The business of the environment

Delivery Plan
2015-16
NERC in brief

The Natural Environment Research Council is the UK’s leading funder of environmental science. We invest £330m each year in cutting-edge research, postgraduate training and innovation in universities and research centres.

Our scientists study the physical, chemical and biological processes on which our planet and life itself depends – from pole to pole, from deep Earth and oceans to the atmosphere and space.

We partner with business, government, public and the wider research community to shape the environmental research and innovation agenda. Our science provides the knowledge, skills and technology that deliver sustainable economic growth and public wellbeing.

NERC leads the world in excellence and efficiency:

- UK environmental scientists produce more top-ranked publications per pound than any comparable nation.
- NERC scientists deliver 5000 refereed publications a year. They are cited 40% more often than the UK average.

NERC supports:

- 3000 scientists and 1000 PhD students.
- 1000 research projects and 60 UK or international programmes.
- 55 universities and 20 research institutes.
- UK research capability including 4 ships, 7 aircraft, 6 polar stations, 6 data centres and 32 community facilities.
- Knowledge exchange and innovation activities with businesses, government departments and agencies, and local authorities.
Section 1  NERC priorities

Environmental science for a changing world

NERC’s strategic goal is to fund excellent, peer-reviewed environmental science that helps us:

• Understand and predict how our planet works.
• Manage our environment responsibly as we pursue new ways of living, doing business, escaping poverty and growing economies.

To achieve this goal, NERC will foster UK and international partnerships so that business, government, civil society and scientists can work together to: address the challenges and opportunities of managing the environment; co-design and co-deliver new environmental science; find and apply existing scientific knowledge; drive UK innovation, jobs, economic growth and societal wellbeing.

Directed research programmes

Strategically directed research provides the knowledge to meet the greatest challenges facing society. We will fund programmes that help business, Government and society to benefit from natural resources and ecosystem services, build resilience to environmental hazards and manage environmental change. We will work with our national and international partners to co-design, co-fund and co-deliver programmes that meet UK stakeholder needs and leverage additional funding, drawing upon the world-leading excellence and creativity of the UK researcher base.

During 2015/16 NERC will continue to invest in a rolling portfolio of priority programmes:

• RCUK ‘grand challenge’ themes – NERC will continue to invest with other Research Councils in shared initiatives listed in the RCUK Delivery Plan.
• New partnership research programmes – NERC will launch new programmes co-designed and co-funded with partners to address critical societal and economic challenges. Examples given in section 3 include: valuing nature; food security; soil quality; tree health; air pollution in developing mega-cities.

Discovery science

Curiosity-driven ‘discovery science’ drives fundamental advances in our knowledge of how the Earth works – past, present and future – and underpins the world-leading position of UK environmental science. Curiosity-driven environmental science has, throughout its history, delivered lasting benefits to our economy, society and wellbeing that were unforeseen when the research began.

During 2015/16 NERC will invest in excellent discovery science (responsive mode) projects across the breadth of NERC science disciplines, using improved peer review processes to focus on truly ground-breaking research and drive up standards. And we will invest in independent research fellows to develop outstanding scientists to become internationally recognised leaders in research and innovation.

Postgraduate training

Doctoral training equips the next generation of leaders with essential knowledge and skills for UK science, business and government across all sectors of the economy.

NERC investment during 2015/16 will sustain the flow of top talent and skills for the UK. We will work with universities and other providers to deliver imaginative new doctoral training partnerships (DTPs) that offer excellent, multidisciplinary training environments with HEIs and employers. We will invest in a new programme of centres for doctoral training (CDTs) that deliver strategically important research and skills for the UK, identified in collaboration with business, Government and other stakeholders.
National capability

National capability is a term NERC uses to describe the large-scale, long-term infrastructure, community facilities, skills and environmental data located in research centres and universities. Much of this capability is provided by six world-class NERC research centres – to enable strategic and responsive environmental research, training and innovation across the entire UK research base, and to provide vital national good services to government including rapid response to national emergencies.

