



March 2012

## **BRIEF SUMMARIES OF LWEC ACCREDITED ACTIVITIES CATEGORISED BY MOST RELEVANT LWEC CHALLENGE**

### **Climate Challenge: To understand the risks of climate change and assess options for avoiding or managing such risks**

#### **1. Joint Weather and Climate Research Programme (Met Office and NERC)**

The overarching aim of the JWCRP is to ensure that, in areas of common interest to the Met Office and NERC, the UK maintains and strengthens its leading international position in climate science, and hence in climate forecasting and provision of advice for climate policy. The programme (£13.6M) was launched in April 2009.

#### **2. Quantifying Uncertainty: EQUIP (NERC, EA, Met Office)**

Approximately £1.5M was made available to the climate science community (in addition to that under the Joint Climate Research Programme) to address the key issue of uncertainty in climate modelling. Unless we can better quantify uncertainty – or become more confident in the way we handle uncertainty in predictions of change – it will be difficult to develop effective mitigation or adaptation strategies. UK scientists aim to use this work to have a major impact on the work of the IPCC. The quantifying uncertainty programme will be delivered by a single collaborative award – End-to-end Quantification of Uncertainty for Impacts Prediction (EQUIP), which involves numerous universities and partners.

#### **3. Avoiding Dangerous Climate Change (AVOID) (DECC and Defra lead with other partners)**

The £1.3M AVOID programme is to be delivered by a consortium including the Met Office and research centres. The three main outputs will be policy-relevant evidence and research needed to achieve international agreement on greenhouse gas emission reductions, core research for understanding dangerous climate change and its implications and a framework that will further encourage the integration and communication of scientific and socio-economic research on climate change.

#### **4. Centre for Climate Change, Economics and Policy (CCCEP) (ESRC funds with non-LWEC partners)**

The primary focus on the Centre, which is chaired by Lord Stern, is to improve climate-change policy and to increase the capacity of decision makers (both public and private) to respond to one of the most critical challenges facing the world today. £7.3M of the Centre's funding forms the portion of work accredited by LWEC.

#### **5. Tyndall Centre for Climate Change Research (NERC, EPSRC, ESRC)**

The internationally renowned Tyndall Centre for Climate Change Research that contributed significantly to the IPCC assessments on climate change adaptation and mitigation has been provided with an additional £2.4M of funding. This is to help orientate and engage the UK climate change research community to deliver more effectively on the LWEC environmental change objectives.

#### **6. Met Office Hadley Centre Climate Programme (Defra and DECC)**

This is a five year programme with just over £72M funding. The aim of the programme is to provide tailored climate change advice to UK government, and supporting DECC and Defra in developing policy to tackle climate change.

**7. Impacts of Climate Change in the UK and Adaptation Options (Defra, EA and non-LWEC partners)**

The projects within this programme (total budget ~£1.6M), have been designed to collectively produce a portfolio of work that makes excellent use of the UK's climate change projections (UKCP09). Individually, but more so together, they provide a substantial body of evidence on which to develop robust adaptation policies, and outputs will be integrated in to the Adapting to Climate Change Statutory National Climate Change Risk Assessment.

**8. Centre in Understanding and Managing Natural and Environmental Risks (the Risk Centre) (EPSRC, ESRC, NERC, Defra)**

LWEC Partners identified risks and the way we deal with them as a cross-cutting aspect of LWEC. This £1.2M centre, with its headquarters at Cranfield University, will enable improved management of risk through a focus on better understanding the ways the public responds to perceived risks in areas such as natural and man-made hazards, extreme events and new and emerging diseases. The LWEC RCUK Theme Leader sits on the advisory board.

**9. Ice Sheets and Sea Level Rise (NERC (BAS), Met Office & 22 other partners)**

This £7M programme is the NERC component of a large EU FP7 programme: **Ice2Sea**.

Ice2Sea is an integrated programme that includes:

- targeted studies of key processes in ice sheets in both polar regions (Greenland and Antarctica);
- improved satellite determinations of changes in continental ice mass;
- development and implementation of ice-sheet/glacier models to generate detailed projections of the contribution of continental ice to sea-level rise over the next 200 years.

These results will be delivered in forms accessible to scientists, policy-makers and the general public, which will include clear presentations of the sources of uncertainty.

**10. Identification and modelling of the processes that govern climate (NERC (NCAS), Met Office & other non-LWEC partners)**

Climate change on centennial time scales is a major scientific, societal and policy issue. The work here (total £16.2M) is geared to addressing the key science questions and providing information for evidence-based decision making to the relevant stakeholders, including government departments (Defra and DECC). It will feed into the international research and policy arenas through contribution to IPCC and WMO/UNEP assessments. It will be closely aligned to the NERC Theme Action Plans (TAPs) e.g. the Joint Weather & Climate Research Programme (JWCRP), and will involve wide collaboration with the Met Office.

