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Cover image: Sita Magnuson of The Value Web
UNDERSTANDING CHANGE, INFLUENCING CHANGE

The Environmental Change Institute has 22 years of experience in helping governments, business and communities anticipate and respond to the risks and opportunities of environmental change.

We do this through advanced measurement, analysis and simulation of environmental change and the drivers affecting it.

We operate at global, national and local scales, working in partnership with people who can make a difference.

We train the next generation of environmental leaders with the knowledge and critical thinking to do the same.

THE RESULT?

Better informed decision-making by our partners and world-class advances in the science of environmental change today and in the generations that will follow.
The planet faces a convergent and interacting combination of challenges in energy, water and food security, coupled with ecosystem degradation and climate change. Professor Jim Hall offers his perspectives on ECI’s 22 years at the nexus of these issues.

The ECI pioneers a distinctive programme that spans an intellectual continuum from scientific enquiry into the processes of environmental change, to the analysis of sustainable solutions and the promotion of change for the better through Masters and Doctoral education and through partnership with government, business and civil society.

ECI is a remarkable entity which has grown, matured and strengthened over the years since it was founded in 1991. It is characterised highly motivated individuals, a strong sense of identity, excellent research programmes and a network of alumni who are providing the global environmental leadership that is so urgently needed. I’m constantly impressed by the quality of people who we recruit to our educational programmes and research teams, and by our research fellows and scientific leaders who are facilitating those teams. ECI brings together natural and social scientists and engineers, but for the most part my colleagues have left their disciplinary roots far behind them, adapting their outlook.
and methods to address challenges that span disciplines and scales. At ECI we are instinctive integrators who can’t resist grasping the interdependencies between the various dimensions of global environmental change.

ECI’s interdisciplinary approach is inspired by the needs of decision-makers who are striving to respond to global environmental change. Undeniably, our science is telling us that in many respects the prospects for global environmental change are profoundly challenging, often even bleak. Yet our approach is solutions-orientated, seeking to shape responses and carve out opportunities in the space between the necessary and the possible. Engaging seriously with the challenge confronted by decision-makers is a constant stimulus for innovation in our research, education and engagement. By working as a trusted and reliable partner we have been able to maximise the impact of our work and become recognised for our reach and influence.

We can do nothing alone, and partnership-working is central to our mission and structure. ECI is located at the heart of the University’s Science Area, which is an ideal base from which to act as an integrator of disciplines, issues, people, sectors and approaches.

Thus, within the University of Oxford, ECI is striving to cultivate, contribute to and, where appropriate, coordinate networks of purposeful interdisciplinary environmental research, working together in a diverse and rapidly evolving web of collaborations with like-minded intellects from across Oxford. Meanwhile, on a world stage we are leading, coordinating and contributing to global sustainability initiatives.

As befits an Institute with ‘change’ in its title, we ourselves are in a constant state of flux as we adapt to a changing world, never ceasing to learn about the environment we inhabit and constantly growing our network of partnerships and influence. Thus the snapshot presented in this publication is an ephemeral impression of ECI, but the principles and results of our purposeful environmental research and education are enduring.
ABOUT US

ECI is a centre of research excellence and intellectual innovation with two decades of experience leading agendas in environmental change science.

350 PARTNERS
60 RESEARCHERS
60 GRADUATE STUDENTS
40 COUNTRIES

We have expert teams in:
- biodiversity and climate adaptation;
- climate impacts and adaptation;
- ecosystem dynamics and ecosystem services;
- energy demand management;
- food security;
- sustainable infrastructure systems;
- tropical forests and carbon dynamics;
- water security.

We ADVANCE understanding of the processes and implications of change in coupled human and natural systems.

We DEVELOP and analyse potential economic and social responses, policies and management practices of relevance to governments, business and communities.

We LEAD and engage in large national and international consortia with research and stakeholder partners.

We TRAIN international graduate students in strategic environmental leadership, management and decision-making.