During 2015/16 NERC will invest – with public, private, university and international partners – to maintain a critical mass of UK national capability that addresses the following longer term strategic priorities:

- Deliver scientific understanding of environmental processes over large time and space scales.
- Reduce the long-term cost of large facilities – such as research ships, planes and monitoring networks – by investing in new sensors and robotic technology that make far-reaching environmental research and observation more cost effective.

Innovation and impact

Environmental science fuels innovation and drives new ways of living, doing business, escaping poverty and growing economies in a changing world. NERC plays an important funding and brokering role in the wider UK ‘innovation ecosystem’. We work with research providers, translators and users – directly and in partnership with TSB – to support knowledge exchange and speed up innovation across the whole UK economy as described in section 3 (see UK economic growth).

NERC investment in innovation in 2015/16 will focus on the following strategic priorities:

- Broker strategic partnerships with leading businesses, bringing them together with researchers, Government and NGOs – for example in business and technology clubs – to identify their innovation needs and harness NERC science to meet them.
- Develop innovation programmes in industry sectors with high growth potential and where environmental science can make a major contribution. Innovation programmes will be led by business, working with TSB, Researcher Councils and others to co-design new research and to speed up innovation by translating existing knowledge.
- Open up valuable environmental data, working with other public data holders and business to develop innovative environmental information products and services.
- Establish research and innovation hubs at campuses where NERC Research Centres are co-located with enterprising universities, working with LEPs and other local partners in: Edinburgh, Southampton, Cambridge, Norwich.

Enabling change

To deliver our strategic goals for excellence, impact and efficiency (see section 3) we need to reshape NERC organisation, skills and funding mechanisms. Changes we will support during 2015/16 include:

- Implement any recommendations on new ownership and governance arrangements for NERC Research Centres, which may arise from the current review.
- Integrate community facilities and other national capability activities.
- Reduce the long-term running costs of large facilities.
- Clarify the purpose, use and evaluation of national capability funding elements.
- Deliver BIS strategic and triennial review changes.

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1 British Antarctic Survey (BAS), British Geological Survey (BGS), Centre for Ecology & Hydrology (CEH), National Centre for Atmospheric Science (NCAS), National Centre for Earth Observation (NCEO), National Oceanography Centre (NOC).
Section 2  Allocation of costs

The following tables indicate how NERC’s programme (resource) budget will be allocated in 2015/16 to support the strategic priorities and UK benefits outlined in this document.

Table 1 : Near cash programme resource

<table>
<thead>
<tr>
<th>BIS category</th>
<th>NERC funding stream</th>
<th>2015/16 £m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research</td>
<td>Long-term research in Centres</td>
<td>NC</td>
</tr>
<tr>
<td></td>
<td>Strategic research (large programmes and highlight topics)</td>
<td>RP</td>
</tr>
<tr>
<td></td>
<td>Partnership research</td>
<td>RP</td>
</tr>
<tr>
<td></td>
<td>Discovery Science</td>
<td>DS</td>
</tr>
<tr>
<td><strong>Research sub-total</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fellowships</td>
<td>Fellowships</td>
<td>DS</td>
</tr>
<tr>
<td>Training</td>
<td>Postdoctoral training (PhD)</td>
<td>PGT</td>
</tr>
<tr>
<td>Knowledge Exchange</td>
<td>Innovation</td>
<td>INN</td>
</tr>
<tr>
<td><strong>Multi-user facilities sub-total</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>International subscriptions</td>
<td></td>
<td>NC</td>
</tr>
<tr>
<td>Other</td>
<td>National good services provided by Centres</td>
<td>NC</td>
</tr>
<tr>
<td></td>
<td>Enabling change</td>
<td>EC</td>
</tr>
<tr>
<td><strong>Other sub-total</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Gross programme resource (excluding BAS partition)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Co-funding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Earned income</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Net programme resource (excluding BAS partition)</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2 : Other programme resource

