



Department
for Environment
Food & Rural Affairs

www.gov.uk/defra



Science
Advisory
Council

www.defra.gov.uk/sac/

Defra Science Advisory Council

Annual Report: April 2013 – March 2014



© Crown copyright [insert year of publication]

You may re-use this information (excluding logos) free of charge in any format or medium, under the terms of the Open Government Licence v.2. To view this licence visit www.nationalarchives.gov.uk/doc/open-government-licence/version/2/ or email PSI@nationalarchives.gsi.gov.uk

This publication is available at www.gov.uk/government/publications

Any enquiries regarding this publication should be sent to us at science.advisory.council@defra.gsi.gov.uk

PB 14160

Contents

Contents	3
Foreword by Defra's Chief Scientific Adviser	6
Introduction	8
Overview of SAC	8
What is SAC?	8
Membership	8
Structure of Business	9
Governance.....	9
Monitoring performance of SAC	9
Summary of SAC discussion topics	11
Agri-tech strategy	11
Climate Change Risk Assessment	11
Defra's Evidence Strategy (formerly called the Evidence Investment Strategy (EIS))...11	11
Food	12
Integrated landscape planning: Sustainable Intensification Platform & Demonstration Test Catchments	13
ONE Business Evidence	13
Biodiversity offsetting	14
Bovine TB.....	14
Countryside Stewardship Scheme	14
Genetic Modification.....	14
Hazard versus risk, and quality standards for evidence	14
Horizon Scanning.....	14
Intellectual Property Rights	15

Neonicotinoids.....	15
Peer review	15
Pollinators	15
Science Advisory Structures in Defra	15
SAC subgroups.....	16
Exotic Diseases Sub-Group (SAC-ED)	16
Climate Risk Evidence sub-group	17
Other SAC activities.....	21
Social Science Expert Panel	21
EIS Horizon Scanning Workshop	21
Defra review of Quality Assurance and Modelling Project.....	21
Meetings attended by the SAC Chair.....	22
Meeting with Defra Parliamentary under Secretary of State for natural environment and science	22
Meeting with Shadow Secretary of State for Environment, Food and Rural Affairs.....	22
House of Commons Science and Technology Committee evidence session.....	22
Defra Expert Scientific Committees	23
Hazardous Substances Advisory Committee (HSAC)	23
Air Quality Expert Group (AQEG).....	23
Darwin Expert Committee	23
Farm Animal Genetic Resources Committee (FAnGR)	24
Farm Animal Welfare Committee (FAWC)	24
Pesticide Residues in Food Committee (PRiF)	25
Veterinary Residues Committee (VRC).....	25
Resources and Expenditure.....	26
Contact for further information	27

Annex 1: Terms of Reference of the Defra SAC	28
Annex 2: Membership of the Defra SAC	30
Ex-Officio Membership	32
Annex 3: SAC SAC-ED Subgroup (Terms of Reference and Membership).....	33

Foreword by Defra's Chief Scientific Adviser



Science and evidence are at the heart of most of Defra's policies, it provides the basis for our decisions, describing current problems, offering new solutions and identifying future issues. This is recognised within Defra's organisational structure by having me, the Chief Scientific Adviser (CSA), occupying a senior position. The CSA is a member of the Defra Executive Committee, which is responsible for the operational management of Defra as well as the Defra Board, which is the governing body. I have an unusual role within the Civil Service combining advice to the department, acting as a key adviser to Ministers, and public outreach.

A network of advisory committees contributes to the support that the CSA receives. Most of these committees are focused on particular fields of evidence that are important to Defra and support decision-making within specific Defra policy directorates. Defra's Science Advisory Council (SAC) is tasked with taking a strategic overview of evidence to support the CSA and it operates at the same level as the CSA. SAC is composed of a small number of senior scientists who, through their experience and relationship with Defra, have sufficient knowledge to provide relevant advice.

In the past year, SAC has commented on major evidence topics being dealt with by Defra, some of which have, at times, been challenging and difficult. The SAC have contributed to Defra's evidence activities relating to Bovine Tuberculosis, Climate Change Risk Assessment, Genetic Modification, Horizon Scanning, Integrated Landscape Planning, Neonicotinoids, Pollinators and Defra's ONE Business Evidence and Network Evidence Strategy.

In particular I'd like to highlight the Defra Network Evidence Strategy - 'Making the most of our evidence' – published in June which is the first evidence strategy to cover the whole of Defra and its network. It sets out the evidence we need to help deliver our shared policy priorities and operational needs and means we will be changing the way we engage across the network and with external partners. SAC members made a valuable contribution to the development of this strategy.

I wish to thank all the members of SAC for their help and in particular Professor Chris Gilligan for his dedication to chairing the Council.

Finally, I also wish to thank the dedicated team that has supported various aspects of SAC in addition to other duties – namely Emma Hennessey, Claire Hill, Yvette Hood, Chris Jacobs and Nicky Gee.

Professor Ian Boyd

Foreword by SAC Chair



The primary role of the Scientific Advisory Council (SAC) is to provide independent, constructive challenge and support to the Chief Scientific Adviser at Defra in ensuring that the evidence that underpins policy is robust, that uncertainties are recognised, and that programmes for collection and assessment of evidence are appropriate for Defra needs.

While retrospective analysis can be useful, one of the obvious advantages in having a Science Advisory Council is to seek advice on proposals before implementation. The coincidence of a fundamental review of the Defra evidence strategy for setting research priorities, alongside the 'ONE Business' project to develop a strategic, flexible and resilient model for the Defra network, accordingly occupied a considerable amount of SAC time during the past year. SAC also continued to work through its forward plan / topics including the research and evidence strategy underpinning food production, integrated landscape planning, as well as genetic modification and advising on the next phase of Climate Change Risk Assessment. SAC considered reviews from other specialist groups on several topics including pollinator health, neonicotinoids and Bovine TB. Further details of these and other SAC activities are summarised in this report and in detailed minutes of SAC meetings on the SAC website.