**11. Agricultural Greenhouse Gas Research Platform (Defra, SG, WG and NI Executive)**

The overarching aim for the £12.6M GHG platform is to track, understand and predict future changes in greenhouse gas emissions from agriculture. This requires significant reduction in the uncertainties in the agricultural GHG inventory and development of country-specific emission factors to be used in combination with national statistics in order to better characterise and allocate GHG emissions from agriculture. The projects will be managed by Defra in collaboration with the above partners and a Research Advisory Group (RAG) will be responsible for providing quality assurance.

**12. BGS Climate Change (NERC (BGS), Defra, EA, BBSRC (Rothamsted Institute) and many other UK and International non-LWEC partners)**

This ~£4M collaborative programme is addressing climate change issues through a variety of focused efforts. The aim is to:

- observe past and present climate;

- to understand those observations, and ultimately;
- to predict future climates and the environmental responses to those climates.

**13. Geoscience Technologies** (NERC (BGS), Defra, EC Environment DG and EC Space DG)

This £1.26M collaborative programme led by BGS is designed to develop the tools needed by all of the other BGS science programmes to map, measure, monitor and model the geological environment. Major application areas for these tools include resources (groundwater, energy, minerals and the land as a resource), geological hazards (landslides, subsidence, earthquakes, volcanoes and the geological aspects of flooding) and geo-environmental management (waste materials, pollutants and the impacts of climate change).

**14. Storm Risk Mitigation through Improved Prediction and Impact Modelling** (NERC, Met Office, EA)

Storms have had an increasing social and economic cost over recent years and are likely to be a main cause of loss of life or assets in the UK over the next few decades. The objective of this ~£5M collaborative programme is to improve short (0-48 hours) and longer term (decades) forecasting of storms and their impacts on catchments and coasts.

**15. Next Generation Weather and Climate Prediction Systems** (NERC, Met Office, STFC)

Technical developments in computing and in global scale observations create an environment of enormous opportunity for improving capabilities for weather and climate prediction, but there are major scientific and technical barriers to realizing this potential.

This £4.4M programme aims to address two key areas where scientific and technological advances offer opportunities to maintain UK leadership in environmental prediction:

- Goal A - Resolution of small scale weather systems in the atmosphere and ocean
- Goal B - Use of observations to initialise climate predictions

**16. Arctic Research Programme** (NERC, Met Office, DECC, FCO)

The overarching aim of this ~£15m programme is to improve capability to predict changes in the Arctic, particularly over timescales of months to decades, including regional impacts and the potential for feedbacks on the global Earth System.

**17. Designing a Programme to Address Evidence Gaps in Greenhouse Gas and Carbon Flux from UK Peatlands** (NE, Defra, DECC, SG, WG, SEPA)

The importance of peatland management to the releases of green house gases has been recognised globally, however a recent review indicated significant gaps in monitoring data. This £40k project, led by JNCC, aims to address this problem.

**18. Geoengineering: integrated assessment and feasibility study** (EPSRC, NERC, STFC)

Geoengineering is in its infancy and research is required to reduce uncertainties about the various methods and their impacts should they be required in the future. EPSRC, NERC and STFC are working together to fund research which will allow informed and intelligent assessments about the development of Climate Geoengineering technologies. These Partners have conducted a joint sandpit event, as a result of which two projects have been funded: IAGP (Integrated Assessment of Geoengineering Proposals) and SPICE (Stratospheric Particle Injection for Climate change). Total funding for this activity is ~£3.4M.

**19. Coastal Sediment Systems** (NERC, Environment Agency, Defra)

The escalation in future investment costs to adapt to climate change along our coasts calls for improved knowledge on coastal evolution and its influence on flood and erosion risk. The objective of this £3.85M collaborative programme is to improve our capability to predict long-term and regional scale change on the coasts and in our estuaries.

**20. Flood Risk from Extreme Events (FREE) (NERC, Met Office, Environment Agency, Defra, Jacobs Babbie consultancy)**

This 5-year programme aimed to research what causes and propagates extreme flood events, to help forecast and quantify flood risk. It brought researchers from the hydrological, meteorological, terrestrial and coastal oceanography communities together in an integrated research programme for the first time. (Total funding £7.8M but only 2007-2010 years included in LWEC reporting (therefore £4.68M)).