<table>
<thead>
<tr>
<th>BAS partition net programme resource</th>
<th>2015/16 £m</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>29.5</td>
</tr>
</tbody>
</table>
Table 3: Estimated figures for collaboration, external income and leverage

<table>
<thead>
<tr>
<th></th>
<th>2015/16 £m</th>
</tr>
</thead>
<tbody>
<tr>
<td>NERC funding used in collaboration with TSB</td>
<td>3.0</td>
</tr>
<tr>
<td>NERC funding used in collaboration with other Research Councils (RCUK activities)</td>
<td>93.3</td>
</tr>
<tr>
<td>External income</td>
<td>58.0</td>
</tr>
<tr>
<td>Additional leveraged income</td>
<td>115.0</td>
</tr>
</tbody>
</table>

Explanatory notes to financial tables

General
- All figures £m, rounded.
- Excludes capital, which is allocated by a separate mechanism. NERC ‘sustaining capital’ for 2015/16 is £35m, of which £7.6m is partitioned for BAS Antarctic infrastructure.
- Excludes administration budget, which is allocated by a separate mechanism.
- NERC is currently reviewing the ownership and governance of its owned Research Centres. If any centres move outside Government ownership, NERC and BIS will negotiate how to allocate the costs of shared administrative services provided to centres by UK SBS Ltd and NERC Swindon Office.

Table 1
- Excludes BAS Antarctic large infrastructure (see table 2).
- Column 1 headings defined by BIS. Column 2 maps NERC funding streams onto BIS headings.
- NERC is redefining its funding streams for greater clarity and transparency. National capability (NC) now shows 4 elements and directed research (RP) now shows 2 elements. Responsive mode (RM) is now discovery science (DS). Efficiency (EFF) is now enabling change (EC). Postgraduate training (PGT) is now a separate funding stream (was previously included in RM).
- To derive gross expenditure figures, all co-funding is included in partnership research and all earned income is included in long-term research in centres.

Table 2
- HMG Science Minister has decided to partition Antarctic large infrastructure, associated with the British Antarctic Survey (BAS), from the rest of the NERC budget.
- Table 2 shows the 2015/16 cost of meeting specified requirements for this activity, as agreed by the BAS Review Group (including BIS and FCO).
Section 3  Benefits for the UK

Scientific excellence

UK environmental science leads the world on excellence, and produces more top-ranked publications per pound than any comparable nation\(^2\). NERC-funded research beats the UK average for environmental sciences on similar measures, and 53% of NERC-funded scientific publications are internationally co-authored\(^3\). Excellence flows from the UK dual support system, and the way NERC shapes UK environmental science capability to address key challenges identified by society. In the face of strong international competition, where other developed and emerging nations are investing a greater share of GDP in research for future growth, NERC is determined to maintain the health and excellence of the UK research base.

During 2015/16 we will:

- Focus community attention on the directed research challenges facing society, whilst supporting responsive discovery science that is ambitious, ground-breaking and risk-taking.
- Ensure that NERC research centres thrive as vibrant, innovative, sustainable organisations by implementing new ownership and governance arrangements. Use HEFCE REF-style performance monitoring to drive strategic investment decisions and performance management in centres.
- Fund excellent directed research programmes, such as:
  
  **Habitable planet** – How conditions for life are maintained by the cycling of volatile elements (eg hydrogen, carbon, sulphur, oxygen) within the deep Earth and their exchange with the atmosphere. Partners include Deep Carbon Observatory (Alfred P Sloane Foundation) and Geoprisms (US-NSF).
  
  **Air pollution and human health in developing mega-cities** – Bring UK environment, technology and health research funding together with Indian and Chinese resources to establish how pollutants affect health and life expectancy, identify mitigations, and develop low-cost technology opportunities.
  