We COMMIT significant resources to active engagement with a wide range of key audiences, including dissemination of our research insights.

INTERDISCIPLINARY IN OUTLOOK AND APPROACH

45,000 citations BETWEEN 2000 & 2014

4.7 MILLION TOTAL INCOME 2012/13
3.6 MILLION RESEARCH FUNDS
Postgraduate education
Our alumni go on to achieve influential and varied careers. We were delighted that the Queen’s Award for Enterprise in Sustainable Development was awarded to ClimateCare - founded by ECM Alumnus Mike Mason - in 2014 for outstanding contributions to poverty alleviation and tackling climate change.

Pursuing academic excellence
A recent front cover article in Nature on drought sensitivity of the Amazonian carbon balance included two ECI authors. In the first quarter of 2014 we have published over 50 peer-reviewed academic papers and are on target to have our most prosperous year in terms of academic outputs.

Sustainability Internship Programme
In April 2014 we launched a new Sustainability Internship Programme for a group of ambitious Oxford University interns. The programme - linked with the Oxford University Internship Office - offers intensive sustainability training by ECI, followed by placements in corporations such as GSK, Coca Cola, Nestle and Unilever.

Contributing to global understanding
Our academics have played key roles in the new IPCC Global Assessment reports. We have lead authors in all three working groups, which cover the science, impacts/adaptation and mitigation aspects.

Linking with policy and practice
UKCIP has been awarded £1.2million to continue running the ARCC Adaptation and Resilience in the Context of Change network. The network brings together stakeholders and researchers to share knowledge and inform policy.

Social media presence
We have a growing and active online social presence through our website, twitter, facebook, linkedin and the use of videos. We now have over 2400 twitter followers.

Influential appointments
Jim Hall is a member of the Adaptation part of the UK Climate Change Committee, giving independent evidence-based advice to the Government and Parliament. He has appeared in the media talking about adaptation options in relation to recent flooding in the UK.

Sharing knowledge
In March 2014 we held an international conference on Megafauna and Ecosystem Function. The conference looked at the possible causes of the large scale extinctions and discussed the potential and ethics of rewilding.

Leading major new consortia
In 2013/14 we begin two new major multi-million funded consortia: EU-funded IMPRESSIONS will examine the impacts and risks of extreme climate change and RCUK-funded MARIUS will look at droughts and water security in the UK.
TRAINING ENVIRONMENTAL LEADERS

Our Environmental Change and Management MSc course is one of the most successful programmes in environmental science and leadership in the world.

ECI’s Master of Science (MSc) in Environmental Change and Management is a unique interdisciplinary post-graduate course that responds to perhaps the most compelling issue of our times: how do we adapt sustainably to the major environmental challenges we face? Our highly popular and rigorous programme is renowned for the quality, depth and integrative breadth of training it provides to a select international cohort of aspiring environmental leaders seeking to address this issue.

Since 1994 we have trained more than 600 environmental professionals in business, government, non-governmental organisations and academia. Each year we select an elite group of 25 outstanding students from around the world with backgrounds in physical, natural, and social sciences and humanities, to pursue this intensive one-year course. The course aims to improve understanding of, and responses to, environmental change through interdisciplinary education.

We strive not only to teach students to grasp the interdependencies between key issues and challenges relating to climate change, sustainable energy, ecosystem science and conservation, but also provide them with the tools to deliver integrated solutions to society’s most pressing environmental management problems. We achieve this through dedicated teaching and support staff, unique field opportunities and partnerships with organisations that are similarly seeking solutions.
THE ECM PROGRAMME

CORE MODULES
- The earth system
- Ecosystems
- Env economics and policy
- Climate mitigation & energy
- Human systems & env change
- Responding to env change
- Governing the anthropocene

FIELD COURSES
- Climate change and land use
- Marine science and policy
- Alternative energy
- EU environment policy
- National Parks and cultural landscapes