**21. Probability, Uncertainty and Risk in the Environment (PURE) (NERC, EPSRC Environment Agency, TSB)**

This £2.77M action aims to take a national leadership role in changing the way in which uncertainty and risk are assessed and quantified across the natural hazards community. The action has two elements:

1. the PURE programme, which will focus on
  - Flooding hazards
  - Multi-phase fluid flow hazards e.g. avalanches, landslides, rockslides & pyroclastic flows
  - Earthquake hazards
  - Hydro-meteorological non-flooding hazards such as storms, droughts and heatwaves.
2. the PURE network., which aims to stimulate good practice guidance and the standardisation of the assessment and quantification of uncertainty and risk across natural hazards science.

**22. National Centre for Earth Observation (NCEO) (NERC, Met Office Hadley Centre, Environment Agency, European Space Agency, NASA, ECMWF)**

The National Centre for Earth Observation (NCEO) is one of NERC's Research and Collaborative Centres. Its core competence is the ability to utilise the wealth of observations from Earth-orbiting satellites to record how the Earth is changing, to understand why it is changing and to pinpoint errors in mathematical models that are used for prediction. It achieves this via a partnership of over 100 scientists from 26 universities and institutions from a range of disciplines. Collaborative funding of the Centre over the next 5 years will be £42M (with allowances made for double counting with other accredited activities).

**Ecosystem Challenge: To ensure that decision-making takes full account of impacts on the natural environment and their consequences for ecosystem sustainability, human well-being and economic prosperity**

**23. National Ecosystem Assessment (Defra, SG, WG, NERC, ESRC)**

This world-leading, £1.2M initiative will produce the world's first national assessment of its kind. Following the Millennium Ecosystem Assessment chaired by Professor Robert Watson (Chief Scientific Adviser for Defra) it will provide an assessment of the current state of all of the ecosystems in the UK. The study will provide the evidence foundation of the ecosystems approach to policy that Defra are leading across Whitehall, identifying both threats and opportunities.

**24. UK Ocean Acidification Research Programme (NERC, Defra, DECC)**

The overall aim of this £12.4M Research Programme is to provide a greater understanding of the implications of ocean acidification (as a result of the absorption of anthropogenic carbon dioxide) and its risks to ocean biogeochemistry, biodiversity and the whole Earth System. SG and WG have also been consulted in the design phase of the programme.

**25. Demonstration Test Catchments (Defra, EA, WG)**

The Demonstration Test Catchments will develop an evidence-base for wider application to the management of river catchments across England and Wales. The £8M project will initially set up three instrumented catchments with an integrative data infrastructure to provide a shared-use network as the framework for collaborative analysis. Research and mitigation actions in other

catchments will also be drawn in and supported where relevant, to enhance the developing evidence base.

**26. Open Air Laboratories (OPAL)** (Lottery fund to Imperial College London, with additional contributions from Defra & EA)

Open Air Laboratories – OPAL – is a ~£13M multi-disciplinary programme that seeks to encourage and support collaboration between the academic, statutory, voluntary and community sectors in pursuit of excellence in environmental science focusing on the issues of loss of biodiversity, environmental degradation and climate change.

**27. Marine Predators as Indicators of the Integrity and Health of Marine Ecosystems** (SMRU (NERC), SG, Defra, SNH, Natural England)

The £20M research programme at the Sea Mammal Research Unit aims to fulfil a need for information within government and industry about the upper end of marine food chains. Marine mammals reflect underlying process within a complex ecosystem and are vulnerable to anthropogenic effects.

**28. Continuous Plankton Recorder (CPR) Survey** (NERC Defra & many non-LWEC UK and International contributors; run by NERC (SAHFOS))

The CPR survey is the world's most geographically extensive and longest-running (started 1931) large-scale plankton biodiversity monitoring activity (with current funding of approximately £1.2M per year). The survey determines the abundance and distribution of microscopic plants (phytoplankton) and animals (zooplankton) in our oceans and shelf seas. Using ships of opportunity from ~20 shipping companies, it obtains samples at monthly intervals on ~30 trans-ocean routes. The survey is internationally-funded with a wide consortium of stakeholders.

**29. Character and Quality of England's Landscapes** (NE, Defra and English Heritage)

The ~£1M CQuEL Project (Character and Quality of England's Landscapes) aims to assess change in the character and quality (the form and the function) of England's landscapes. CQuEL seeks to provide 'place-based' evidence about the character and function of landscapes and the provision and quality of selected ecosystem services delivered by England's natural environment, where the natural environment is understood through the concept of landscape. The project seeks to develop a better understanding of the ways in which different landscapes are changing and what this means for the ecosystem services these places provide.