  **Environmental microbiology for human health** – To improve public health through fast and efficient identification of microbial pathogens and allergens in the environment. Partners include Defra, Dstl, Food Standards Agency and Scottish Environmental Protection Agency.
  
  **Variability in atmospheric circulation and weather** – To understand unusual and prolonged weather patterns – at different times of the year – in the UK, western Europe and Asia. Partners include the UK Met Office and India.
  
  **Future climate for Africa** – To enable resilient planning, adaptation and development, based on ‘decision-relevant’ evidence on medium-term climate change in sub-Saharan Africa. Partnership with DfID.

Multidisciplinary research

NERC’s environmental science remit is inherently multidisciplinary. It encompasses physical, chemical and biological sciences to understand geological, marine, terrestrial, atmospheric, polar and space processes, and how they interact. This embedded multidisciplinary culture makes NERC especially suited to partnership with other research funders in the UK and internationally.

Multidisciplinary partnership mechanisms available to NERC include RCUK’s cross-council funding agreement (CCFA) for grant review, and RCUK’s ability to fund multidisciplinary strategic research using variable geometry – from bilateral initiatives to large-scale multilateral programmes where joint strategy, investment and decision-making is needed to support government priorities. By 2015/16 NERC and RCUK will further strengthen the way we support multidisciplinary research and communicate it more clearly.

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During 2015/16 NERC will participate in a portfolio of multi-Research Council initiatives, to include joint initiatives listed in the RCUK Delivery Plan and:

- **Soil quality** – To sustain ecosystems and the services they deliver to people, such as food, regulation of flood and disease, carbon storage, clean water. Supports HMG’s agri-tech growth strategy. Partnership with BBSRC, Defra, US-NSF (the latter for access to world-leading infrastructures).

- **Valuing nature**: To support HMG’s Natural Capital Committee by funding multidisciplinary research – with ESRC and AHRC – to understand the value to the economy of services we derive from the environment.

- **Tree health**: Multidisciplinary research to help the UK manage pests and diseases such as ash and oak die-back. Partners are Defra, BBSRC, ESRC, Forestry Commission, Scottish and Welsh Governments.

**Highly skilled people**

NERC trains highly skilled people who pursue successful careers in research, business and government across all sectors of the UK economy – including food, water, energy, infrastructure, insurance, technology and many more\(^4\). Highly skilled people are essential to sustain and grow the UK’s increasingly knowledge-based economy, especially in fast-growing and innovative companies. Postgraduates bring a breadth of environmental science knowledge and skills to policy and innovation, and help the UK capitalise on its world-leading environmental science base.

By listening to our partners and supporting HMG’s industrial sector and growth strategies, we will monitor the UK’s needs for high level skills in environmental science and shape our investment accordingly. NERC will support the flow of top talent and skills during 2015/16:

**Postgraduate training**

- NERC will support at least 240 new students every year through our doctoral training partnerships (DTPs). We will fund HEI partnerships who offer a rich PhD training experience to a whole cohort of students – providing an excellent, multidisciplinary research environment that delivers broad skills in partnership with other HEIs, research centres and employers.

- We will establish two new centres for doctoral training (CDTs) to deliver specific PhD training priorities identified with business and government: soil science (with BBSRC); managing and mitigating risk using big data (with ESRC). We will grow industry partnership in our CDT in oil & gas (launched 2014) to deliver the environmental skills identified by HMG’s oil & gas industrial strategy.

- We will fund new Advanced Training initiatives to deliver non-PhD training priorities identified by business and government. Priorities for advanced training include data and information management, and cutting-edge maths and statistics, to support HMG’s Eight Great Technologies ‘big data’ strand.

- NERC research centres will host and train more than 100 new PhD students every year, providing university-based students with individual research projects and national training programmes.

**Research fellowships**

- NERC will develop the leaders of tomorrow by funding independent research fellows – outstanding early-career scientists – to become internationally recognised leaders in research and innovation. We will work with host organisations to strengthen the support, training and networking of NERC fellows.