SPECIALIST TRAINING
- Research methods
- Effective communication
- Cost-benefit, risk and life-cycle analysis
- Environmental modelling and GIS
- Environmental monitoring and data analysis

READING GROUPS
- Environmental law
- Adaptation policy
- Marine fisheries
- Ecological seminars

ELECTIVE SEMINARS
- Climate models
- Energy policy
- Ecosystem valuation
- Indigenous people and the env
- Sustainable behaviour change
- GIS
- Species modelling

25 CLASS SIZE
200+ APPLICANTS
80-90% INTERNATIONAL STUDENTS
71 NATIONALITIES TO DATE
75% SCHOLARSHIP FUNDED IN 2013
Our doctoral training programme is a core and integral part of the ECI. We embed our students within our core research teams and programmes so they can interact and work alongside our experienced academic and post-doctoral staff.

The students are as diverse as the ECI itself, and conduct their research across the world. We have students carrying out primary data collection on the functioning of forest ecosystems in pristine rainforests in remote Amazonia; developing frameworks for climate change adaptation costings in farming communities in Kenya; alongside projects in the UK, Europe, Asia as well as those undertaking theoretical and modelling studies in Oxford.

Our students attract scholarships and bursaries from wide sources, including research councils, consulates and increasingly from industry. In 2013 we were selected to form part of the new NERC and ESRC Doctoral Training Programmes, offering new students the opportunity to pursue a comprehensive and fully funded doctoral training experience.

The rise in industry funding is a reflection of the significance of sustainability research for business. Engineering firms Arup and CH2M HILL are funding doctoral research on appraisal and adaptation of infrastructure networks. Thames Water is supporting doctoral research on sustainable water resources management and energy efficiency. These scholarships are examples of our growing links to industry and help to foster a new generation of innovative systems thinkers.

The academic achievements of our doctoral students are demonstrated by the numbers choosing to publish their thesis through peer-reviewed journals. In 2013 our students published papers in, among others, the following journals: Conservation Biology; Energy Policy; Energy and Environment; and International Journal of Sustainable Development & World Ecology.
Resilience and adaptive capacity of food systems to climate change.

Abrar Chaudry (pictured above on fieldwork) is a doctoral student and former Rhodes Scholar on the ECM masters and Oxford’s MBA programme. He is part of the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) funded multidisciplinary project team conducting research into resilience and adaptive capacity of food systems to climate change.

His research focuses on unraveling the complex interconnections between regional, national, and local actors entrusted with translating national climate change policies into effective adaptation actions and smallholding farming communities impacted by these changes.

Abrar’s research spans many levels from strategic regional scenarios, national adaptation plans, to local community action plans in farming communities across the Terai plains of Nepal, the vulnerable north of Ghana and the flood prone south of Pakistan.

While clearly many disconnects exist between policy and action, Abrar has experienced wonderful examples of local adaptation strategies and resolve of national and local actors to collectively tackle the problem of climate change.

Reducing the risks associated with infrastructure system failures due to extreme climatic events.

Scott Thacker (pictured right) is a third year DPhil student, fully funded by the EPSRC and the engineering consultancy ARUP. Scott’s research is affiliated with the Infrastructure Transitions Research Consortium (p24) and focuses on reducing the risks associated with infrastructure system failures due to extreme climatic events.

His work has received high-level interest from HM Treasury and the UK Committee on Climate Change. Following a successful EPSRC knowledge exchange proposal, Scott will work with National Grid on translating theoretical developments into a tool to support their business needs.

Alongside interaction with industrial and governmental partners, Scott has been an active member of the academic community, presenting papers at a number of conferences including NetSci 2012 and 2013 and the 2014 ITRC conference on the Economics of Infrastructure. He has had wider interaction with the School of Geography and the Environment, teaching on the undergraduate course and interviewing potential future students.
Max Thabiso Edkins (ECM 2007-08) recently joined the World Bank as a Climate and Communications Expert in its Connect4Climate team in Washington DC. He is part of a team designing innovative climate change communication interventions that advance solutions for the climate challenge and help support the global movement for climate action.