**30. KnowSeas (Knowledge-based Sustainable Management for Europe's Seas)** (NERC (SAMS), NERC (SAHFOS), Defra (Cefas), and many non-LWEC UK and International partners)

KnowSeas is a large-scale integrating EU FP7 collaborative project with 30 partners from 15 countries, coordinated by the Scottish Association for Marine Science (SAMS), a NERC Collaborative Centre. The total project cost is £6,335,740, with a total EU contribution of £4,923,570. Europe's four regional seas have suffered severe environmental degradation due to human pressure. The Ecosystem Approach to management, a management paradigm that encompasses humans and the supporting ecosystem, offers a means of sustainably managing our seas to optimize both ecological and social well being. However, the science base for this approach needs strengthening and practical tools must be developed and tested for policy implementation. The KnowSeas consortium will strengthen the science base for managing Europe's seas through the practical application of systems thinking.

**31. Southern Ocean Fisheries and Climate Change** (NERC, FCO)

Work on Southern Ocean fisheries and Climate Change is delivered through the ~£5.5M Ecosystem Science into Policy (ESP) programme which focuses on the maintenance of, and potential threats to, Ecosystem Services derived from the Southern Ocean. ESP is specifically targeted at providing policy makers, particularly the Foreign & Commonwealth Office (FCO) that leads on UK policy for Antarctica, with the information they require concerning management of

ecosystems in a changing environment. ESP is the NERC/UK contribution to the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR).

**32. Valuing Nature Network** (NERC, with possible involvement from ESRC, Defra, SG and NE)

The aim of the proposed £0.6M research network is to create partnerships to promote and develop research capacity in the valuation of biodiversity, natural resources and ecosystem services. Capacity will be created by establishing cross-disciplinary collaborations between the natural and social science communities designed to:

- Articulate the nature of the valuation problem we currently face in relation to understanding the contribution that natural capital makes to human well-being; and,
- Identify and develop the underpinning natural science knowledge that would enable robust monetary and non-monetary valuation to be achieved.

**33. Macronutrient Cycles Programme** (NERC, EA, Defra, SG, WG)

This is a major new £9.5M programme that aims to understand the interactions between Carbon, Nitrogen and Phosphorus Cycles in the environment. The research will assess the fate and distribution of these nutrients and the likely changes due to man-made impacts such as climate change, land use change, population changes and changing pollution gradients across the UK and Europe.

**34. Marine Renewable Energy** (NERC, Defra)

This £3.7M programme will contribute to the evidence base to predict the environmental implications of future marine renewable energy options at appropriate scales, and to the research capacity to deliver decision support about the biophysical properties of coastal and marine environments to promote offshore and near-coastal renewables development with enhanced environmental benefits.

**35. Algal Bioenergy Special Interest Group** (NERC, TSB)

The key goal of this £0.77M network is to understand the opportunities and risks to the quality of freshwater and marine environments of using algal biomass as a source of renewable energy. The network will enable early evaluation of the environmental and economic impact of algal bioenergy through development of a 'sustainability framework' using analogues developed for terrestrial bioenergy deployments. The network will also ensure close engagement with technological developments in this area.

**36. BioMara (Sustainable Fuels from Marine Biomass)** (NERC (SAMS) lead, SG Agency and other non-LWEC partners including EU Framework funding, Universities and Irish and Northern Irish Departments and Institutes)

This €6 million UK and Irish joint project (funded through Interreg IVA, Highlands and Islands Enterprise and the Crown Estates) aims to demonstrate the feasibility and viability of producing third generation biofuels from marine biomass, using both macroalgal (seaweeds) and microalgal (single celled plants) sources as an alternative to agri-fuels production from terrestrial land plants. It focuses on Scotland, Northern Ireland and the border part of Ireland, aiming to provide the region with access to a more economically and environmentally sustainable local renewable fuel source, whilst also helping to service local public transport infrastructure and build on the regions' technology-base.

**37. Sustainable Marine Bioresources** (NERC, Defra and other non-LWEC partners including SEERAD/FRS and AFBI)

This collaborative 5-year programme is a response to the Prime Minister's Strategy Report on the future for UK fishing (2004), which called for Research Councils, universities and government agencies to pool their scientific expertise to help deliver the knowledge and understanding needed to progress the objectives and practice of ecosystem-based fisheries management. Funding includes £1.4M cash with a further £0.9M in kind contributions.

**38. CEH Biodiversity Programme** (NERC, Defra, NE, BBSRC, ESRC and other non-LWEC partners including European Commission, SNH and JNCC)

This programme aims to create a knowledge flow from detecting environmental change and how it interacts with natural processes, then predicting its wider impact on the environment and the likely consequences for sustainability, including assessing risks, and finally integrating these to develop policy relevant solutions to benefit society. Over the 5 years of LWEC (2008-2013) the funding for this programme totals £32.51M.