**People exchange**

- We will fund exchange opportunities to accelerate the two-way flow of people, knowledge and skills between environmental science disciplines and our partners – in business, government and NGOs – at all career stages. Such exchange has been shown to benefit the individual and their career, the organisations they work for, innovation, the UK economy and society as a whole.

\(^4\) Case studies are available in NERC’s annual Impact Report: [www.nerc.ac.uk/about/perform/reporting/reports/](http://www.nerc.ac.uk/about/perform/reporting/reports/)
UK economic growth

NERC is committed to growing investment in innovation (ex-knowledge exchange) as a share of our budget, in support of Government priorities for growth in strategic industry sectors and technologies.

NERC science is fundamental to the whole UK economy, fuelling innovation across all industry sectors:

- All businesses directly or indirectly consume natural resources and services – NERC helps them benefit from natural resources and services whilst living within the Earth’s limits.
- All businesses have supply chains and customers – NERC helps them understand their globally distributed and local risks and vulnerabilities to natural hazards, and build resilience.
- All businesses need to operate safely in the environment, and manage it responsibly – NERC helps them understand the risks and opportunities arising from environmental change, and manage their impacts upon the environment.

Whilst supporting the whole UK economy, NERC strategic investments and partnerships will contribute to specific HMG industrial sector and technology growth strategies. For example:

Oil & gas

NERC research and technology helps the oil and gas industry to find and safely extract energy reserves around the UK, Falklands Islands and globally. This sector added £30bn GVA to the UK economy in 2011 – no other sector has created more prosperity for the UK. NERC impacts include: new technology for more accurate drilling worth £500m to the industry over the past 15 years; assessing the potential and safety of UK shale gas; mapping the sea-bed and monitoring the environment for regulatory compliance.

- In 2015/16 NERC will partner with Heriot Watt University to build a new Scottish Centre for Earth and Marine Technology, combining NERC British Geological Survey (Edinburgh) with HWU’s five-star rated Institute of Petroleum Engineering and other research strengths. NERC will also fund a new centre for doctoral training (CDT) in oil & gas. Together these partnerships will address the environmental data, technology and skills needs identified by HMG’s oil & gas industrial strategy.

Agri-tech

In addition to the RCUK Global Food Security Programme, NERC supports the food and drink industry and HMG’s agri-tech industrial strategy through research and innovation in water, soils, ecosystem services, insect pollinators and pollution (eg effects of ozone on crops). NERC advises Defra on agri-environment schemes and Scottish Government on fish-farm licencing.

- In 2015/16 NERC will partner with BBSRC through industry clubs to launch new research and innovation programmes in sustainable agriculture and aquaculture – to address the challenges of maintaining or intensifying food production whilst reducing water use and other supply chain costs. And we will fund soil quality research (with BBSRC and Defra) and PhD training (CDT with BBSRC).

Big data and the information economy

The UK is rich in environmental data collected for research as well as for regulation and compliance. Building on previous investments in e-infrastructure, NERC is currently investing in its own data centres to provide open access for large volumes of data, and in research and technology to provide new tools for visualising and using environmental data and models.

- In 2015/16 we will invest in the translation of data to provide environmental products and services for business and public – through SMEs (with TSB), the Environmental Science to Services Partnership (NERC, Met Office, Environment Agency, Ordnance Survey) and Satellite Applications Catapult Centre.

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5 Annual Business Survey 2011
Robotic technology

NERC is a world leader in developing autonomous technology and sensors to study remote environments. The latest NERC Autosub can go deeper and further than comparable commercial or military vehicles, remaining at sea for up to 6 months and travelling 6,000 km.

- In 2015/16 we will partner TSB to help major companies use this NERC technology to monitor carbon storage sites beneath the North Sea, and SMEs in the maritime and defence industries to develop this UK technology and grow new markets.