It is important that SAC maintains independence and can initiate as well as respond. Accordingly, a part of every meeting is reserved for closed SAC discussions. The monthly teleconferences continue to improve engagement, communication and agility between quarterly meetings. The pairing-scheme, with one-to-one discussions between individual SAC members and senior officials within Defra, also improves two-way communication. SAC continues to use time-limited sub-groups to provide detailed advice on specific topics, as for Climate Change Risk Assessment and Exotic Animal Diseases.

The work of a Scientific Advisory Council is a continual learning-process. Quarterly meetings with chairs of other SACs and chief scientific advisors across Whitehall provide an additional opportunity for exchange and briefings, as does feed back from within Defra. There was an opportunity to share experience of how the Defra SAC works at an evidence session of the House of Commons Science and Technology Committee on scientific advisory committees. Finally, it has been a busy period and I would like to thank the Secretariat and to acknowledge the remarkable commitment and enthusiasm of my fellow SAC members in the work covered in this report. SAC looks forward to continuing to work together and with the CSA, Prof. Ian Boyd, to support and challenge Defra on its use of evidence.

Professor Chris Gilligan

Introduction

This is the second Annual Report of the Defra Science Advisory Council (SAC) and covers the period from April 2013 until March 2014. The report summarises the key activities of SAC during this period, and further detailed information can be found in meeting minutes on the SAC website¹.

The Annual Report is produced as part of the Council's policy on openness, as set out in the Government Office for Science's Code of Practice on Scientific Advisory Committees².

Overview of SAC

What is SAC?

The Defra Science Advisory Council (SAC) is an Advisory Non-Departmental Public Body (NDPB) sponsored by Defra. It was first set-up in 2004 to challenge and support the Department's Chief Scientific Adviser (CSA) in independently assuring and challenging the evidence underpinning Defra policies and ensuring that the evidence programme meets Defra's needs. The Council communicates its advice to the CSA, and through the CSA to Ministers.

An independent review³ and a separate Arm's Length Body (ALB) review led to the establishment of a new model for SAC, implemented at the end of 2011. New members were recruited and new Terms of Reference established ([Annex 1](#)).

Membership

During the annual report period there were seven SAC members ([Annex 2](#)). All, including the chair, were appointed in August 2011 in accordance with the Nolan principles⁴ for a three-year term. The selection process sought members with a sound and broad basis of expertise across natural, economic or social sciences of relevance to Defra's portfolio of work. All SAC members have declared any interests that are relevant to the remit of SAC and these are published on the SAC website⁵.

¹ <http://www.defra.gov.uk/sac/meetings/>

² <http://www.bis.gov.uk/assets/BISPartners/GoScience/Docs/C/11-1382-code-of-practice-scientific-advisory-committees.pdf>

³ <http://www.defra.gov.uk/sac/files/sac-review-sept-2010.pdf>

⁴ Fair, independent and open assessment

⁵ <http://www.defra.gov.uk/sac/about-us/register-of-interests/>

Structure of Business

SAC's working practices are detailed in the SAC Handbook, which can be found on the SAC website; primarily it is organised in four principal ways:

- quarterly meetings incorporating working dinners;
- monthly teleconferences;
- subgroups on specific policy/evidence areas; and
- Defra Official and SAC Member pairing scheme.

Defra's Natural Environment and Science Minister meets with the SAC Chair on an annual basis, and a key part of their discussion is on SAC's past and future work. The last meeting took place on 7th October 2013.

As much of Defra evidence covers both England and Wales, the SAC meetings are also attended by a representative of the Welsh Government to utilise the SAC advice and outputs on evidence within the Welsh policy context.

As the majority of Defra's evidence budget does not cover Scotland, there is not the same requirement to engage with the Scottish Government. However, Scottish interests are often brought to the discussion through the membership of Louise Heathwaite in the SAC (who is also the Chief Scientific Adviser, Rural and Environment for the Scottish Government).

Governance

The SAC handbook⁶ provides guidance on the establishment, management, and activity of SAC and its ongoing relationship with Defra. The SAC handbook is reviewed annually to reflect any changes to working practices that may be required.

A triennial review of SAC, forming part of the Cabinet Office's NDPB triennial review programme, was announced on 25th March 2014⁷. It is likely that the findings of the review will be available in 2015.

Monitoring performance of SAC

An annual appraisal of members' and the Chair's performance is conducted in line with recommendations detailed by the Office of the Commissioner for Public Appointments

⁶ <http://www.defra.gov.uk/sac/files/SAC-handbook-code-of-practice.pdf>

⁷ <http://publicappointmentscommissioner.independent.gov.uk/wp-content/uploads/2012/02/Code-of-Practice-for-Ministerial-Appointments-to-Public-Bodies.pdf>

(OCPA) Code of Practice⁸. The SAC appraisals are not aligned with the reporting period covered in this report, and took place in 2013 covering the period 1 July 2012 – 30 June 2013.

⁸ <http://publicappointmentscommissioner.independent.gov.uk/wp-content/uploads/2012/02/Code-of-Practice-for-Ministerial-Appointments-to-Public-Bodies.pdf>

Summary of SAC discussion topics

The information below summarises the main areas of focus for SAC's discussions during the report period covered in this report (April 2013 – March 2014), these are presented in alphabetical order and do not reflect any prioritisation. Further details may be found in the minutes from SAC quarterly meetings and teleconferences that are available on the SAC website⁹.

Agri-tech strategy

SAC have been kept up to date on the progress of the Agri-tech strategy, and have provided both support and critique of the plans; for example, supporting the ideas for work on public perception of new technologies, and raising the need to understand/measure the implication of the strategy and the enhanced that it seeks to deliver.

To support Defra work relating to the strategy SAC members provided input including: specific examples of science topics that could support growth; and thoughts on overcoming sector fragmentation and examples for inclusion in the Agri-tech strategy.