**39. Biogeochemistry Programme** (NERC, Defra, DECC, EA, SEPA)

This programme, measures, analyses and models biogeochemical cycles and local, regional and global scales. These cycles include the greenhouse gases and important pollutants which interact strongly with themselves and with the global climate system. The programme aims to understand the linkages between the biogeochemical cycles and water and biodiversity and hence quantify possible effects of man's interventions on the cycles and on ecosystem services. Over the 5 years of LWEC (2008-2013) the funding for this programme totals ~£33M.

**40. Ecosystem Services for Poverty Alleviation (ESPA)** (NERC, ESRC, Defra, DFID)

This £40.5M programme will address key environmental vulnerabilities in areas of the world where poverty is worst. The aim is to find ways in which poverty can be reduced by accounting for regional variations in climate, weather patterns and land use without causing or worsening enduring environmental problems.

**41. Biodiversity and Ecosystem Service Sustainability (BESS)** (NERC, Defra, Natural England, Scottish Government)

Whilst we know that there has been significant biodiversity loss in the UK, we have a very limited understanding of its functional consequences in terms of levels of biodiversity we must have in order to provide the ecosystem services we need and how to manage land and resource use to support important biodiversity-ecosystem function relationships in an integrated way. The £13M BESS programme aims to develop this understanding via research on four landscape types: lowland agricultural, wetland, upland and urban.

**Resources Challenge: To promote human well-being, alleviate poverty and minimise waste by ensuring a sustainable supply of water, food and other resources**

**42. Changing Water Cycle Programme** (NERC with other Partner input)

This programme will develop an integrated, quantitative understanding of the changes taking place in the global water cycle, involving all components of the earth system. It will address the urgent needs to understand the changes taking place now; predict changes that will take place over the next few decades; and, through LWEC, work with Partners to build resilience, mitigate problems, and develop adaptive solutions. The EA, Met Office and Defra have all been involved in the development stages of the programme. The current funding figure is £10.1M, which is likely to increase once contributions from other stakeholders are confirmed.

**43. The Waste of the World** (ESRC)

This £3M programme of six linked projects aims to produce a defining social science study of waste, for academics, policy makers and stakeholders. Its overarching aims are to reconceptualise the place of waste and how we think about waste within social science. The programme has three objectives.

- Provide the first investigation of newly emerging global waste economies, focusing particularly on hazardous waste, its trade, management and disposal.
- Offer a radical reconceptualisation of waste within productive activities. Rather than locate waste as the end point of production-consumption, we argue that surplus and loss (and therefore waste) is fundamental to all economic activity.

- Provide the first empirical examination of the disposal rituals surrounding the excess of economies in key parts of the world, within the EU and in India.

**44. Groundwater Science** (BGS (NERC), Defra, EA, SEPA, DFID & other non-LWEC partners)

The ~£6M Groundwater Science programme focuses on providing an improved understanding and characterisation of the fundamental properties of groundwater systems and on investigating/forecasting the impacts of a changing environment (from both a quality (chemical) and quantitative perspective) on groundwater and on other parts of the aquatic and terrestrial environments directly dependent on groundwater, e.g. rivers and wetlands.

**45. Minerals and Waste** (BGS (NERC), DCLG, Defra & other non-LWEC partners)

The drivers for the ~£8M Minerals and Waste theme/programme within the overall BGS Strategy are the need to secure a sustainable supply of minerals and energy, in the face of the twin challenges of population increase and climate change. The research outputs focus on the need to move towards a low carbon economy as set out in the UK Climate Change Act 2008 which sets legally binding emission reduction targets of 34% (by 2020) and 80% (by 2050).

**46. CEH Water Programme** (CEH (NERC), EA, Defra, NE, Met Office, SEPA, DFID, SG)

To support the sustainable use of freshwater resources, this programme contributes to the integrated understanding of air, water, soil, vegetation and human influences upon the hydrological cycle across different scales of spaces and time. It provides monitoring and the management of national and international datasets related to the hydrological cycle to enable the development of water related policies, management methods and tools. Over the 5 years of LWEC (2008-2013) the funding for this programme totals £36.8M.

**47. Insect Pollinators Initiative – IPI** (BBSRC, Defra, NERC, SG)

This initiative (which also includes a significant contribution from the Wellcome Trust) will invest almost £10M in determining the importance of factors that lie behind the declines in pollinators (such as honeybees and bumblebees). Possible causes include disease, chemicals (such as pesticides), habitat change and a range of management practices. The research will aim to identify solutions that will help reverse the declines in this economically important group of organisms.

**48. Challenge-led Competition in Water Security** (TSB, NERC, Defra, EPSRC)

The current water resource situation in the UK remains largely within supply-demand balance. However, this situation is expected to become less secure in the future and, by 2050, a potential significant shortfall in available supply is predicted due to, for example, a changing climate and the demographics of a larger population. The aim of this £4.5m collaborative programme is therefore to develop step-change solutions that address overseas and predicted future UK water security challenges.

