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# Environmental science for a better world

Our five-year strategy to 2030

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UK Centre for  
Ecology & Hydrology



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## Foreword

The world is facing unprecedented environmental, societal, and economic challenges, from climate change and biodiversity loss to food security and pollution. These issues are growing and threaten human health and economic stability, demanding urgent and sustained action.

The UK Centre for Ecology & Hydrology (UKCEH) is a recognised authority in environmental research, trusted for our expertise across the land we use, the air we breathe, and the water we drink. Since our last strategy, we have expanded our capabilities and partnerships, delivering the knowledge, data, and solutions that governments, businesses, and researchers need to tackle the great challenges of our time.

UKCEH's new five-year strategy, **Environmental Science for a Better World**, presents our ambition for the future. It outlines our commitment to meeting the increasing demand for our expertise and further enhancing our impact.

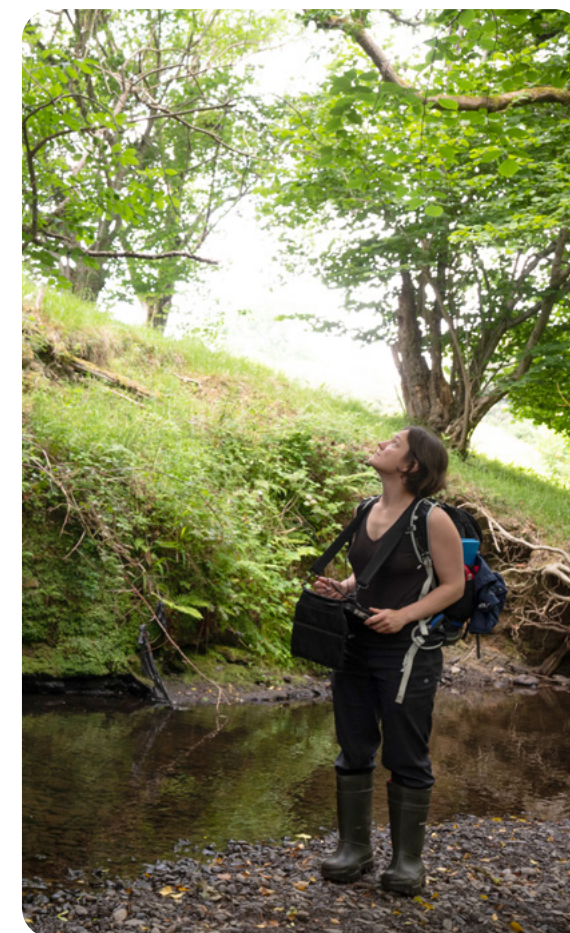
Over the next five years, we will:

- Deliver excellent research to advance the frontiers of knowledge across land, water, and air systems.
- Inspire collaboration with the research community to use our infrastructure, data, and skills – boosting UK research and driving scientific advancement.
- Strengthen our role as a trusted provider of high-quality evidence and impartial advice to governments domestically and internationally.
- Partner with businesses and NGOs to benefit nature, people, and the economy.
- Combat misinformation with independent environmental research that is clear and robust.

Our work is only possible because of our expert and dedicated people. We will continue to empower them, ensuring they have the skills they need to make a positive difference.

Environmental challenges cannot be tackled in isolation. Our partnerships span borders, sectors and disciplines, benefiting all involved. Together, we can deliver the science needed to address these complex issues – enhancing the environment, boosting growth, and improving people's lives.

**We look forward to working with you to make the world a better place.**





# Our view of the future



**Environmental challenges will intensify, causing more frequent disruptions to daily life.** There will be a pressing need for robust, cross-disciplinary research to help governments, businesses, NGOs, and the public respond effectively.



**Public sector science funding will face both opportunities and challenges.** UK research will continue to underpin economic growth and compete internationally. Public policy will emphasise investment in environmental science.



**Policy approaches to environmental issues will vary across the world, but recognition of environmental risks will grow.** As governments balance competing priorities, shifts in environmental policy and funding are likely.