Our Alumni Officer Christine Baro spoke to Max to find out more about his life post ECI. “After the course I researched and advised on South African climate mitigation scenarios, focusing on renewable energy, and taught a masters class at the Energy Research Centre in Cape Town. Together with my classmate Astrid Westerlind Wigström I took on and ran the NGO ResourceAfrica UK where we implemented the ClimateConscious Programme working with local communities in Namibia, Tanzania and Kenya, building capacity on community-led adaptation through communication activities. Through our work and global outreach I became aware of the Connect4Climate team, for whom I now work. The course prepared me well for my career and taught me to better understand and work with a broad range of climate issues, from the science, to the impacts, to adaptation and mitigation options. All these are valuable in the cross-cutting activities I’m involved in at the World Bank.”

In addition to Max, six other ECM alumni are currently employed by the World Bank.

When Yuyun Ismawati (2010-11) joined our MSc programme as a mature student she had just been awarded the Goldman Environmental Prize - the world’s largest award for grassroots environmentalists.

Yuyun was the recipient of the Gita Wirjawan Graduate Fellowship and came to the ECI off the back of an established career as an environmental engineer and campaigner in her home country, Indonesia.

“I decided to do ECM mid-career to refresh the way I see and define environmental problems and how we can contribute to promoting the solution in this dynamic and fragile world. As an environmental engineer, I see the importance of combining technical knowledge with social and policy approach as well as geographic perspectives in my work. It was like an enlighting and inspiring sabbatical year for me.”

Yuyun established her own NGO, BaliFokus Foundation, in 2000 to promote community-based urban environmental management, later focussing on toxics, especially mercury pollution caused by the Indonesian gold mining industry. “My thesis during the ECM course was on mercury in Artisanal and Small-scale Gold Mining and its social, economic and health impact. My research provided significant contribution towards the mercury negotiation process. I was able to disseminate my results and use them for policy advocacy at the UN forum.”

Today, Yuyun leads the Mercury Program at IPEN, a global network of organisations advocating and promoting a toxics-free future.
Al Harris joined the ECM course in 2002 with an undergraduate degree in zoology and a vision to work in marine conservation and help protect one of the world’s most vulnerable ecosystems.

His master’s thesis on coral reef disturbance in Tanzania directly resulted in the launch of an NGO whose mission was to rebuild small-scale fisheries by helping coastal communities make conservation work for them. The high-impact idea was simple: coastal communities can become powerful partners in marine conservation because they have the greatest interest in sustaining their livelihoods. Provided with the right education and support, they can live from the sea and help protect it at the same time.

Facing the challenge to create meaningful incentives for people to engage in conservation, Blue Ventures have already found plenty of unconventional innovative solutions, be it helping octopus populations recover or establishing the farming of sea cucumbers as a lucrative alternative to fishing.

Interdisciplinarity is a basic principle of Blue Ventures’ work. An example of their holistic approach is the family planning programme “Safidy” (Malagasy for choice), which introduces community- based reproductive health services in remote villages in coastal Madagascar. “Gender empowerment is just as important for conservation”, explains Al.

Al Harris gave the pre-dinner talk at the 2013 ECI Alumni Dinner on 7th September, reminiscing on his journey from ECM student to social entrepreneur and executive director of an award-winning NGO.

With the livelihoods of over 500 million people depending on small-scale fisheries worldwide, Al has ambitious plans to continue to expand his work over the coming years.
Our research is structured by broad processes, which cut across our various research endeavours:

1. Understanding the PROCESSES OF CHANGE, in which we undertake natural and social scientific enquiries into the drivers and impacts of global environmental change. The work spans local, national and global scales. It combines empirical analysis with modelling and simulation to explore potential future change in the context of societal and environmental drivers.