Policy support

NERC science supports a wide range of Government policy departments, regulatory agencies and infrastructure planning, for example: food and farming; water supply and flooding; energy and mining; transport; environmental quality and status (EU Directives); climate impacts and monitoring. In 2015/16 we will invest in new programmes that provide essential policy support to HMG:

- **Tree health** – research to inform policy and practice in managing trees and wider ecosystems exposed to pests and disease, such as the recent ash and oak die-back diseases. Research to be co-designed and co-funded with Defra, Scottish Government, Forestry Commission and BBSRC.

- **Valuing nature** – to understand how the state of the natural environment affects the performance of the economy, individual health and well-being, addressing HMG Natural Capital Committee priorities, advising HMT on opportunities for sustained prosperity. Partners include Defra, ESRC and AHRC.

Greater leverage

NERC achieves significant leverage through multidisciplinary and collaborative co-funding with partners, eg:

- NERC support for oil & gas research leveraged £135m from industry to HEIs and BGS (10 yrs to 2012).
- NERC investment in the National Geological Repository saves oil and gas companies drilling new boreholes at a cost of £5m-£20m each.
- NERC investment of £1.5m in the International Space Innovation Centre at Harwell leveraged £15m, laying foundations for the new Satellite Applications Catapult Centre (2011-13).
- NERC investment of $47m in the International Ocean Drilling Programme leveraged $3bn from other nations (2003-13).
- NERC funding of £236m in directed research programmes leveraged £153m (2009-13: £14m business; £92m other Government departments and international; £47m other Research Councils).

During 2015/16 NERC will take further action to boost leverage:

- Planned capital investment in research and innovation hubs (section 1) and large test-bed facilities for energy, water and farm-scale research will attract significant industry funding.
- Investment in environmental data products and services (see big data above) will lever business, TSB and other Government funding.
- Technology proof of concept fund, at low technology-readiness-level (TRL 1-4), to de-risk technology development – a pilot programme delivered faster innovation, high business take-up and leverage.
- Investment in autonomous vehicles and sensor technology will lever business, ETI and TSB funding.
- A £3.5m large grant to deploy and recover instruments and autonomous marine gliders in the North Atlantic and Arctic Oceans – to understand how ocean flows affect climate – will build the UK’s technology lead and leverage £25m from US (NSF), Netherlands, Germany and Canada.
- New programmes with China, India, USA and other Belmont Forum partners (see above and section 5) will multiply NERC investment many-fold.
Greater efficiency

During 2011-15 NERC has delivered increasing efficiency in the science resource budget through its own actions, and by participating in the RCUK efficiency programme to save more than £400 million by 2015. We have increased partnership and leverage (above), reduced costs in universities (Wakeham) and NERC centres (prioritising and integrating national capability), and reduced demand for grants. NERC reduced its headcount more than any other Research Council.

In 2015/16 NERC will continue to drive efficiency in its use of the science budget, for example:

- Extend the RCUK efficiency programme (see RCUK Delivery Plan). Work with HEFCE and HEIs to deliver a further £100m of Wakeham savings in 2015/16, while further developing asset-sharing and demand-management. Work ever more closely across RCUK to harmonise processes and increase efficiency.
- Work with BIS and other Research Councils to implement recommendations of the BIS strategic review.
- Enhance efficiency in NERC research centres by making the purpose and use of national capability funding elements more transparent (separate funding lines for distinct activities), evaluating and managing its performance more transparently, and integrating community facilities.
- Reduce the long-term running costs of large facilities – such as research ships, planes and monitoring networks – by investing in new sensors and robotic technology that enables far-reaching environmental research and observation at lower cost, and by sharing facilities with UK and international partners.
- Streamline NERC funding processes to improve agility, turn-around time and quality of decision-making, make it easier to match-fund international partners, and work with HEIs to manage demand for grants. These measures will promote both leverage and cost-efficiency.