**49. Environmental Virtual Observatory** (NERC, with additional in kind contributions from Defra, EA, BBSRC, TSB, Met Office)

The £1.6M Pilot Environmental Virtual Observatory, EVOp, is a proof of concept project to develop new cloud-based applications for accessing, interrogating, modelling and visualising environmental data. By developing local and national scale exemplars, EVO is demonstrating how cloud technologies can make environmental monitoring and decision making more efficient, effective and transparent to the whole community. Initially the focus is on questions related the “Sustainable use of Soils and Water” component of NERC’s portfolio, as this area offers great potential to illustrate the benefits of cloud computing as applied to environmental issues.

**Health Challenge: To understand and protect human health in a changing environment**

**50. Urban Atmospheric Science: Clean Air for London** (NERC, Defra, EA, Met Office)

Poor air quality, particularly in urban areas, has a demonstrable effect on human health, but the processes responsible for producing the main pollutants, namely particulate matter, ozone, nitrogen dioxide and heat are not well understood and are poorly predicted. The aim of this £2.9M NERC-led programme is to provide integrated measurements of the meteorology, composition and particulate loading of London's urban atmosphere.

**51. Environmental and Social Ecology of Human Infectious Diseases Initiative (ESEI) (MRC, NERC, ESRC, BBSRC)**

As identified by the Foresight Detection and Identification of Infectious Diseases (DIID) Project, we need to respond to the threat from new and emerging pathogens so that we are better able to anticipate, prepare for, and control future outbreaks. This ground-breaking £10M MRC-led initiative aims to establish novel inter-disciplinary approaches to studying the ecology of infectious diseases.

**52. Environmental Exposure and Health Initiative (EEHI) (NERC, MRC, DH, ESRC, Defra)**

EEHI is led by NERC and also supported by the MRC, DH, ESRC and Defra. Between £8-10M is available to fund 4-6 large interdisciplinary research programmes for up to 4 years. It will provide important new knowledge on the interconnections and pathways between environmental pollutants and interacting stressors, exposure routes and health effects in humans, including variations in susceptibility and the definition of health risks.

**53. Centre for Environment and Health (MRC, DH/HPA)**

This new £5.4M multi-disciplinary grouping using a mix of more traditional and leading edge techniques is centred around Imperial and Kings Colleges in London. It aims to identify and understand health impacts of a range of environmental changes on the scales that influence management policies and practices.

**54. Detection and Identification of Infectious Agents Innovation Platform (TSB, DH)**

Infectious diseases are a constant threat to the health and wealth of the nation. The research and development that will be funded by the Innovation Platform will be aimed at producing new rapid diagnostic tests and Point of Care (POC) devices for the detection and identification of infectious agents in both humans and animals. The range of diseases and areas chosen were prioritised by government (DH and Defra). This platform (currently £55M) may also potentially involve ESRC, EPSRC, BBSRC, Defra and MRC contributions.

**55. Reducing Uncertainty in Models for Environmental Decision-Making (NERC, Defra)**

NERC, in collaboration with Defra is supporting a scoping study on 'Reducing Uncertainty in Models for Environmental Decision-Making'. With the overall aim of enhancing the performance of environmental models, this £80k study will focus on identifying priority science questions that a future research programme on this topic should seek to address, together with possible funding mechanisms for such a programme.

**56. Increasing Resilience to Natural Hazards (NERC, ESRC)**

This £6.7M interdisciplinary programme aims to build resilience in earthquake-prone and volcanic regions by reducing risks from multiple natural hazards, increasing population resilience to high impact events, particularly as they increase in severity and frequency. A strong interdisciplinary approach to research throughout this programme aims to improve forecasting and uptake of scientific advice and increase understanding of vulnerability and risk.

**57. Ecology of Infectious Diseases (EID) (ESRC, BBSRC, NSF, NIH)**

This international £7.95M US-UK collaborative programme supports the development of predictive models and the discovery of principles governing the transmission dynamics of infectious disease agents, with a strong focus on interdisciplinarity. The funders are particularly keen to receive proposals for studies to better understand animal reservoirs as a source of infectious diseases, how animal pathogens spill-over into human populations, and the spread of

those pathogens through and between communities in the UK or other parts of the world. The aim is to fund research into pathogens that are considered to be a significant threat to public health now or in the future.