Climate Change Risk Assessment

Following on from the Climate Risk Evidence sub-group report on Climate Change Risk Assessment (CCRA) (SAC sent to Lord Krebs, Chair of the Adaptation Sub-Committee and included in the Section of this report on sub-groups); officials briefed SAC on how they had responded to the sub-group report. The response noted that addressing the points made by SAC was being achieved through a number of improvements in procedure and methodology for CCRA2. Further engagement was agreed with SAC over the course of CCRA2.

Defra's Evidence Strategy (formerly called the Evidence Investment Strategy (EIS))

The Evidence Strategy sets out how Defra and its network bodies will address its evidence priorities. This (and ONE business evidence) has been the main focus of SAC work over the reporting period with numerous briefings and updates throughout the year. SAC have been given the opportunity to comment and provide input as the work progressed. SAC's valuable advice and challenge helped inform drafting of the Evidence Strategy.

⁹ www.defra.gsi.gov.uk/SAC

Issues raised by SAC on the Evidence Strategy included:

- the timescales envisaged for implementing the Evidence Strategy;
- whether evidence from other government departments would be used;
- how cross-cutting issues would be considered;
- ensuring delivery of both long and short-term evidence needs and the need to start work on long-term issues in the near-term;
- that management and effective use of data includes making data available (including understanding the quality of data and knowledge of what data are held and where);
- whether statutory requirements could be met differently (and were still needed) to release resources;
- the balance and achievability of evidence needs within the Evidence Strategy; and
- presentational aspects, to help communicate the Evidence Strategy to a wider audience.

As part of SAC's involvement Chris Gilligan, Lynda Warren and Peter Liss attended an Evidence Strategy horizon scanning workshop. SAC confirmed their support for the Evidence Strategy ahead of its publication¹⁰.

Food

Food evidence and policy is a wide ranging area for Defra, and SAC briefing on this topic enabled SAC to obtain a deeper understanding of Defra evidence requirements and policy in relation to food. David Heath MP, Minister of State for Agriculture and Food, also participated in a SAC discussion relating to food, focussing on evidence needs in relation to production, the supply-side, and consumption.

SAC made a number of general comments regarding this evidence area for Defra to consider, including: the importance of integrating pre and post-farm gate evidence work; consider land, water and energy in an integrated way; and to work with other funders (e.g. BBSRC).

SAC agreed to produce a short report for Defra on their initial thoughts following the food briefing to be completed summer March 2014.

¹⁰ Making the most of our evidence: A strategy for Defra and its network':

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/318610/evidence-strategy-defra.pdf

Integrated landscape planning: Sustainable Intensification Platform & Demonstration Test Catchments

Officials briefed SAC on a number of occasions on the Sustainable Intensification Platform (SIP) and Demonstration Test Catchments (DTCs). SAC discussed the existing DTCs and plans for the SIP, including the importance of modelling and up-scaling.

SAC voiced their support for the SIP noting that it was an innovative and ambitious project. SAC reviewed the draft specification for the SIP project, which resulted in a number of significant changes being made to the specification.

Officials shared research questions for the next phase of DTC work and governance plans for SIP with SAC who provided further challenge and advice. SAC particularly noted that as a number of initiatives are emerging, clear leadership to join these together would be beneficial; and encouraged Defra to continue engaging with other potential co-funders and stakeholders. Defra noted that they would take SAC's comments into consideration going forward.

ONE Business Evidence

ONE Business Evidence (ONE) is part of Defra's 'ONE business' project and aims to develop a future business model that is more strategic, flexible and resilient. This (and Defra's Evidence Strategy) has been the main focus of SAC work over the reporting period with numerous briefings and updates throughout the year. SAC have been given the opportunity to comment and provide input as the work progressed. SAC's valuable advice and challenge helped inform development of ONE.

SAC welcomed the co-design planned between agencies and Defra under ONE and encouraged Defra to engage with a wider range of Research Councils. SAC also assisted the development of ONE by suggesting ways to challenge and test plans; and were also involved in the ONE evidence steering group via Louise Heathwaite, who was present representing Scotland.

In addition to the above, SAC has had a number of briefings on a number of issues to keep SAC in touch with departmental issues and priorities where extensive follow up discussion was not required. The summary of these briefings and shorter discussions are given below.

Biodiversity offsetting

SAC were updated on the work Defra is doing on Biodiversity offsetting, particularly analysing the response to its consultation on future plans when six offsetting pilots complete. SAC were informed that the Defra Economic Advisory Panel were discussing and being consulted on the evidence.

Bovine TB

With other independent advisory groups providing close, specific oversight of the bovine tuberculosis (TB) programme, SAC's role continues to be one of high level oversight. As such, SAC received regular updates and briefings throughout the year on bovine TB activities and evidence work.

Countryside Stewardship Scheme

Plans for a new agri-environmental scheme, known as Countryside Stewardship (CS), were presented to SAC. SAC commented on issues faced in monitoring and evaluating this multi-objective scheme and offered to engage further on them and implementation of CS.

Genetic Modification

SAC received a presentation on Defra's genetic modification (GM) activities. In response, SAC highlighted the need for clearly articulated information in this area, including on the costs and benefits of GM and what is meant by the umbrella term GM.

Hazard versus risk, and quality standards for evidence

The SAC were introduced to the work of the Hazardous Substances Advisory Committee (HSAC) on HSAC's approach to hazard, risk and uncertainty; and work on quality standards for evidence. SAC welcomed the opportunity to engage with HSAC and commended the HSAC paper as an exemplar that warranted wider discussion.

Horizon Scanning

SAC provided advice on Defra's plans for its horizon scanning activity, which Defra used in its consideration of the commissioning of successor arrangements.