2. Exploring SUSTAINABLE SOLUTIONS, in which we creatively identify potential responses to environmental change and also develop the methods and tools to appraise, evaluate and communicate those responses. The responses we explore include governance, economic, technological and behavioural measures and strategies.

3. Influencing change through PARTNERSHIP and EDUCATION, in which we deliver impact from our research and educational activities. We invest time and energy in exchanging knowledge with partners, working with them to improve decision-making. Our educational and research programmes interact synergistically.

To illustrate how these interactions operate in practice, our Ecosystem Dynamics group of leading environmental scientists includes a team of experts looking at the governance of forests. In this interdisciplinary initiative, both ecosystems and governance issues span from the local processes in forests and villages to the global interactions of the carbon cycle and climate governance.

Another example is the UK Climate Impacts Programme, which is building tools underpinned by the best scientific understanding of the threats posed by climate change and using these to inform, train and equip business and organisations as they adapt to a changing climate.

Our research programmes are:

- The CLIMATE Programme, led by Professor Myles Allen and Roger Street
- The ECOSYSTEMS Programme, led by Professor Yadvinder Malhi and Dr Pam Berry
- The ENERGY Programme, led by Dr Nick Eyre and Dr Sarah Darby
- The WATER Programme, led by Professor Jim Hall
- The FOOD Programme, led by Dr John Ingram.

Demand for our research in each of these fields is high; in 2012/13 we secured £3.6million of new research funding.
Weather@home climate experiments
A group of regional climate modelling experiments within climateprediction.net – engaging over 350,000 individuals in 150+ countries as citizen science partners and mobilising immense computing power for world-class climate research.

European Food Systems Scenarios (TRANSMANGO)
We lead the scenarios work package of this European Commission project which aims to develop a comprehensive picture of the global drivers of change on the European food system within a global context.

GWP/OECD Global Task Force on Water Security and Sustainable Growth
We are co-Chairs of this Task Force to understand the links between water security and sustainable growth and compare different strategies for achieving water security.

Impacts and Risks of Extreme Climate Change (IMPRESSIONS)
We lead a new 9 million Euro, 27 partner EU research consortium to quantify risks and impacts associated with the extreme climate and socio-economic scenarios. IMPRESSIONS will develop strategies and solutions for coping with these changes.

UK Infrastructure Transitions Research Consortium (ITRC)
Working with utilities, engineering and insurance companies and over 50 partners, ITRC is analysing how to design long-term UK infrastructure for energy, water, waste, transport and ICT services, in response to strategic change and risk in drivers such as demographics, climate change and resource constraints.

UK Energy Research Centre (UKERC)
We have a central role in the new phase of the UK Energy Research Centre, leading a new research theme on decision making from 2014. We have been a core partner in the UKERC since its formation in 2004, formerly leading the Energy Demand theme and Meeting Place.

World Weather Attribution
We are working with Climate Central, an independent organisation of leading scientists and journalists researching and reporting facts about our changing climate, to routinely assess ‘before the floodwaters subside’ whether climate change played a role. This opportunity presents many scientific and communication challenges, but offers the potential to transform the dialogue about climate change and extreme weather.

UK Climate Impacts Programme (UKCIP): supporting adaptation
Since 1997, UKCIP has been bringing together the experience of research, practice and policy communities to create innovative adaptation outcomes for use in decision-making. Our diverse portfolio has a strong practical focus, including knowledge exchange, stakeholder involvement, transformative adaptation and adaptation-specific monitoring and evaluation.

Global dataset on tropical tree diversity and ecosystem function
This ambitious field campaign will result in the first global dataset linking tropical tree diversity to ecosystem function. The project introduces a rigorous data collection protocol across our Global Ecological Monitoring (GEM) plot network and uses the world’s most cutting-edge airborne remote sensing technology to better understand these pristine and remote landscapes.
A GLOBAL FOREST MONITORING NETWORK

Our pioneering monitoring network allows us to study the carbon and nutrient cycle in some of the most remote regions of the planet. Working with local partners we are seeing how pristine tropical forests are changing in response to climate change and informing policy on how best to protect them.

