UK R&D landscape is robust and diverse enough to respond to Defra's challenges);
- and how SAC could be involved in the Science Review, including engagement with experts.

The SAC agreed that the list of challenges presented was pertinent but flagged the need to consider the interconnectedness of the challenges, taking a systems view. The SAC highlighted the importance of also considering challenges for Defra relating to chemicals, waste, land contamination, and other similar policy areas which were not specifically in the list of challenges presented. SAC agreed that a focus on terrestrial biodiversity and freshwater was appropriate. The SAC thought that it would be helpful to have mechanisms to initiate collaborations between universities and PSREs on technical solutions.

The SAC was asked for thoughts on engagement with external experts to support the work, including any suggestions for specific experts. Defra wishes to ensure a good cross-section of expertise is involved and the SAC suggested that getting international input to the work could be useful, including consideration of how other countries access science capability to address policy challenges. Defra will consult the SAC with specific questions as the work progresses and on the findings.

8. Defra's innovation strategy

The SAC discussed the new Chief Scientific Adviser's Office (CSAO) environmental monitoring project (see Section 3) and advised on where/who within the UK (both within academia and the private sector) have scientific or technical strengths and capabilities in the area of monitoring. Defra asked SAC which other countries are pursuing significant environmental monitoring innovation programmes or have

scientific or technical strengths and capabilities, and what are the most appropriate forums, networks or industry representative groups.

The SAC thought Defra could benefit by linking with UK SMEs who have developed strengths in Earth observation, cyber security, data gathering, and data science and machine learning for improved data processing. Examples of networks and companies Defra could engage with are CENSIS, CSIRO, Digital Environment Network UKRI, UK Environmental Observation Forum, GEOBON, CABO, Aquasense, Planet labs, CubeSat, Earth Observation Land Information System FIR, or SWEEP. The SAC also recommended looking at monitoring developments in the technology for portable genetic sequencing for monitoring soil health and pathogens, or soil monitoring using biodegradable materials and conductive polymers.

The SAC considered other important non-technical innovations that Defra can benefit from such as researching where to locate sensors most effectively. The SAC suggested Defra should also be aware of the need for a period of trials and data quality validation before widespread rollout of new sensors. The new sensors can be tested against the long-standing datasets such as the UK Habitat Survey, National Forest Inventory, and social science surveys like the Understanding Society study.

9. SAC wrap-up session, future SAC discussion proposals, and any other business

The SAC reflected on the Lead Scientists meeting and overarching meeting theme which allowed a more through discussion on certain areas (e.g. on the PSREs – what they do and how they overlap).

When considering future discussion topics, the SAC suggested they would like to provide challenge to topics such as chemical pollution, how green finance layers into the ELM programme, and nutrient offsetting (e.g. exploring evidence behind on nutrient management and implications for housing developments). The SAC considered it vital that issues such as nutrient diffusion are introduced into Defra's planning in a scientifically robust way.

ACTION June (22) 01: The SAC suggested future discissions could cover issues around chemical pollution, how green finance layers into the Environmental Land Management (ELM) and nutrient offsetting programmes.

Annex A: Attendees and apologies

SAC members

Louise Heathwaite (Chair)
Richard Bardgett
Lisa Collins
Felix Eigenbrod
Rosie Hails
Susan Owens
Marian Scott
Lin Field

Defra CSAO

Gideon Henderson – Chief Scientific Adviser
Rob Bradburne – Deputy Chief Scientific Adviser
SAC Secretariat

Devolved administration observers

Caryl Williams – Welsh Government Observer

Defra officials in relation to specific agenda discussion

Chief Scientific Adviser's Office (CSAO) – Strategic Evidence Partners
CSAO – Science Review
CSAO – Research and Innovation Strategy
CSAO – Innovation
Defra Science Leads

Apologies

Nick Hanley – SAC member
Peter Cox – SAC member
Rowland Kao – SAC member
Alistair Carson – Northern Irish Government Observer
Matthew Williams – Scottish Government Observer