Intellectual Property Rights

Defra's changed approach to its intellectual property rights and that it differed to the Research Councils was discussed. SAC noted that the Research Councils have no need to use the outputs in the way that Defra may need to. SAC suggested that there may be a case for distinguishing between access to data or models, and access to IP that could be economically exploited.

Neonicotinoids

Discussion in relation to neonicotinoids followed on from a meeting in January 2013 specifically focussing on neonicotinoids (details of which are in the SAC Annual report 2012 – 2013). It was noted that the developing situation in relation to neonicotinoids had overtaken planned actions from the January meeting. However, SAC considered that in the longer term there are still questions about experimental methods that need addressing.

Peer review

SAC discussed the issue of the quality of evidence, focussing on the quality of the peer review process, particularly in open access journals. It was concluded that a wider initiative is needed to address present issues and that this would require input from the Government Chief Scientific Adviser, academics and the Royal Society.

Pollinators

Officials briefed SAC on Defra's policy and evidence in relation to pollinators and also explained that an expert panel would advise on future trials and experiments related to pollinator health and pesticide impacts. SAC provided feedback on various aspects of evidence work in this area and what additional skills the expert panel may need.

Science Advisory Structures in Defra

Recognising SAC's role in supporting the CSA in his oversight of scientific expert committees in Defra, SAC agreed to consider how links with and between the scientific expert committees might be better developed and initial discussions on this will be developed further in the forthcoming reporting year.

SAC subgroups

It was agreed that SAC would establish time-limited sub-groups in relation to emergencies, or to focus in more detail on a specific issue (further information about subgroup formation can be found in the SAC Handbook).

Exotic Diseases Sub-Group (SAC-ED)

In partnership with Defra's Chief Veterinary Officer (CVO), SAC established SAC-ED to give oversight and assurance for dealing with animal exotic disease outbreaks. In an emergency situation, SAC-ED can be called upon, by the CVO, to provide strategic advice on the use of evidence rather than on specific operational actions. The CVO is the main recipient of the subgroup's challenge and advice although SAC-ED will also report to the CSA. SAC ED's terms of reference and membership is described in Annex 3.

During 2013 the sub group joined a national animal disease emergency response exercise (Exercise Walnut¹¹). Members joined the exercise in order to review the use of evidence and identify any evidence issues or gaps and how these might be addressed. Following the exercise the sub group made recommendations which included consideration of:

- the costs/benefits in securing better demographic data on livestock location/movements;
- the merits of maintaining up to date models that could quickly be used in emergency outbreaks;
- the potential for establishing a reserve of academics and practical people who could quickly input external knowledge and challenge in the case of future outbreaks;
- a pre-emptive need for stronger economic information on businesses/rural communities to allow quicker economic impact analysis in the case of future outbreaks; and
- the potential for use of 'trusted intermediaries' and social media for managing communications in future outbreak scenarios.

It was agreed that SAC-ED provided useful interdisciplinary external advice and challenge which was recognised as a useful resource for Defra's CVO and CSA to draw on in future

¹¹ <http://webarchive.nationalarchives.gov.uk/20140707135733/http://www.defra.gov.uk/ahvla-en/files/exercise-walnut-lessons-ident-report.pdf>

outbreak scenarios. The group remains on standby, and will be reconvened if required by Defra.

SAC members involved: Professor Quintin McKellar (Chair)

Climate Risk Evidence sub-group

It was agreed by the SAC that there was value in a small core group of SAC members meeting to focus on providing the Adaptation Sub-Committee¹² with comments from SAC on the Climate Change Risk Assessment (CCRA), with particular focus on inputting to the developing plans for CCRA2. This group was Chaired by Peter Liss and participated in by Ian Bateman and Lynda Warren.

The below text is a copy of the letter and associated report that was sent to Lord (John) Krebs – Chair of the Adaptation Sub-Committee.

Letter to Lord Krebs

Dear John,

We have previously met to discuss areas of mutual interest and Defra Science Advisory Council (SAC) have continued to review the evidence underpinning the Climate Change Risk Assessment (CCRA), discussing the matter at a number of SAC meetings.

While noting that the 2012 CCRA was internationally leading in a number of respects, SAC also have a number of concerns. These focus on the approach used by the CCRA. SAC was particularly concerned that the CCRA team had not always made the best use of the scientific community, leading to gaps in the report. SAC also identified some limitations in modelling, notably in the failures of response functions to take account of interactions in driving variables.

SAC has recently been informed that Defra is beginning to plan for the next CCRA and a CCRA Requirements Working Group has been formed. SAC convened a subgroup Chaired by Prof. Peter Liss which produced a short report that was endorsed by SAC. The report was presented to Ian Boyd, Defra Chief Scientific Adviser, who in turn has passed it to the Chair of the CCRA Requirements Working Group. Defra has advised the SAC that the report will be used in the scoping work for the next CCRA.

¹² <http://www.theccc.org.uk/about/structure-and-governance/asc-members/>

The SAC would also like to forward the report to you, as attached, for your consideration in the work of the Adaptation Sub-Committee.

SAC sub-group report

This report is based on the following inputs:

- i) Key discussion topics identified by SAC members (Paper SAC(12)23 dated 26/6/12);
- ii) Compilation of SAC discussions on climate risk and CCRA (covering the period from 21/9/11 to 12/10/12);
- iii) Draft report of LWEC Workshop on CCRA (held 12-13/11/12); and
- iv) Information from Defra CCRA team to Ian Boyd on next steps (dated 14/1/13); and discussion at the SAC meeting on 31/1/13.

The field is very large and many opinions are expressed in the above documents/inputs. What we, supported by SAC, have done is pick out topics that seem to be important and of some generality; necessarily the process is somewhat arbitrary and reflects our own biases. We note the following points, gathered together under the headings **Approach**, **Modelling**, and **Other Considerations**.