**58. Environment and Human Health** (NERC, Defra, EA, MoD, ESRC, MRC, BBSRC, EPSRC, Health Protection Agency, Wellcome Trust)

The aims of this ~£5M joint three-year interdisciplinary capacity-building programme were to:

- develop a community of researchers who can undertake multi- and interdisciplinary work to help understand the links between the natural environment and human health,
- improve our ability to identify and predict emerging issues of potential concern,
- improve the evidence available to support risk assessments and regulation-setting by government departments, agencies, and other stakeholders.

Two successor programmes have been started as a result of this programme, the **Environmental and Social Ecology of Human Infectious Diseases Initiative (ESEI)** and **Environmental Exposure and Health Initiative (EEHI)**, both of which are LWEC accredited.

**59. Understanding the factors controlling urban air pollution** (NCAS (NERC), Defra)

Air pollution has proven negative impacts on human health, ecosystem services, biodiversity and climate. The costs of implementing emission changes however can be significant, hence a sound knowledge base is essential before policy is formulated. This £7.8M p/a (for at least 5 years) collaborative LWEC activity brings together the research programme on Air Quality within the National Centre for Atmospheric Science with relevant components of the research programme of Defra (Atmosphere and Local Environment). It will also link up with another LWEC accredited activity – the Urban Atmospheric Science: Clean Air for London (ClearLo) project.

**Infrastructure Challenge: To make infrastructure, the built environment and transport systems resilient to environmental change, less carbon intensive and more socially acceptable**

**60. Adaptation and Resilience to a Changing Climate - ARCC** (EPSRC, ESRC and Defra, with potential interest from DCLG and other Partners as the programme develops)

ARCC will enable the design of urban systems that are more resilient to climate change. In May 2009 six new projects were funded. In addition a network for £0.4m was supported (operated by UKCIP) which brings together these projects with previously funded other climate change projects to give a programme of 13 projects with total funding in excess of £12M.

**61. Intelligent Transport Systems and Services Innovation Platform** (TSB, DfT, EPSRC)

This £56M platform is designed to, over 7+ years, help UK businesses develop innovative products and services in response to new market opportunities that may result from government interventions in transport. Through a series of strategic interventions, its aim is to encourage private-sector R&D with the potential to improve efficiencies in the overall transport network and/or promote lower-carbon travel choices.

**62. Low Carbon Vehicles Innovation Platform** (TSB, DfT, EPSRC)

This £89M platform aims to maximise the benefit to UK-based businesses of the rapidly-developing low carbon vehicles market, and to help accelerate the adoption of low carbon vehicles in the UK. The platform currently supports two key activities: ‘The Low Carbon Vehicles Integrated Delivery Programme’ and ‘The Ultra Low Carbon Vehicle Demonstration Competition’, both of which also involve key input from RDAs.

**63. Low Impact Buildings Innovation Platform** (TSB, NERC, ESRC, EPSRC, DCLG)

The UK cannot meet its declared environmental targets without dramatically improving the life-cycle environmental cost of buildings. This £53M platform aims to help the UK construction

industry deliver buildings with a much lower environmental impact, responding to growing demand from customers and regulators.

**64. Biofuels Executive Research Board (DfT, Defra, DECC)**

The biofuels executive research board brings together Chief Scientific Advisors from across Government and so provide a forum through which to monitor and manage research into biofuels and facilitate successful engagement with experts outside UK government. The three sponsoring Departments are expected to contribute £2million pa to biofuels research.

**65. Land Based Renewables (NERC, NE plus Shell UK)**

By 2020, the proposed EU requirement is that the UK meets 15% of its final energy demand from renewable sources, which equates to around 40% for electricity. There is an urgent research need to understand the environmental implications of this requirement, as the recent controversy over biofuels shows. Up to £2.4 million has been invested to date in support of collaborative grants to address this topic, including a financial contribution from Shell UK of £350k. Natural England is contributing support in kind to the research programme which has included expertise helping define the scope.

**66. Science and Heritage Programme (AHRC, EPSRC)**

This £8M programme takes forward recommendations made by the House of Lords Science and Technology Select Committee report on science and heritage of November 2006 which concluded that there was a compelling need for a comprehensive national strategy for heritage science which covered both immovable and moveable heritage. The joint five year research programme has a dual purpose: it will provide funding opportunities for high quality research to increase our understanding, and improve the resilience of cultural heritage in the face of 21st century environmental change. It will also develop the heritage science community by funding networks and other awareness-raising and capacity building activities.

**Societal Challenge: To understand the role of government, business and society in enabling all to live with environmental change**

**67. Social and Environmental Economic Research (SEER) into Multi-Objective Land Use Decision Making (ESRC, Defra)**

This deliberately ambitious £1.8M research project examines arguably the most fundamental of all resource problems: the optimal use of land. It seeks to assess this using a novel methodology intended to undertake simultaneous economic assessment of both (a) the primary effects of policy, market or environmental change upon land use and (b) the second round, dynamic consequences of that change which may in turn generate multiple feedback effects upon various other environments.