**Businesses will increasingly wish to act more sustainably and take a long-term view.** There is a growing desire from businesses to protect their future. They will take advantage of new opportunities in the green economy. This will create openings for us to partner with them to drive research and impact.



**Public debates around environmental issues will polarise, and addressing misinformation will be critical.** While many people will become more concerned about environmental issues, others may focus on affordability and security. The links between these differing priorities will need to be clear.



**Technological advances will offer greater insights into environmental issues.** Advances such as AI, sensors, Earth Observation (EO), and digital infrastructure will create both opportunities and competition.



**Our future workforce will change, driven by demographics, technology, and evolving career aspirations.** We will need to equip our people with new skills to meet the demands of the future.





# Our new strategy



## Our ambition

To make the world a better place through science addressing climate change, promoting biodiversity, and creating sustainable ecosystems.



## Our purpose

To advance the vital environmental science that governments, businesses, NGOs, and researchers rely on to meet the great challenges of our time.



## Our history

For over 60 years, UKCEH and its predecessor institutes have been at the forefront of monitoring and modelling environmental change. The long-term environmental data hosted by UKCEH inform policymaking, enable new discoveries, and drive research and innovation.



## Our role

We research land, water, and air systems across different geographies and timescales. Our cross-disciplinary teams of experts make new discoveries, inform decision-making, and empower the research community. We deliver vital evidence, driving societal, economic, and scientific benefits.



Photo credit: Dr Adi Jaya from the University of Palangka Raya



## Working in partnership

No single organisation or sector can tackle these challenges alone. We build the right partnerships, teams, and approaches to tackle increasingly complex issues.

### Researchers

We support the research community by providing access to our infrastructure, data, and expertise. We play a key role in training the next generation of environmental scientists, and in cultivating the cross-disciplinary collaborations that are essential to driving scientific advancement.

### Research institutes

We work with other national institutes to deepen understanding of the entire earth system, inspiring innovation, and informing government and business decisions.

### Governments and NGOs

We will expand our role as an independent and trusted provider of research of the highest quality and rigour across governments and NGOs. Our evidence underpins national and international policy, strengthens regulation, builds resilience, and supports green growth.

### Businesses

We partner with the private sector, collaborating to develop new commercial opportunities to tackle environmental challenges, spur growth, and improve people's lives.

### Citizens

We foster outstanding public engagement across our research portfolio, with a focus on citizen science, community engagement, and public dialogue. We provide a trusted, evidence-based public voice on environmental issues.



## Custodians of national capability

As an independent research institute funded by UKRI-NERC, UKCEH delivers impartial environmental science to benefit the UK research community, governments, businesses, and society.

Our large-scale research infrastructures and national capability programmes generate high-quality scientific evidence, enabling and inspiring the academic community, and putting the environment at the heart of critical policy and business decisions.

On behalf of the nation, we continually develop and operate this infrastructure, creating opportunities for collaboration and innovation. We generate, curate, and open up long-term environmental data collections for use by academia, the public, private and third sectors to advance scientific knowledge.

Our cutting-edge science also supports rapid responses to national crises and meets national needs.

[Read about our National Role](#)

National



### HOW WE WORK

#### Governments and NGOs

We operate large-scale monitoring and observation networks, essential for measuring environmental change over time.

#### Research facilities

Our facilities and experimental platforms enable research into the drivers of environmental change and the effects of interventions.

#### Data science and modelling

We forecast changes in the environment using mathematical modelling. Our models contribute to forecasting floods and droughts, predicting and mitigating the impacts of climate change, and guiding policy decisions for nature recovery, for example.

[Read about our science infrastructure](#)

Science



# Our core principles

Our core principles combine scientific excellence, innovation and collaboration, with a relentless focus on impact and sustainability. We put nature and people at the heart of everything we do. These principles guide our priorities and decisions, so we can achieve our ambition.

## Excellent and inspiring research

We use expertise, knowledge, and infrastructure to unlock insights and discovery.