Approach

- a) While we acknowledge the challenge faced in undertaking the first CCRA, nevertheless there has been substantial criticism of the **methodology** adopted. It is said to be lacking in transparency and so not open to critical assessment.
- b) The **Approach** to be used in a future CCRA receives a good deal of attention from critics. The use of consultants, as in the first assessment, is not generally favoured, with several commentators recommending a more open approach. This might be achieved by opening the discussion to the many scientists and policy makers interested in the area with some physical meetings included. Or a more on-line approach advocated by some might be adopted.
- c) An open question concerns whether different sectors should be treated through **separate methodologies**, although this could lead to a loss of coherence in approach. Regardless of which methodologies are used, another open question is how can an integrated assessment be achieved?

Modelling

- d) Important modelling issues not dealt with properly (or at all) include **population change**, **economic growth** and **technological developments**.
- e) **Response functions** are much used but are viewed as simplistic and unable to deal well with interactions between risks or non-linearities, synergies and interactions between climate variables.
- f) There is an issue of how **ecosystem level risks** could be assessed. While we have reasonably good understanding of how individual species and species assemblages function at the population level and can model how they might change under given circumstances, it is by no means clear that we have sufficient understanding to take this

modelling to a higher level. And with some species assemblages/habitats we do not have enough knowledge to understand how they function under present conditions; marine ecosystems present a good example.

- g) **Socio-economic modelling** was largely absent from the original CCRA but is now said to be sufficiently advanced to be useful in future exercises; if this is so it should be encouraged because of its clear importance.

Other Considerations

- h) A future exercise should pay more attention to the **international dimension**, both with respect to far-field changes affecting the UK, as well as gaining from expertise in other countries facing similar issues in their climate change risk assessments.
- i) **Opportunities and Threats** tend to get unequal treatment with much more emphasis on the latter. All change produces winners and losers and future assessments should pay appropriate attention to the opportunities that climate changes present, both social and commercial.
- j) Doing what **we should be doing anyway**. There are many examples where we know what needs to be done to deal with current and future risks but we seem unable or unwilling to expend the effort and funds needed for their implementation. Often these actions have multiple benefits, e.g. guarding against risk while at the same time doing things more efficiently and so saving money. It is remarkable that the phrase 'win-win' does not seem to appear in any of the documents (but one should be on guard for unexpected consequences and over-simplistic solutions). It has been noted that health is an area where win-win solutions have been pushed in relation to climate change.
- k) Given the plethora of questions asked and proposed for possible action in, for example, the LWEC workshop report, it is very difficult to see the wood from the trees. Many, and in particular politicians, are likely to throw up their hands in horror because it will not be possible to do all that is suggested needs to be done with the limited resources that are likely to be available. Thus, **prioritisation** of tasks is essential and urgent. A limited number of areas that are really important and where progress can be made need to be identified. An associated point made by some is to ask the question 'are we measuring the most appropriate parameters'. It is not possible to answer the question properly without having identified the key issues for study. Once that is established what needs to be measured/monitored becomes an answerable question.
- l) **Resilience** is topic that receives little attention, although given the uncertainty of climate model predictions, in for example UKCP09, it is clearly an important issue. An example is severe weather and UK food chain resilience as documented in T. Benton et al. (2012) in a report of the Food Research Partnership: Resilience of the UK Food System Subgroup.
- m) **Behavioural change** is a topic that also needs more attention. If we knew what combination of levers (fiscal, legal, media, peer pressure) would get society to do things in different ways it could be a cost-effective way to reduce some risks. There is very unlikely to be one combination of levers that works in every case so they would need to be case specific. We have some understanding of the use of thresholds and trigger points in determining pivotal points of change from a technological perspective (e.g. how much flooding from sea level rise can be tolerated before a new approach to the problem is required) but there has not been comparable work on triggers for behavioural change.
- n) Some comment that the CCRA exercise should give greater consideration to **Adaptation & Mitigation**. Clearly they should be integral since they are important ways

in which risks are dealt with and/or avoided. In this context, the RCEP report on 'Adapting Institutions to Climate Change' (RCEP 28th Report) is a useful study particularly for the governance of adaptation both national and local and has useful examples of how particular organisations assess the risk to their operations. It was also noted that insufficient account is taken of transformational change; are we adapting to incremental or dramatic change?

- o) Finally, we comment strongly on the absence of **marine** affairs in much of the discussion to date. For example, the topic seems entirely absent from the LWEC meeting report. The paper SAC(12) 23 gives examples of its importance, including sea-level rise and storm surges and their effect on vulnerable coastlines; species shifts in response to change in climate and other variables; migration of organisms; lowered seawater pH; inputs of oestrogens (and other exotics) and nano-particles; change in ocean circulation and its effects on weather and climate; and eutrophication.

Concluding Remarks

In the above we have not considered such basic questions as 'is another CCRA needed and is anyone reviewing whether it is necessary?' and 'does a new CCRA need to be done every 5 years?', although these were asked at the recent SAC meeting.

The next step would seem to be for the SAC CCRA sub-group to have a discussion with the Adaptation Sub-Committee of CCC to advise on the way ahead so as to help shape the next CCRA.

Peter Liss, Ian Bateman, Lynda Warren

April 2013

Other SAC activities

SAC members have been asked to be engaged in other Defra activities beyond the core of SAC activities.

Social Science Expert Panel

Professor Judith Petts has continued for the second year as an independent Chair to the Defra and Department of Energy and Climate Change (DECC) Social Science Expert Panel (SSEP). For further detail about the SSEP, the SSEP annual report can be provided by contacting the SAC Secretariat.

EIS Horizon Scanning Workshop

The EIS Horizon Scanning workshop was designed to inform Defra's Evidence Investment Strategy and discussed the implications of relevant future trends, drivers and issues for Defra's long-term evidence needs. Findings fed into the development of the strategy to ensure it considers the Department's long-term, as well as the short-term, evidence needs.

SAC members Professors Chris Gilligan, Peter Liss and Lynda Warren attended to help stimulate and challenge people's thinking about future evidence needs across the Department and network, and to provide cross-cutting societal and economic issues that are likely to impact on the majority of policy areas.

