

Nurse Review of Research Councils: Call for Evidence

Response Form

Please state whether you are responding as an individual, or on behalf of an organisation:

Organisation

Please write here your name/ the name of your organisation and contact details. This would help us to contact you if we have further questions.

The British Ecological Society
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Please provide evidence and views in relation to the following themes:

1. Strategic decision-making

For example, views are invited on how funding decisions are made; how society and government can engage with science funding decisions; how good decision-making can be encouraged at different levels; and how Research Councils can make the best decisions to ensure research drives economic growth and promotes health, quality of life and environmental sustainability.

The following questions from the review Terms of Reference may be relevant here:

- How should the Research Councils take account of wider national interests including regional balance and the local and national economic impact of applied research?
- Is the balance between investigator-led and strategically-focused funding appropriate, and do the right mechanisms exist for making strategic choices?
- Within each Research Council is the balance of funding well-judged between support of individual investigators, support of teams and support of equipment and infrastructure?

a. Balance between investigator-led and strategically-focused funding.

As recognised in the Triennial Review, the functions of the Research Councils are best carried out at arm's length from government. Their current status as non-departmental public bodies (NDPBs) enables operational independence in line with the Haldane Principle – that decisions on individual research proposals are best taken by researchers themselves and not government¹.

Given the potential conflict between short-term political priorities operating on a five-year timeframe, and the long-term vision required to ensure that the UK continues to deliver world-leading scientific research, it is important that the Haldane principle is maintained. It would be undesirable for the objectives of the Research Councils to be driven by

¹ As recently expressed by former Science Minister David Willetts
<http://www.publications.parliament.uk/pa/cm201012/cmhansrd/cm101220/wmstext/101220m0001.htm>

short-term government interests.

However, the Research Councils' decision-making processes cannot be completely divorced from the wider national interests that government must address. Research Council funding must continue to be balanced between investigator-led funding driven by long-term scientific objectives, the grand societal challenges (e.g. climate change, energy, food security, health and wellbeing, environmental sustainability, ecosystem services) and other strategically focused funding more closely aligned with short-term Government priorities.

Aligned objectives are important to ensure the relevance and responsiveness of the Research Councils to immediately pressing scientific questions, for instance those which have arisen recently with respect to tree health (e.g. work currently being funded through phase three of the Living With Environmental Change 'Tree Health and Plant Biosecurity Initiative' on threats to oak health and to trees from *Phytophthora*²). It is also necessary to allow the Research Councils to respond comprehensively to challenges that have been unresolved for long periods. Successful examples of work responding to policy needs include the delivery of the National Ecosystem Assessment, Insect Pollinator Initiative and Valuing Nature Programme through the Living with Environmental Change initiative.

The Research Councils must be prepared to make arguments to Government to defend both curiosity-driven and applied research which scientists perceive as valuable but which may not be favoured by politicians at the time. Research outputs related to these longer-term priorities may not deliver immediate local, national or international economic impact, but in the longer-term may have important benefits for the economy, health, quality of life and environmental sustainability.

b. Decision making mechanisms

Improvements are also required in the mechanisms for making and implementing strategic decisions. For example, NERC has been criticised in the past for not being sufficiently light on its feet when needs have emerged for co-ordinated, strategic, research across funders. It is encouraging that NERC introduced new processes in 2014 to address these shortcomings in response times; it is too early to evaluate their effectiveness.

2. Collaborations and partnerships

For example, views are invited on the effectiveness of the Research Councils' interactions with each other and with external organisations, as well as the Research Councils' role in supporting collaborations and partnerships between institutions and between disciplines, and the links between Research Council-funded activities and other academic, industrial, European and global R&D activities.

The following questions from the review Terms of Reference may be relevant here:

- How can the RCs catalyse collaboration between institutions?
- How should the work of the research councils integrate most effectively with the work of agencies funding innovation, such as Innovate UK, and with the work funded by Departmental research and development budgets?
- Should the funding of Research Councils be directed almost exclusively to the university sector, with organisations such as the Meteorological Office, the Health and Safety Laboratories and the National Physical Laboratory out of scope?
- Do they adequately support interdisciplinary research?