### Key Goals

- Conduct world-leading research that advances global understanding of the environment.
- Expand and deepen partnerships across domains, disciplines, and sectors.
- Develop and provide cutting-edge technologies, research infrastructure, and facilities.

## Sustainability and resilience

We lead by example, ensuring our work is both financially sustainable and environmentally responsible, while adapting to a rapidly changing world.

### Key Goals

- Secure diverse funding sources and guarantee our financial sustainability.
- Lead by example in adopting sustainable practices to minimise our environmental footprint.
- Build and protect our reputation with a range of audiences.

## Research with impact

Our research and innovations deliver real-world solutions that benefit nature and people.

### Key Goals

- Extend our partnerships with governments, businesses, and NGOs to provide the evidence they rely on to make informed decisions.
- Expand the reach of our expertise, evidence, and partnerships to shape future environmental research agendas.
- Provide an informed, trusted, evidence-led public voice on the environment.

## Outstanding people and culture

Our culture is trusting, respectful and inclusive, enabling diverse talents to thrive.

### Key Goals

- Embed a positive research culture to enable our people and research to thrive.
- Live our values of teamwork, integrity, and excellence.
- Approach our relationships professionally, ethically, and commercially.

# Our people and culture

Our people are at the core of our success. We take pride in our inclusive and welcoming environment and will continue to strengthen the characteristics that make UKCEH a great place to work.



## Our values

### EXCELLENCE



We promote excellence in everything we do, empowering our people to push the boundaries of environmental science, and undertake research of the highest quality and rigour.

### INTEGRITY



Integrity is central to our reputation and success. We uphold the highest standards in our research, how we apply our research, and our communications, ensuring honesty, impartiality, and responsible ethical behaviour.

### TEAMWORK



We value and celebrate the diverse contributions of our team. Through openness, mutual respect, and shared goals, we create a culture where everyone can thrive. Together, we are greater than the sum of our parts.

[Read about our commitment to environmental sustainability](#)

[Environmental sustainability](#) ↓

[Read our commitment to equality, equity, diversity and inclusion](#)

[Equality, equity, diversity and inclusion](#) ↓





# Our research priorities

Our strategy focuses on three interconnected environmental challenges which are crucial for a sustainable future.



**Building resilience in a changing climate**



**Enhancing ecosystem and human health**



**Restoring biodiversity for a sustainable future**



## Building resilience in a changing climate

### The challenge

Climate change is a major threat to our planet, affecting the environment, people, and economies. Its effects are far-reaching, from rising global temperatures to extreme weather events and damaged ecosystems.

### Our role

UKCEH's research enhances climate security, delivering the critical knowledge and tools needed to understand, predict, mitigate, and adapt to the impacts of climate change.

We study the complex interactions between land, water, and air across different geographies and timescales. Our insights improve climate predictions, build resilience to extreme events, and shape land use strategies for climate mitigation.

### OUR GOALS

1

Deepen understanding of how climate change will affect the environment and ecosystems in coming years.

2

Enhance our capability to monitor national-scale environmental change over time, identifying trends, tipping points, and assessing the effectiveness of interventions.

3

Evolve our modelling capability to better predict extreme events and environmental conditions.

4

Transform understanding of floods and droughts, and their effects on nature, communities, and livelihoods.

5

Discover new ways to reduce and remove greenhouse gas emissions, providing insights to inform, track, and verify the effectiveness of mitigation efforts.



**THE IMPACT WE WILL HAVE:** We will empower our partners to take meaningful action to tackle the climate crisis, informing adaptation strategies and interventions that maximise resilience, promote sustainable land use, accelerate the journey to net zero, and protect communities from floods, droughts and water scarcity.

Read how Hydro-JULES is informing a new generation of hydrological models

The Hydro-JULES





## Enhancing ecosystem and human health

### The challenge

Human activities cause pollution, habitat destruction, and overuse of natural resources, harming ecosystems, human health, and the economy. These ecosystems provide essential services like clean air, fresh water, fertile soil, and a home for wildlife. Protecting and restoring them is vital.