Defra review of Quality Assurance and Modelling Project

The Chair of SAC, together with the Chair of the SSEP and the Chair of the Defra Economics Advisory Panel were appointed as external members of a Defra group chaired by the Defra Chief Economist. The group was tasked with reviewing quality assurance in modelling and models used across Defra. Work is on-going.

Meetings attended by the SAC Chair

The SAC Chair represents SAC at the Government Chief Scientific Adviser's (GCSA) quarterly meetings with Chairs of SACs and Chief Scientific Advisers (CSAs). These meetings are an opportunity to be briefed by the GCSA on new developments and emerging cross-cutting policy issues. SAC Chairs and CSAs may also raise matters and several of the issues listed in the body of this report have been discussed.

In addition, the SAC Chair has attended a number of meetings in his capacity as SAC Chair in order to make wider links for SAC and obtain information of relevance to SAC's activities, as detailed below.

Meeting with Defra Parliamentary under Secretary of State for natural environment and science

The Chair met Lord de Mauley in October 2013. Discussion focused on SAC's progress and planned future work, in particular: working methods, the value of SAC, lessons learned and things done well. The Minister expressed his support for SAC, noted the importance of its independence, and recognised the challenges it faces and the value it adds to Defra's work.

Meeting with Shadow Secretary of State for Environment, Food and Rural Affairs

In his capacity as Chair of SAC, Professor Chris Gilligan met the Shadow Secretary of State for Environment, Food and Rural Affairs, Maria Eagle in January 2014 to provide a factual briefing on what SAC does and its context. This included an overview of SAC, explaining its formation, the way the meetings are organised, how agenda items are agreed and initiatives that he has introduced, such as the pairing scheme.

House of Commons Science and Technology Committee evidence session

The Chair accompanied the Government Chief Science Adviser, Sir Mark Walport, and Professor Les Iversen, Chair of the Advisory Council on the Misuse of Drugs at a Science and Technology Committee evidence session in April 2014, examining the GO-Science Review of Science Advisory Councils 2013. The session covered a range of issues, including how SACs and committees fit into the framework of advice to government, the role of GO-Science, how the findings of the GO-Science review had been followed-up by SACs. The Chair responded to questions about SAC's outputs and how SAC have advised and challenged Defra's CSA, amongst other things.

Defra Expert Scientific Committees

In accordance with the recommendations of the independent review of SAC and the Arm's Length Body (ALB) review, the Defra CSA has oversight of all Defra expert scientific committees, and SAC supports and challenges the CSA in this role.

Below is a summary of each of the committees and information about their activities during this reporting period. The CSA has an annual meeting with the Chairs of each of the expert scientific committees.

Hazardous Substances Advisory Committee (HSAC)

The Hazardous Substances Advisory Committee (HSAC) is the successor body to the Advisory Committee on Hazardous Substances (ACHS) and provides expert advice on the science behind hazardous chemicals. Further information about HSAC can be found at:

<https://www.gov.uk/government/policy-advisory-groups/hazardous-substances-advisory-committee>

The HSAC 2013 annual report can be found at:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/342114/HSA_C-annual-report-2013_final.pdf

Air Quality Expert Group (AQEG)

AQEG provides independent scientific advice on air quality, in particular the air pollutants contained in the Air Quality Strategy (AQS) for England, Scotland, Wales and Northern Ireland and those covered by the EU Directives on Ambient Air Quality. Specifically, AQEG gives advice on levels, sources, and characteristics of air pollutants in the UK. It does not advise on health impacts or air quality standards.

AQEG communicates advice to Defra and the Devolved Administrations through the production of papers; both reports and shorter advice notes.

Further information about AQEG can be found at: <http://uk-air.defra.gov.uk/library/aqeg/>.

Darwin Expert Committee

The Darwin Expert Committee is a scientific expert committee managed by Defra to support the Darwin Initiative. [The Darwin Initiative](#) is a UK government-funded grants scheme that helps to protect biodiversity and the natural environment through locally-based projects worldwide.

The initiative funds projects that help countries rich in biodiversity but poor in financial resources to meet their objectives under one or more of the following biodiversity conventions:

- the [Convention on Biological Diversity \(CBD\)](#)
- the [Convention on International Trade in Endangered Species of Wild Flora and Fauna \(CITES\)](#)
- the [Nagoya Protocol on Access and Benefit Sharing](#)
- the [International Treaty on Plant Genetic Resources for Food and Agriculture](#)

Further information about membership of the Darwin Expert Committee can be found at:

<https://www.gov.uk/government/groups/the-darwin-initiative#darwin-expert-committee>

Farm Animal Genetic Resources Committee (FAnGR)

The Farm Animal Genetic Resources Committee (FAnGR) provides advice to Defra and the devolved administrations in Scotland, Wales and Northern Ireland on all issues relating to farm animal genetic resources particularly its conservation and sustainable use.

Key achievements

- Tim Brigstocke was appointed as chair of the Farm Animal Genetic Resources Committee for 3 years commencing on 1 April 2014.
- The Committee organised several events with Defra and Devolved Administration colleagues including meetings with Defra's Chief Scientific Adviser in February 2013; with FAnGR stakeholders in Belfast in June 2013; with the Welsh Administration in Cardiff in October 2013; and in Edinburgh in January 2014.

Information about FanGR Committee's recent key activities can be found at the Committee's website and in the current newsletter at:

<https://www.gov.uk/government/groups/farm-animal-genetic-resources-committee-fangr#newsletter>

Farm Animal Welfare Committee (FAWC)

The Farm Animal Welfare Committee (FAWC) is an expert committee that provides advice to Defra and the Devolved Administrations in Scotland and Wales on the welfare of farmed animals, including farmed animals on agricultural land, at market, in transit and at the place of slaughter.

