

Next Generation Science for Planet Earth

Delivering the benefits of environmental research



Next Generation Science for Planet Earth

The Natural Environment Research Council's strategy *Next Generation Science for Planet Earth* confronts the unprecedented environmental challenges and opportunities facing society. This leaflet illustrates how environmental science delivers a productive economy, a healthy society and a sustainable world.

Now is a critical time for planet Earth. Rapid economic and population growth are putting increasing pressure on natural resources such as food, water and energy. Human activities are causing large-scale environmental change that is affecting climate, land use and biodiversity.



Our natural environment provides us with a variety of benefits collectively known as 'ecosystem services'. Examples include clean air and water, regulation of flood and disease, plus cultural and recreational benefits.

We depend on our ability to exploit these beneficial services to develop new markets and jobs. For example capturing carbon dioxide from power stations and storing it in porous rocks under the North Sea could be worth more than £2 billion a year to the UK economy by 2030, sustaining at least 30,000 jobs.

Government investment in environmental sciences through NERC enables the UK to:

- Lead the G8 countries in environmental research excellence and skills
- Lead international policy in key sectors such as climate and energy
- Provide competitive advantage in new low-carbon-markets
- Attract private and foreign investment to generate economic growth.



NERC's Strategic Goal

To deliver world-leading environmental research at the frontiers of knowledge:

- Enabling society to respond urgently to global climate change and the increasing pressures on natural resources
- Contributing to UK leadership in predicting the regional and local impacts of environmental change from days to decades
- Creating and supporting vibrant, integrated research communities.



Strategic science themes

Biodiversity

Biodiversity provides us with many benefits, or ecosystem services, including food, fuel, clean water, climate regulation, protection from natural hazards, breakdown of waste, and aesthetic enjoyment. Biodiversity is being lost at an unprecedented rate through human activities. This theme will help us understand and protect the richness of life on earth and the benefits it gives us.



Earth system sciences

Planet Earth is a complex system. We need to know more about its component parts and how the Earth's biogeochemistry – its biological, geological and chemical processes – regulates our ability to live on the planet. This theme looks at how the Earth works today, how past changes in one part of its system have caused changes elsewhere, and how we can predict the nature of these relationships in the future.



Sustainable use of natural resources

Our use of natural resources such as water, soils and minerals is already creating challenges for water, energy and food security. These challenges will grow in the face of increasing world population and changes in climate and land use. This theme will help us understand how we can maintain productive economies and improve quality of life while living within the Earth's environmental limits.

Environment, pollution and human health

Changing environment affects the cause and spread of many human diseases. NERC science provides new approaches to predicting the behaviour of pathogens and pollutants and seeks solutions to health issues such as the spread of communicable disease, drinking-water contamination and air pollution.

Natural hazards

Since 1990 more than 1 million people have died in natural disasters and over \$1 trillion of economic losses have been reported. NERC plays a central role in the science of forecasting and mitigating the effect of natural hazards, such as earthquakes, volcanoes, flooding, storms, tsunamis, coastal erosion and landslides. Scientific advances will lead to tangible economic and humanitarian benefits.



Climate systems

NERC will play a leading role in collaborating with the Met Office to develop predictions and risk-based assessments for the future state of our climate, on regional and local scales, spanning days to decades. These predictions will underpin policy and practical strategies for adapting to and mitigating the effects of climate change.

Technologies

Technology plays an essential role in finding solutions to this century's most pressing environmental challenges. New technologies will be used to observe and monitor the environment, to predict change, to develop solutions, and to exploit new opportunities such as carbon capture and storage.

NERC science delivering impact

Productive Economy

Boosting the UK reinsurance industry

New developments in environmental data and risk models, from space weather to flooding, are worth up to £130 million pa in smarter risk management.

Creating new low-carbon industries

Scientific advice to Government on the capacity and regulatory framework for carbon dioxide storage in the North Sea that could be worth £2-4 billion pa to the UK by 2030, sustaining 30,000 to 60,000 jobs.

Creating new companies

A spin-out company MTEM developed by a PhD researcher was sold for \$275m to Petroleum Geo-Services.

Protecting lives and business from flooding

Predicting coastal storm surges, surface flooding and underground water protects lives (£31 billion pa in London), property and business (£4 billion pa in London, £46 million in Oxford) and reduces flood management costs (£34 million in England).

Protecting house buyers

Subsidence data provided to developers, planning authorities and house-buyers benefits the UK economy by £70-270 million to 2030.

Healthy Society

Responding to emergencies – volcanic ash

NERC research aircraft, satellite instruments and radar provided vital information on the Eyjafjallajökull volcanic ash cloud for the Met Office, Civil Aviation Authority and Government to get planes flying safely again.

Responding to emergencies – earthquakes

Within 24 hours of the Haiti earthquake NERC researchers provided rescue and relief agencies with detailed assessments of damage, safe areas and water resources.

Rebuilding countries

Supported by the World Bank, NERC research has helped to rebuild devastated public services and economies in Mozambique, Afghanistan and other countries.

Reducing sulphur emissions

For the last four decades, NERC research has informed Government policy to lower sulphur emissions, leading to significant reductions in hospital admissions and premature deaths from the effects of pollution.

Sustainable World

Informing UK and international policy

Independent scientific advice informs DECC and the UN Inter-governmental Panel on Climate Change (IPCC) on climate projections and impacts.

Protecting the marine environment

Scientific advice informed the Government's new UK Marine Science Strategy and legislation for the sustainable management of natural resources in our seas.

Sustaining beneficial environmental services

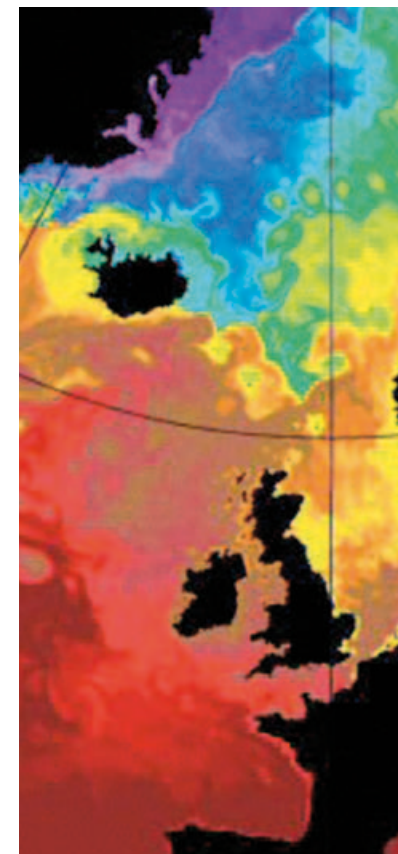
New research enables us to value and manage biodiversity for the secure and sustainable supply of environmental services such as clean air, water, energy and food.

Identifying renewable energy sources

Tidal energy from the Solway and Morecambe estuaries could supply 5-6% of UK demand, about half of the north-west's energy needs.

Monitoring the environment

The state of the UK environment is monitored using satellites and site surveys to inform Defra and the Environment Agency on environmental protection policy, legislation and compliance.



Investing in Excellence with Impact

NERC invests £400m pa on science research and training in UK universities and research centres.

NERC supports the training of 1500 post-graduate environmental scientists each year.

NERC research and training is used by industry, policy-makers and society.

The UK leads the G8 nations for the excellence of environmental science as measured by citations impact.

The Nobel Peace Prize was awarded to the UN Inter-governmental Panel on Climate Change (IPCC) which included many NERC researchers.

NERC is a lead partner in the £1bn cross-government Living with Environmental Change (LWEC) programme.



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