### Our role

We study how pollutants, nutrients, and pathogens move through the environment and affect ecosystems. By using monitoring, modelling and process studies, we track their impacts, and inform safe and sustainable solutions for the future. Our research ranges from understanding threats to assessing the consequences for ecosystems and human health.

### OUR GOALS

1

Develop whole-system approaches to help us understand how different environments respond to the combined pressures of pollution, climate change, and land use changes.

2

Generate insights and inform interventions to reduce the impact of pollution on ecosystems and human health.

3

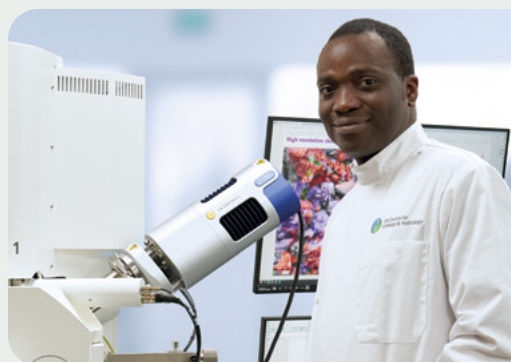
Develop integrated environmental strategies that consider the multiple impacts of nitrogen, phosphorus, and other nutrient cycles.

4

Scrutinise new technologies, including those used to reach net zero, ensuring they are sustainable and fair for everyone globally.

5

Design new approaches to restore or repurpose damaged and polluted landscapes so they are resilient for the future.



**THE IMPACT WE WILL HAVE:** Our work will inform effective strategies, regulations and policies to mitigate risks, support adaptation, and safeguard nature and people. Our research will strengthen food and water security, combat invasive species and disease, and inform solutions for healthy environments and people.



Read our rapid study of the Kakhovka Dam Breach

[The Kakhovka Dam Breach](#) ↓

Read our case study on Establishing Sustainable Nitrogen Management

[Sustainable nitrogen management](#) ↓



## Restoring biodiversity for a sustainable future

### The challenge

Biodiversity loss is happening faster than ever and presents major challenges for the environment, people, and economies worldwide. The rich variety of life on Earth provides essential benefits that are threatened by this decline. Preserving and restoring biodiversity is crucial to ensuring a sustainable future.

### Our role

Our research examines the state of biodiversity in the UK and around the world. We explore the role of biodiversity in ecosystem functioning and providing services that are vital to maintaining a healthy environment including pollination, climate regulation, flood protection, soil fertility, food production, and the benefits people get from being in nature. Using a whole-systems approach, we shape sustainable solutions for restoring nature, tackling habitat loss, pollution, climate change, and invasive species. From our decades of research, we have unparalleled insights into how to restore biodiversity across land, lakes, rivers, and coastal areas.

### OUR GOALS

1

Enhance understanding of the pivotal role that biodiversity plays in providing benefits for people, guiding better decision-making.

2

Integrate citizen science, professional surveys, and new technologies to monitor biodiversity, spot trends, and identify tipping points.

3

Work with partners to develop innovative methods for continuously monitoring biodiversity at sensitive sites across the globe.

4

Create new insights into the causes of biodiversity loss, helping to shape interventions and inform scenario planning.

5

Scale up our research and monitoring capabilities to landscape scale, accelerating the pace of new discoveries, and delivering solutions to conserve and restore biodiversity.



**THE IMPACT WE WILL HAVE:** We will inform strategies that balance sustainable development with effective conservation, supporting efforts to ensure food security, mitigate the biodiversity crisis, restore nature, and build sustainable and resilient ecosystems.



Read our case study on preventing biodiversity loss and economic damage caused by invasive non-native species

[Non-native invasive](#) ↓





# Our strategic pillars

The key pillars of our strategy underpin our efforts to create meaningful change in the world.



## Pioneering partnerships and innovation

The challenges society faces require insight, advice, and innovative solutions. To ensure research can meet these challenges our work has a strong focus on impact. We engage with partners to inspire and galvanise excellent and novel research, and embed innovation.