Information about FAWC's recent advice and current activities can be found at:
<https://www.gov.uk/government/groups/farm-animal-welfare-committee-fawc>

Pesticide Residues in Food Committee (PRiF)

PRiF provides independent advice to the Health and Safety Executive (HSE), the Food Standards Agency (FSA), and UK Ministers on: the planning of surveillance programmes for pesticide residues in the UK food supply; the evaluation of the results; procedures for sampling and sample processing and new methods of analysis.

PRiF reports and results, and other information about surveys, can be found at:

2013 Annual Report: http://www.pesticides.gov.uk/guidance/industries/pesticides/advisory-groups/PRiF/PRiF_Results_and_Reports/2013++Programme

2014 Programme: http://www.pesticides.gov.uk/guidance/industries/pesticides/advisory-groups/PRiF/PRiF_Results_and_Reports/2014_Programme

2015 Programme: http://www.pesticides.gov.uk/guidance/industries/pesticides/advisory-groups/PRiF/PRiF_Results_and_Reports/2015_Programme

Veterinary Residues Committee (VRC)

The Veterinary Residues Committee is an independent scientific advisory committee that advises government on the testing of foods from animals to look for residues of veterinary medicines and banned substances.

The VRC held regular meetings during the reporting period. Minutes and papers from the meetings and information about its current activities can be found at:

<http://www.vmd.defra.gov.uk/vrc/>.

Its report on surveillance for veterinary residues in 2013 can be found at:

<http://www.vmd.defra.gov.uk/vrc/pdf/reports/vrcar2013.pdf>

Resources and Expenditure

The Defra SAC is an independent SAC but does not have resources of its own. The activities of the Council are funded by Defra; and information on the fee rates and expenses guidance can be found in the SAC member's handbook¹³. Table 1, below, summarises how the budget for SAC has been spent in financial year (2013-14). A total of £26.9K was spent on SAC activities in 2013-14 compared to £31.2K in 2012-13. The Secretariat has actively worked to ensure that venues for meetings offer the best rates available and have worked with SAC to ensure that cost-saving options are chosen where ever possible.

Table 1: SAC expenses (Financial year 2013-14)

	Member fees	Member travel and subsistence expenses	Other expenses (as defined by footnote)
Quarterly SAC meetings	£10.1K	£1.9K	£7.4K ¹⁴
Monthly SAC teleconferences	£1.5K	N/A	N/A
Subgroup activities	£2.3K	£0.3K	N/A
Additional SAC member activities ¹⁵	£2.3K	£1.1K	N/A
Total Expenditure	£16.2K	£3.3K	£7.4K

¹³ <http://www.defra.gov.uk/sac/files/SAC-handbook-code-of-practice.pdf>

¹⁴ Expenditure associated with working dinners and meeting refreshments

Contact for further information

Further information about the Defra SAC can be found at:

<https://www.gov.uk/government/organisations/science-advisory-council>

or by contacting the SAC Secretariat:

SAC Secretary
Defra
Area 2C, Nobel House
17 Smith Square
London
SW1P 3JR

Email: science.advisory.council@defra.gsi.gov.uk

Annex 1: Terms of Reference of the Defra SAC

1. Defra's Science Advisory Council (SAC) is an advisory Non-Departmental Public Body sponsored by the Secretary of State. Lord de Mauley will act as the lead Minister accountable for SAC, and will:

- set terms of reference for the Council and make appointments to it;
- agree strategic work plans, receive reports and advice;
- receive periodic reviews of the Council's functions and value for money;
- consult other Departments as appropriate about the Council and its work.

2. SAC will challenge and support the Department's Chief Scientific Adviser (CSA) in independently assuring and challenging the evidence underpinning Defra policies and ensuring that the evidence programme meets Defra's needs. In doing so SAC will:

- review, on a rolling basis, the evidence plans put in place to support policy programmes, and identify any gaps in Defra's science or evidence base at present or likely in the foreseeable future;
- provide advice, when asked or on their own initiative, in emergency situations;
- respond to requests for, or provide on their own initiative, ad hoc advice on broad strategic and cross-cutting issues (relating to the use of science or evidence) facing the Department;
- identify and publish advice on substantial strategic and cross-cutting issues of Government-wide as well as Defra concern;
- contribute, as required, to the CSA's quarterly reports to the Defra Supervisory Board;
- support and challenge the CSA in his oversight role with respect to other scientific expert committees of Defra, and include annual updates on the work of such committees in the SAC Annual Report;
- via the CSA, ensure the Defra lead Minister receives the highest quality advice.

3. SAC will achieve this by:

- horizon scanning, and planning and publishing an annual programme of work that best challenges and serves the CSA and the needs of the Department;
- co-opting experts to time limited sub-groups, chaired by a SAC Member, to review Departmental evidence plans or other cross-cutting or strategic issues. Subgroup reports and recommendations will be reviewed and adopted by SAC, forwarded to the CSA, to help him advise Defra, and published;
- working with the CSA to respond to GO-Science or other Government-wide policy initiatives or consultations, as appropriate;
- via the CSA and the SAC Chair, maintaining links with the Government Chief Scientific Adviser (GCSA) and other departmental SAC Chairs;
- maintaining and developing links with Research Councils, other scientific institutions and the Devolved Administrations to further the work, aims and objectives of SAC.
- publishing an Annual Report;
- re-reviewing evidence programmes that have previously been subject to SAC's scrutiny where appropriate, and publishing new advice if necessary;
- contributing to reviews of science bodies within the Defra network as required;
- maintaining open lines of communication with Defra, the CSA and its Ministers;
- operating in line with the Government's Principles for Scientific Advice and the Code of Practice for Scientific Advisory Committees.

4. In line with the Commissioner for Public Appointments Code of Practice an annual appraisal of members' performance will be conducted.