NERC’s ability to achieve greater resource efficiencies is strongly linked to the planning of future capital investment. The government’s commitment to planning capital further ahead (to 2020/21) will enhance industry confidence in co-planning large collaborative investments – such as research and innovation test-beds – that will support economic growth. And it will allow NERC to invest in new technology to replace large, long lifespan facilities with more synchronous, cost-efficient solutions.
Section 4 Enhanced partnership

Enhanced partnership and leverage are essential for NERC to achieve its strategy ambitions. NERC will introduce a new partnership research mechanism – for more agile, streamlined decisions; to make it easier for partners to co-design and co-fund new programmes with us; and to support the initiatives listed below.

Business and TSB

NERC plays an important funding and brokering role in the wider UK ‘innovation ecosystem’, working with universities, translators and users – directly or in partnership with TSB, NCUB and others – to support knowledge exchange and speed up innovation and growth.

In 2015/16 NERC will strengthen our engagement with business through the activities listed in sections 1 and 3: to help business access research knowledge and speed up innovation; to create new business in environmental information products; to establish science and innovation hubs; to support HMG’s industrial sector strategies and technology priorities. We will strengthen our partnership with TSB through emerging catapults and catalysts, especially in satellite applications and offshore energy, future cities and big data.

Government

NERC partners Government Departments (eg Defra, Decc, DfID), delivery agencies (eg Met Office, Environment Agency) and others (eg Research Councils, UKSA, NGOs, universities) to tackle large-scale societal challenges through new programmes as listed in previous sections. NERC and the UK Met Office have a particularly strong strategic partnership through the Joint Weather and Climate Research Programme (JWCRP). In 2015/16 NERC will:

- With the UK Space Agency – ensure that our complementary investments in Earth observation and space science deliver excellent research and data, and are exploited for UK innovation and growth.
- With the UK Met Office – jointly invest in world-leading:
  - Infrastructure – upgrade the MONSooN supercomputer and invest in the FAAM BAe146 aircraft so NERC and MO Hadley Centre scientists can share platforms and models (and respond to emergencies).
  - UK Earth system model – jointly build, test and develop the world’s most holistic model for predicting environmental change (NERC research centres collaborate on key components of the Earth system model and provide critical test data).
  - Research – improve our understanding of the weather system, and build scientific advances into weather forecasting, as even modest reductions in the inherent uncertainty will bring huge economic and societal benefits for UK planners and business.
  - Innovation – use our data to create environmental information services for business and public, via the Environmental Science to Services Partnership (with Environment Agency, Ordnance Survey).

International

NERC works with international partners – for example through the Belmont Forum of leading and emerging research nations – to agree international research priorities; to tackle large-scale environmental research challenges; to access and observe all parts of the Earth; to align our national programmes, share capability and make the best use of our resources. In 2015/16 NERC will invest in:

- Phase 3 of the NERC-led RAPID international programme to observe variability in Atlantic circulation and how it affects European climate over 10-year timescales. NERC’s £10m levers co-funding from UK Met Office, US (NSF, NOAA), Germany, driving technology innovation in autonomous marine robotics.
- New research programmes with India and China to study monsoon variability, air pollution, soil degradation and low-carbon cities (the latter with EPSRC) – exploring technological innovations to provide opportunities for UK business.
• New research programme with Africa – partnering with DfID to generate ‘decision-relevant’ evidence on sub-Saharan climate change to enable resilient planning, adaptation and development.

**RCUK and HEFCE**

NERC is committed to working with other Councils, HEFCE and other BIS partner organisations to coordinate policy, decision-making, delivery and efficiency.

In 2015/16 we will implement Triennial Review recommendations, BIS strategic review and RCUK Delivery Plan: to make it easier for business and HEIs to work with us; to deliver multi-disciplinary research and innovation; to achieve efficiencies; to coordinate strategy and policy across the dual support system with HEFCE. We will strengthen our research and innovation collaboration with other Councils in key growth sectors: BBSRC (agri-food), ESRC (financial services), EPSRC (future cities catapult centre).