**68. Adapting Rural Living and Land Use to Environmental Change (Relu Phase IV) (ESRC, NERC, BBSRC, Defra, SG)**

The RELU Programme is to fund (£1.2M) projects under a fourth call on the above theme, co-designed with LWEC. The projects will tackle two objectives. First: to build networks and capacity for creative knowledge exchange with a view to strengthening adaptive capacities. Second: to explore and promote novel approaches and partnerships for interdisciplinary research and analysis on living with environmental change in rural contexts.

**69. ESRC Climate Change Leadership Fellowships (ESRC)**

These six leadership fellows, involving a total of £2M funding, propose innovative approaches and application of leading edge social science to addressing key research issues in mitigating and/or adapting to climate change. Other LWEC Partners have been involved in the peer review of the applications, and will be working with the fellows as their work evolves and findings are disseminated.

#### **70. Flood, Vulnerability and Urban Resilience Study (ESRC, EPSRC, \*EA\*)**

This £0.22M research used diaries, interviews and group discussions to follow the recovery experiences of people across Hull after the floods of June 2007 which affected over 8,600 households across the city. It had the following objectives:

- To identify and document key dimensions of the longer term experience of flood impact and flood recovery, including health, economic and social aspects.
- To examine how resilience and vulnerability were manifest in the interaction between everyday strategies of adaptation during the flood recovery process, and modes of institutional support and the management of infrastructure and the built environment.
- To explore to what extent the recovery process entailed the development of new forms of resilience and to identify the implications for developing local level resilience for flood recovery in the future.
- To develop an archive that will be accessible for future research into other aspects of flood recovery.

#### **71. Resilient development in social science ecological systems (ESRC)**

Research under this £0.25M fellowship will develop a deeper and broader social science understanding of resilience and how the concept is applied to linked social ecological systems. It will do this by drawing on theory across a range of social science disciplines, synthesising recent research findings, and undertaking new empirical investigation of resilience. It will produce a book provisionally titled 'Towards Resilient Development' and a series of scientific papers targeted to social science and interdisciplinary journals.

#### **72. Centre for Business Relationships Accountability, Sustainability and Society (BRASS) (ESRC)**

BRASS is a ~£5.2M joint venture between Cardiff University's School of City and Regional Planning, Business School, and Law School. It pursues high quality, interdisciplinary social science research and engagement with research users, to create knowledge and tools that will promote more sustainable stakeholder relationships amongst and within businesses, society and the environment. Environmental change is a common theme across BRASS projects, either as an influence of businesses, communities, organisations and consumers and their behaviour, or as a consequence of the activities of businesses and their stakeholders within our production and consumption systems.

#### **73. Low Carbon Communities Challenge (DECC, Defra, DCLG, WG)**

The £10.9M LCCC is an innovative approach to policy development being taken forward by DECC, working alongside a number of government departments.

Recognising that Government doesn't necessarily know the best means of helping people cut their carbon emissions, the LCCC is a two-year research programme designed to test delivery options through practical delivery on the ground at community level. Through the project, Government is providing up to £500,000 to 22 test communities in England, Wales and Northern Ireland. Its aim is to support both technical innovation and understand the social changes that are needed to help meet carbon reduction targets.

#### **74. Sustainable Practices Research Group (SPRG) (ESRC, Defra, SG)**

The essence of this £1.6M programme of work is to enhance the social scientific understanding of habitual behaviour in areas of everyday consumption with consequences for environmental sustainability.

The Sustainable Practices Research Group (SPRG) will put particular emphasis on better understanding consumption - on the grounds that changing personal behaviour of billions of individuals provides the greatest of challenges to the achievement of sustainability. The Programme involves seven work packages which will deliver a multi-level analysis of three environmentally-sensitive practices - eating, water-use and sheltering.

**75. Sustainable Lifestyles Research Group (SLRG) (ESRC, Defra, SG)**

This £1.76M Group aims to achieve new and relevant understandings of the processes which lead to changes in people's behaviours and practices and to provide advice on realistic strategies to encourage more sustainable lifestyles. It will be coordinated through the University of Surrey under the direction of Professor Tim Jackson. Other key partners included the University of Bath, the University of Sussex and the institute of Fiscal studies.

**76. Landscape and Environment Programme (AHRC)**

The ~£6.6M Landscape and Environment Programme was created to support research from an arts and humanities perspective on issues related to landscape and environment. The core challenge for this programme was to advance knowledge, critically and creatively, of the cultural forms and processes shaping, and shaped by, landscape and environment.