### OUR GOALS

- 1 Deliver scientifically robust, cross-disciplinary solutions to environmental challenges by partnering with public, private and third sector organisations.
- 2 Work with governments and NGOs to translate research into solutions for environmental sustainability challenges at any scale.
- 3 Collaborate with the private sector and other research organisations to generate commercial solutions to environmental challenges.
- 4 Establish a vibrant ecosystem of startups, spinouts, and social enterprises that will contribute to the green economy and sustainable development.
- 5 Engage members of the public with our research, building on our strengths in citizen science, community engagement, and public dialogue.







## Transforming infrastructure for environmental research

On behalf of the UK, we provide critical national capability and infrastructure across land, water, and air systems. Our integrated infrastructure includes long-term monitoring networks, field-based experimental platforms, and advanced laboratories. We measure the changing environment over decades and generate a baseline for evaluating the impact of interventions on the state of the environment.



Our integrated infrastructure amplifies collaboration and empowers academia to make new scientific discoveries. Our infrastructure is flexible and responsive, enabling us to adapt to new science priorities and changing environments. We provide the blueprint for the research community to measure the environment and enhance our understanding of environmental change and climate extremes.

[Read more to find out about FDRI](#)

FDRI



### OUR GOALS

- 1 Integrate and co-locate sensors and field sites to generate new research opportunities and insights.
- 2 Drive innovation in the development and use of new technologies to enhance our monitoring and research infrastructure.
- 3 Pioneer an integrated approach to environmental monitoring by creating interconnected networks of observations.
- 4 Build a flexible, national-scale research infrastructure that can respond to evolving science priorities and policy needs.
- 5 Convene our partners to create a roadmap for sustainable infrastructure that will guide future investment towards common science and policy goals.



## Harnessing environmental data and digital technologies

The new era of environmental science is characterised by an unprecedented volume of data and the ability to develop and deploy it for public good. We now have the computational capacity and digital technologies to uncover novel insights and profoundly influence our response to environmental change.



Part of an art-science installation for innovative public engagement with environmental data science, displayed at UKRI STFC Rutherford Appleton Laboratory, the UK's data analysis facility for environmental science.

Photo credit © Ewelina Ruminska.

### OUR GOALS

- 1 Develop digital innovations across land, water, and air to support a whole-systems approach to understanding the environment.
- 2 Harness new ways to capture, store, process, and communicate data, including the use of AI and state-of-the-art digital platforms, to advance environmental research.
- 3 Enable seamless discovery, access, use, and reuse of environmental data by ensuring it is FAIR (Findable, Accessible, Interoperable, Reusable).
- 4 As part of the NERC Environmental Data Service, collaborate with our partners to create data standards to enhance interoperability and insight.
- 5 Use digital developments to advance environmental modelling, creating new insights into our changing environment.

[Read our UKECH Digital Strategy 2024-2030](#)

Digital







## Expanding our international reach

Addressing global environmental challenges requires international collaboration. We lead efforts to tackle these challenges through our work with United Nations agencies and programmes, like the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), the United Nations Environment Programme (UNEP), the United Nations Educational, Scientific and Cultural Organization (UNESCO), and the World Meteorological Organization (WMO).

By strengthening our international partnerships and overseas presence, we will contribute to the UK's global science leadership and support sustainable development around the world.

### OUR GOALS

- 1 Establish lasting equitable partnerships around the world to produce impactful, relevant research.
- 2 Expand our leading role in international initiatives that shape the global environmental research agenda.
- 3 Work together to develop tailored evidence and tools to underpin international development, and build capability.
- 4 Contribute to the UK's international science ambitions by leading and contributing to global environmental projects on behalf of the UK.



Photo credit: Françoise Guichard, Laurent Kergoat, CNRS







**WORK WITH US TO MAKE THE WORLD A BETTER PLACE.**

Over the next five years, we will work towards delivering our strategy and realising our ambitions to achieve meaningful change. With your help, we can tackle environmental challenges, improve lives, boost growth, create exciting scientific insights, unlock innovation solutions, and pave the way for a sustainable future. We look forward to hearing from you!

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