Annex 2: Membership of the Defra SAC

Membership, during the reporting period is reflected below:

Name	Organisation	Expertise	Biography
Professor Chris Gilligan (Chair of SAC)	University of Cambridge	Biological sciences, specifically epidemiology, and mathematical biology	Professor Gilligan is Head of the School of Biological Sciences and Professor of Mathematical Biology, University of Cambridge. He also holds Professorial Fellowship at King's College and is Head of the Epidemiology and Modelling Group in the Department of Plant Sciences. His research has developed and tested a suite of models to predict invasion persistence and control of botanical epidemics in agricultural and natural environments.
Professor Ian Bateman	University of East Anglia	Environmental economics	Professor Bateman is Professor of Environmental Economics and Director of the Centre for Social and Economic Research on the Global Environment at the University of East Anglia. His main research interests are integrated environmental and economic modelling for decision making. He is a member of the UK Natural Capital Committee (NCC), the NERC Strategic Programme Advisory Group, the BBSRC working group on Sustainable Intensification of Agriculture and led the economics team for the UK National Ecosystem Assessment.
Professor Louise Heathwaite	Lancaster University	Land and water system science	Professor Heathwaite is Co-Director of the Centre for Sustainable Water Management in the Lancaster Environment Centre, Lancaster University. She also works part-time as a science champion for the Natural Environment Research Council (NERC) as Theme Leader for the Sustainable Use of Natural Resources theme. Her research expertise is in land and water systems science. She has over 25 years research experience in diffuse nutrient pollution, wetland hydrochemistry, and water quality. Her applied research interests cut across the environmental sciences to interface with social science and economics.

Name	Organisation	Expertise	Biography
Professor Peter Liss	University of East Anglia	Environmental chemistry	Professor Peter Liss is a Professorial Fellow in the School of Environmental Sciences at the University of East Anglia. His research interests are in ocean-atmosphere interaction particularly involving trace gases. He served as chairman of the International Geosphere-Biosphere Programme (IGBP) for 5 years and was subsequently Chair of its Surface Ocean – Lower Atmosphere Study (SOLAS). He is a Fellow of the Royal Society.
Professor Quintin McKellar	University of Hertfordshire	Veterinary Science	Professor McKellar is Vice-Chancellor at the University of Hertfordshire. He was previously Principal of the Royal Veterinary College, University of London. His research interests are in the pharmacology of anti-infective and anti-inflammatory drugs in domestic animals. He has been a member of the Biological and Biotechnological Research Council, the Government's Veterinary Products Committee, Special Advisory Committee on Antimicrobial Resistance, Regulatory Agency Strategy Board, and Chairman of its Scientific Advisory Committee on Bovine Tuberculosis. He is currently chair of the Pirbright Institute Trustees Board as well as a Non-Executive Director of the Animal Health and Veterinary Laboratories Agency.
Professor Judith Petts	University of Southampton	Social Science	Professor Petts is Pro-Vice-Chancellor (Research and Enterprise), University of Southampton. Her research has focused on environmental risk governance and response to environmental and health hazards in areas such as climate change, energy, waste management, land contamination, natural hazards, and health and wellbeing. Professor Petts holds two other Ministerial appointments as a member of BBSRC Council and Chair of Sciencewise Expert Resource Centre Steering Group. She is also a member of NERC Innovation Advisory Panel.

Name	Organisation	Expertise	Biography
Professor Lynda Warren	Aberystwyth University	Environmental law	Professor Warren is Emeritus Professor of Environmental Law at Aberystwyth University. Her research interests centre on how law and science are used in developing and implementing environmental policy, focusing on two main areas – radioactive waste management and nature conservation. Professor Warren holds three other Ministerial appointments: Deputy Chair of the Joint Nature Conservation Committee, Member of the Committee on Radioactive Waste Management, and Chair (honorarium) of the Wales Coastal and Maritime Partnership.

Ex-Officio Membership

During the majority of the reporting period SAC membership was complemented by two SAC Ex-Officio members representing Living with Environmental Change Partnership and the Global Food Security Programme.

In February 2014 the CSA re-evaluated how Defra could re-organise its important strategic links with the research community with an aim of maximising benefits. As a consequence, it was agreed that regular attendance by the ex-officio's at SAC meetings would be replaced by an alternative arrangement of regular meetings with the CSA. Although it was recognised that SAC may invite representatives along for specific discussions on an ad-hoc basis.

Considerable advantages were seen in moving in this direction and we emphasise that the re-organisation did not reflect any negative perception about ex-officio input to SAC.

Ex-officio members during the majority of the reporting period were:

- Representing the Living With Environmental Change Partnership¹⁶: Professor Andrew Watkinson
- Representing the Global Food Security Programme¹⁷: Professor Tim Benton

¹⁶ <http://www.lwec.org.uk/>

¹⁷ <http://www.foodsecurity.ac.uk/index.html>

Annex 3: SAC SAC-ED Subgroup (Terms of Reference and Membership)

The Terms of Reference for SAC ED are:

- To respond to requests by the CSA and/or CVO to advise and challenge on Defra's preparedness to deploy evidence and analysis in the event of an exotic disease outbreak, on the evidence relating to policies during an exotic disease outbreak on control and through to any recovery phase, and on any issues or gaps and how they might be addressed.
- To offer advice, through the CSA and/or CVO, to the Devolved Administrations (DAs) as requested.

Members of SAC ED are:

Quintin McKellar – Chair, SAC member

Dirk Pfeiffer; The Royal Veterinary College. Providing expertise in epidemiology.

Neil Ferguson; Imperial College London. Providing expertise in risk and modelling.

Anne Bruce; University of Edinburgh. Providing expertise in social science.

Jonathan Cave; University of Warwick. Providing expertise in economics.

Peter Nettleton; Independent expert. Providing expertise in virology.

Charles Milne; Food Standards Agency. Providing practical expertise.

In addition, there are representatives from Welsh Government, Northern Ireland and Scottish Government.

From Defra, the Chief Veterinary Officer and a policy official are in attendance.