A major scientific focus of ECI’s Ecosystems Programme is to understand how forest ecosystems function, and how they are responding and will continue to respond to climate change. We employ a number of techniques, including satellite remote sensing and computer modelling, but a major part of our effort has been the collection of primary field data.

We have a particular interest in tropical forests, and have pioneered the widespread comprehensive study of the carbon and nutrient cycle of tropical forests, in some of the most remote regions of the planet.

Working with local partners, we have developed a unique network of over 40 intensive monitoring sites within forests that now stretch from the Peruvian Andes, through the Amazon of Bolivia and Brazil, the forests of West Africa and the Congo Basin, to the heart of Borneo. Beyond the tropics the network now includes the unique temperate and montane forests of Chile, and Oxford University’s own research woodland at Wytham.

At each of these sites local partners, researchers and students spend a few weeks per month collecting data on how the forest functions and responds to climate and environmental factors. We employ gradient studies to understand how variation in the environment affects forest function, most spectacularly in the Amazon-Andes where a 3,000-metre elevation transect is yielding fundamental new insights into how temperature controls the functioning of tropical forests.

Our studies have shown that even pristine tropical forests are changing in response to climate change. They are currently increasing in biomass and absorbing approximately 15% of global carbon dioxide emissions. In recent papers we have shown how this carbon sink “switched off” in Amazonia during increasingly frequent drought events.

Beyond pristine forests, we are describing how human activities are altering the functioning of tropical forests, and conducting experiments to understand the threshold and resilience of tropical forests.

In Brazil we are studying the impacts of fire and logging in the Amazon and Atlantic rainforests.

In Malaysia we are involved in a 10-year programme (the Stability of Altered Forest Ecosystems) to understand how conversion of logged forests and oil palm plantations can be managed.
to minimise biodiversity loss and maximise ecosystem services.

In Africa we are studying the ecosystem function and services provided by tree cover in landscapes ranging from almost pristine forests in Gabon, to forest–savanna transitions in Ghana, to the heavily farmed coffee and cocoa farming landscapes of Ethiopia and Ghana. Across the planet, these forest sites are being monitored on a routine basis in a network coordinated by the Ecosystems Programme.

Most recently, we have begun to collect a global dataset on the nature, structure and functioning of tropical leaves, branches and trees, and are embarking on ambitious field campaigns which will range through Peru, Brazil, Africa, Malaysia and Australia.

We also place a high priority on training tropical country students, either in their home country or through visits to Oxford. Our aim is to develop a community of tropical ecosystem scientists that will continue to monitor these forests through the large changes that are occurring over this century.

Linking together our global monitoring network

We have established a novel online social networking platform - GEMnet: Global Ecological Monitoring (GEM) - as an innovative web application for showcasing our ecosystems projects. The website provides a platform for wider engagement with researchers working across continents.

Visit: gem.tropicalforests.ox.ac.uk
What caused the mass extinction of large animals?

When did humans begin to substantially alter the functioning of the Earth system? When did the Anthropocene begin? In the Ecosystems programme we are exploring the intriguing question about whether the mass extinction of large animals (megafauna) was caused by early humans, and what consequences this had for biosphere function.

As well as being an intriguing question in human prehistory, this research opens up a debate about how we should conserve and manage contemporary landscapes, and to what extent “rewilding” is possible.

In 2014 we hosted a major international conference “Megafauna and ecosystem function: from the Pleistocene to the Anthropocene”. This received much media coverage, and will lead to two special issues of academic papers and a book.

Do large animals play a special role in the ecology of the planet?

Recent research by Dr Chris Doughty suggests that large animals do play a special role in the ecology of the planet and that they may act like nutrient arteries.

If you remove the large animals, nutrients are less well distributed. This is important because most large animals went extinct over 10,000 years ago and those that are in rapid decline.