² <http://www.bbsrc.ac.uk/funding/opportunities/2015/tree-health-and-plant-biosecurity-phase3/>

- Are the right arrangements in place to ensure optimal funding for research that crosses disciplinary boundaries?

a. Interactions between Research Councils and support for interdisciplinary research

The current structure of the Research Councils means that many strategically important areas of research cut across multiple Councils, from pollinators (NERC and BBSRC), to sustainable land use in the food-water-energy nexus (NERC, BBSRC, ESRC, EPSRC) and valuing and measuring natural capital and ecosystem services (NERC, BBSRC, ESRC). In addition, these land, water and food-related disciplines involve other major stakeholders such as Defra, the Environment Agency and drainage authorities.

In the past, the Research Councils have not been effective in creating common funding streams to address specific, cross-Council issues such as tree health or insect pollinators, meaning that it has been challenging for scientists to conduct systems-level research. Previous cross-Council initiatives, such as the Rural Economy and Land Use (RELU) programme, have addressed this problem, yet have also seen researchers tending to resort to their disciplines to secure funding following the end of the project, suggesting that the current approach has been more successful at fostering multidisciplinary rather than interdisciplinary research.

The dropping of the ESRC/NERC Fellowship and Studentship schemes is seen by many as a lack of commitment to research across the natural and social science boundary. Similarly, cross-Council initiatives established to address grand societal challenges such as Living with Environmental Change seem to have lost their impetus and drive over the last couple of years, judging by their websites.

There have however been improvements to cross-Council collaboration since the Triennial Review in 2013, (the Global Food Security, Soil Security and Insect Pollinator Initiatives across NERC and BBSRC for example). New programmes such as the Insect Pollinator Initiative (or the Status and Trends of European Pollinators (STEP) programme) offer models for interdisciplinary research funding. Researchers and other stakeholders are prepared to collaborate to address science questions that currently fall between the Research Councils, if funding is available and the mechanisms for writing cross-Council proposals are standardised.

An example of where interdisciplinary research could be better supported is in the area of quantitative/computational ecology. Currently funding for computational tools is mainly provided through EPSRC, yet funding for the application of these tools comes through NERC. As such, development and application are somewhat divorced from each other; the lack of interdisciplinary funding causes confusion for potential applicants and is restrictive. “Big Data” is a further example, with most calls for the development of techniques coming from EPSRC, and more recently ESRC, yet funding of applications of these techniques comes through NERC.

One barrier to effective interdisciplinary research is the grant application process. Despite reassurances, there are still considerable concerns in the academic community over how decisions are reached on interdisciplinary proposals that span the Research Councils. There is often perceived to be double jeopardy and a lack of suitable referees to span the disciplinary divide, especially at the level of curiosity-driven research.

Researchers preparing interdisciplinary research applications, for example encompassing ecology and social sciences, are judged less favourably than those applying with a ‘pure’ ecology or social science focus (i.e. if a researcher prepares an

application that contains fifty percent ecology and fifty percent social science, the fifty percent ecology content is judged against applications which are 100 per cent ecological and therefore compare less well). Interdisciplinary research must be judged on its own merits and researchers encouraged and supported to write cross-Council proposals.

b. Interactions with external organisations

Better collaboration between the Research Councils and external organisations including government, businesses, NGOs and learned societies is required to enable these organisations to make best use of the research base, thus ensuring research impact. The Science and Innovation Strategy rightly recognises (p10) the important contribution that Learned Societies such as the BES can make to excellence in UK science and innovation.

Directing Research Council funding exclusively to universities excludes organisations that have the ability to ensure research has impact, for example NGOs which undertake primary research. These organisations have good links with end-users, such as food/crop growers and practitioners and have a good understanding of what is practical and acceptable to them. Agricultural research, for example, is uniquely dependent on extension services and near-market research if it is to make an impact on farm.

In the case of conservation, practitioners and researchers are often described as 'speaking different languages'; there is a need to bridge the gulf between these two communities and foster knowledge exchange. The Research Councils must support researchers to translate the outputs of their work into clear and accessible formats. Examples include a) field demonstrations and open days to exchange ideas and share information; b) the use of means outside of peer-reviewed journals to advise and engage with the end-users of research, including extension services, the public and the media.

It can also be difficult for researchers to access business. Targeted 'clubs' that bring together researchers and users in particular areas can build mutual understanding and foster partnerships. The 'Sustainable Agriculture Research and Innovation Club' (SARIC) developed by NERC and BBSRC with industry partners offers a useful model. SARIC brings together researchers and industry to 'overcome challenges hindering progress towards sustainable agriculture', promoting knowledge exchange supporting the development of new, and the translation of existing, research.

However, the Research Councils must also realise that despite the public goods provided by the natural environment – including cultural ecosystem services and fundamental regulating services, such as climate regulation, there is currently no business 'pull', or economic demand, for the fruits of research in these areas. . The work of the Natural Capital Committee and Ecosystem Markets Task Force together with the Valuing Nature Programme have gone some way in starting to address these issues but they require long term commitment from the Research Councils.

c. Interaction with Government departments

There is a need for NERC to work better across research areas funded by Government Departments beyond BIS and Defra (where links are strongest through for example the UK National Ecosystem Assessment). Collaboration could be improved with DCMS on topics related to museum collections and national data (highly relevant to responsive mode priorities regarding systematics and taxonomy), and with DCLG on issues such as spatial planning.

Research Council Institutes such as the British Geological Survey and British Antarctic Survey are similar to the Natural History Museum and Royal Botanic Gardens Kew in terms of their responsibility for maintaining national collections, data and capability. There should be adequate resource provided by Government for this national capability to be maintained and enhanced.

With NERC considering new governance arrangements for its institutes, there are concerns over the future of the maintenance of national capability in areas such as biological records and countryside survey.

Due to their lack of adequate resourcing for research, Government departments have compromised their capacity to act as intelligent customers of research and to partner effectively with the Research Councils in cross-disciplinary programmes. The Campaign for Science and Engineering³ has shown that Government departments have made disproportionate cuts to their research budgets in recent years. In 2011/12, half of all departments implemented cuts to research and development expenditure in excess of 20% compared with the previous year. This follows a previous analysis that showed that between 2009/10 and 2010/11, many departments reduced R&D more than any other spending. Government should have a coherent approach to research funding across the Research Councils and Government Departments. We would note that while Defra used to be an exemplar in terms of its ability to interact with the Research Councils, this capacity has recently been severely diminished.

3. Balance of funding portfolio

For example, views are invited on the Research Councils' role in delivering an appropriately balanced portfolio of investments in science in the UK, taking into account factors such as government priorities / grand challenges, discovery and applied research, and geographical distribution.

The following questions from the review Terms of Reference may be relevant here:

- Are the divisions of scientific subject areas between the research councils appropriate?
- Is the balance of funding between different Research Councils optimal?
- What are the gaps or holes in the funded portfolios of the research councils?
- How should the Research Councils take account of wider national interests including regional balance and the local and national economic impact of applied research?
- Is the balance between investigator-led and strategically-focused funding appropriate, and do the right mechanisms exist for making strategic choices?
- Within each Research Council is the balance of funding well-judged between support of individual investigators, support of teams and support of equipment and infrastructure?

a. Divisions of scientific subject areas between the Research Councils

As outlined in response to question two, the structure of the Research Councils cuts across many strategic areas of science. Cross-Research Council programmes have proven to be challenging to deliver in the past, with the risk that crucial research areas, many of which are 'grand challenges' or government priorities, may fall through the cracks. However, if done well, the Research Councils are capable of collaborating to deliver on shared strategic priorities, with the Insect Pollinator Initiative, Global Food Security and Soil Security Initiatives as examples.

As we stated in our response to the Triennial Review in 2013, there is not a compelling case for reorganisation or consolidation from seven Research Councils to fewer. Changing the structure of the Research Councils would take a great deal of time and cause considerable disruption, whilst savings in money and efficiency are uncertain. Engagement with a single Research Council, encompassing the remit of the current seven, could be problematic for external bodies, including learned societies such as the BES, unless the decision-making structures were transparent and not overly-bureaucratic.

³ <http://sciencecampaign.org.uk/CaSE2015ScienceinGovernmentBriefing.pdf>

However it is clearly possible for improvements to be made to the Research Councils' commissioning and management of common funding streams, and the way in which interdisciplinary research applications are considered, as we have outlined above. Despite the improvements to cross Council collaboration that we have identified in our response, the different working procedures of the Research Councils often make the development of joint programmes challenging, with one or other of the Research Councils maintaining control. Consideration should be given to finding a mechanism through RCUK, which would enable some level of independent control of joint programmes.

b. Regional

The British Ecological Society recognises the importance of geographical location for research; indeed, this is at the core of ecological science. However, issues of geography should be used to enhance scientific excellence and not used for political purposes. Whilst networks of businesses, industry and universities, working with Local Economic Partnerships, can provide opportunities for training and collaborative research, it is important to ensure that research is not over-concentrated in particular areas and that the influence of regional hubs does not prevent the emergence of new centres of excellence. Allocation of capital and resource funds should be based on excellence and peer review and not primarily according to geography or region.