Most people don’t realize that until 10,000 years ago most of the planet looked like a modern African savanna with abundant large animals everywhere. Our research suggests that their loss may have led to a decrease in global ecosystem services and that the loss of these services may have a very long time scale. For instance, even though many of these extinctions happened so long ago, we are likely still feeling the effect and ecosystem services may continue to decrease into the future due to these past extinctions.

We hope to be able to calculate the ecosystem services large animals provide us and therefore to give them a proper value, to aid their conservation.

chris.doughty@ouce.ox.ac.uk

Photo: Ralph Combs
Within ECI’s Ecosystems Programme the Forest Governance group consists of social scientists who focus on how societies make decisions to use, exploit or conserve forest resources.

The group is particularly focused on tropical forests, where rapid expansion of logging, farming and mining activities feed growing global consumption, while displacing traditional forest dwellers and pushing developing countries beyond their capacity to govern and regulate.

The Forest Governance group is involved in international collaborative research covering four main themes. These are concerned with assessing “what works and what does not” in balancing local to global goals for forest use and conservation.

The multi-level forest governance theme examines the interaction of international forest governance—from global treaties to consumer based “eco-labeling” schemes—with domestic forest regulations and traditional, community-based forestry.

Core sub themes include research for INTEGRAL, a project under the EU 7th Framework Programme. This work examines the current state of knowledge of the impacts of EU consumption on the world’s forests (i.e. the EU’s “global forest footprint”) and the policies designed to address it.

Environmental and social “safeguards” form another sub theme, including research on safeguards associated with the UNFCCC’s Reducing Emissions from Deforestation and Degradation and forest enhancement (REDD+), as well as newly drafted safeguards for biodiversity financing under the Convention on Biological Diversity (CBD). This work draws and expands upon a framework for assessing “equity” developed in a previous multi–national research partnership.

In concert with growing international interest in “landscape-level” approaches, several additional research projects reach beyond the forest sector to encompass sustainability initiatives in mining (in collaboration with Carleton and Yale Universities) as well as cocoa, coffee and cattle (involving institutional collaborations in Ethiopia, Ghana, Brazil and the USA).

The protected areas theme includes work to update and analyse the Protected Areas Management Effectiveness (PAME) database, which is linked to the World Database on Protected Areas. PAME holds information on the management and governance of over 6,000 protected areas worldwide.

The bushmeat theme involves in-depth field research on the harvest of wild animals for protein in Central Africa.

Science alone cannot dictate how we manage our forests. Actions are based on often conflicting claims of knowledge and science, and involve the prioritisation of different environmental, social and economic goals and values.

Dr Constance McDermott
Oxford Martin School Senior Research Fellow in Forest Governance
constance.mcdermott@ouce.ox.ac.uk
HOW VULNERABLE ARE OUR ANIMALS, PLANTS, COASTS AND CITIES TO CLIMATE CHANGE?

Climate change will affect all sectors of society and the environment at all scales and decision-makers need to be able to access reliable science-based information in order to respond and adapt to these changes.

Building on our 10+ years experience of modelling the impacts of climate change on species’ distributions we are now involved in projects which combine the model with those from agriculture, forests, coasts, water resources and urban development. Thus we can look beyond biodiversity and provide an integrated assessment of climate impacts and vulnerability.

In 2013 we completed a multi-partner EU funded project analysing Europe’s vulnerability to climate changes – CLIMSAVE. The pan-European project involved developing a user-friendly, interactive web-based tool, the CLIMSAVE Integrated Assessment Platform, which integrates model outputs across different sectors. The tool is expected to also be valuable for informing many policy processes, such as the EU Strategy on Adaptation to Climate Change and national adaptation strategies, by building the capacity of decision-makers to understand cross-sectoral vulnerability to climate change, rather than viewing their own sector in isolation.