We recognise though that the UK is made up of four countries and that many areas of policy, including environmental policy, are devolved to those four countries. Conversations between the Research Councils and Government, however, tend to be primarily with the UK Government. There is a need to develop a more sophisticated level of engagement with all three devolved administrations.

c. Infrastructure

The BES welcomes the recent increase in capital funding for science. However, new capital funding must be accompanied by appropriate levels of new resource funding. Without this, resource funding to support new capital infrastructure projects is taken from standard resource budgets in the Research Councils, affecting the delivery of other priorities. The BES is particularly concerned about this issue as ecology as a science has relatively low capital requirements.

The Research Councils have a vital role to play in ensuring the diversity of the UK research base and must therefore ensure that disciplines such as ecology and environmental science, which are world-leading in their excellence but with low capital requirements, do not lose out in a funding environment where large capital investments in engineering, biomedicine and other disciplines may reduce available resource budgets. A positive example of investment in environmental science is through NERC's lead role in the development of technologies such as ARGO floats and gliders, but there remain unresolved issues as to who pays for the technologies once they have become operationalised.

4. Effective ways of working

For example, views are invited on how the Research Councils can operate most effectively within the wider science and innovation system, recognising what works well and identifying opportunities for improvements. You may wish to consider issues such as the strategic leadership provided by the Research Councils, how Research Councils engage with their communities, and the operation of the peer review system.

As discussed in the answer to question one, improvements are required to the mechanisms that deliver the Research Councils' objectives, for example with NERC's capacity to respond quickly to emerging research needs and the delivery of strategically important research.

a. Operation of the Peer Review system

There are considerable concerns in the NERC community about the introduction of caps to the number of applications based on previous success rate⁴, which have the potential to generate inequality of access.

b. Engagement with Communities

There is a need to involve a wider set of institutions in setting the Research Councils' strategic priorities. The British Ecological Society could contribute, drawing on our network of over 5,000 members worldwide, by identifying emerging issues and by recommending scientists whom the Research Councils could draw on to work up these ideas. The Research Councils are often seen to draw on the expertise of a very small number of individuals, who may be perceived as having institutional and disciplinary prejudices.

There is also a need for the Research Councils to take a lead on engaging with public audiences on scientific issues of societal concern such as synthetic biology, genetically modified organisms and biodiversity conservation.

c. Innovation

We recognise that between 2010-2015 the UK government placed considerable emphasis on research driving innovation. The recent REF demonstrated the extent to which UK academics are involved in supporting innovation and impact, yet there is a need for Innovate UK to take a broader perspective on innovation and engage with the Research Councils accordingly. For example, natural capital plays an extremely important role in driving the economy and supporting health and wellbeing, yet Innovate UK has been primarily concerned with more 'traditional' aspects of innovation, for example in manufacturing.

5. Any other comments?

a. Skills and Training

The Research Councils strategic direction must be underpinned by investment in high-quality training for early-career researchers. PhD students and Postdoctoral researchers in their first post must be given the opportunity to develop their communication and other transferrable skills that can equip them for interdisciplinary working – a fundamental approach to tackling the challenges that face society.

Training must equip students for careers outside academia, recognising the contribution highly qualified ecological and environmental science graduates can make to careers in practice, policy and business. The BES provides a great deal of support for our early-career members, who are the lifeblood of future ecological science. In 2015 we will begin a partnership with the NERC ACCE DTP to deliver two one-day training courses in 'Employability and Careers', 'Knowledge Exchange and Science Communication'. Learned societies have an important role to play in supporting postgraduate careers, but leadership from the Research Councils is vital.

b. International Collaboration

International science is becoming increasingly important and the UK has always

⁴ <http://www.nerc.ac.uk/funding/available/researchgrants/demand/>

punched above its weight, as acknowledged in the Science and Innovation Strategy. However, recent changes in environmental science programmes (the loss of Diversitas and the emergence of Future Earth) and the emergence of the Belmont Forum together with the politics surrounding Horizon 2020 funding in Europe illustrate both threats and opportunities to international collaboration at a time when it is increasingly important that research at the global level is better co-ordinated. The Research Councils need to take a more proactive and strategic approach to international collaboration that allows UK environmental scientists to participate in, and to lead, the best international science.

The closing date for responses to this call for evidence is **Friday 17 April 2015 at 23:45**.

Please provide your response in Microsoft Word format. In order to be considered, submissions should be no longer than 3000 words.

Please email or post the completed response form to:

Email: nursereview@bis.gsi.gov.uk

Postal Address:

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