The platform enables stakeholders and interested citizens to use the tool to analyse climate change impacts, vulnerability and adaptation options themselves. By linking together different models, stakeholders are able to explore and understand the interactions and trade-offs between different sectors and adaptation options for reducing vulnerability to climate change. The tool is available from the Climate-Adapt (www.climateadapt.eea.europa.eu) and CLIMSAVE (www.climsave.eu) websites.

"CLIMSAVE is expected to be valuable for informing many European national adaptation strategies."
What would happen in the worst-case climate change scenario?

Projections for future climate change suggest that possible warming of 4 °C may occur without a significant reduction in emissions. Despite the increasing plausibility of these high-end scenarios, there are few studies that assess their potential impacts and the options available for reducing the risks.

The EU funded, 27 partner, IMPRESSIONS Project, led by Dr Paula Harrison, aims to work with decision-makers to improve understanding of the impacts, risks, vulnerability and adaptation options associated with high-end climate and socio-economic scenarios.

The project will involve working directly with decision-makers to better understand their knowledge needs for increasing the robustness of decisions in response to high-end climate change. An integrated set of high-end climate and socio-economic scenarios will be developed and applied to a wide range of existing and new models of impacts and adaptation covering global, European and regional/local scales. This will provide an improved quantification and mapping of cross-sectoral impacts, risks and vulnerabilities associated with high-end scenarios along with consideration of their uncertainties. Options for harmonising adaptation and mitigation strategies to enable society to adapt effectively to these potential impacts will be explored.

The outputs of IMPRESSIONS are likely to offer a new set of reasons for people and organisations to reconsider their approach to climate change policies and actions, including a more precise justification for early, aggressive mitigation, and the reframing of the climate and development challenge. In particular, the project can identify policies that can become a source of economic innovation rather than a financial burden – including those with multiple benefits across sectors, and those which exploit synergies between adaptation and mitigation options.

"We are working directly with the decision-makers to help them understand the risks and the adaptation options associated with extreme climate change."
The focus of our Energy program – the Lower Carbon Futures (LCF) team – is on the interaction of social, technical and policy change in the energy system in the transition to a low carbon future. We have particular expertise in energy demand and related areas of small scale energy generation.

The team is centrally engaged in the UK Energy Research Centre (UKERC), leading its research theme on decision making.

The LCF programme undertakes technical and social assessments and has developed well-used models of energy use in transport and buildings in the UK. These allow quantitative examination of possible changes in demand, using different scenarios for UK energy futures.

The programme has internationally recognised strengths in the human dimensions of energy use. This includes analysis of energy user behaviour and the roles of other actors in energy systems, for example the construction industry, local government and community groups.

The LCF programme has made a big impact in UK policy discussions, with agenda-setting contributions on the Green Deal and housing refurbishment, non-domestic energy efficiency uptake, micro-generation, smart metering and smart grids, fuel poverty, carbon trading, and energy market reform. We combine analysis of specific energy policies with more theoretical work on governance and policy.

Whilst many potential energy solutions are local and context-specific, the challenges are global. LCF is increasingly applying learning from the UK to sustainable energy globally, and vice versa, through international collaboration. The team has recently been involved in the Global Energy Assessment, the IPCC report on Climate Mitigation, and a collaboration with Electricité de France.

Future research into energy demand will be driven by the challenges of rapid decarbonisation of the...
The ECI hosts the interdisciplinary and cross-departmental Energy Network, which brings together researchers from all parts of the University. Over 180 senior researchers from 26 departments and institutes lead activities addressing major technical, social, economic and policy challenges of providing secure, affordable and sustainable energy for all. A newly launched website provides an overview of the wide ranging research for Oxford academics, alumni and the general public.

www.energy.ox.ac.uk
Smart grids, smart metering and people

Smart grids are electricity networks combined with ICT networks. They have the potential to make distributed renewable generation more viable by managing demand in order to match supply (‘demand response’), to reduce demand by improving customer awareness of their electricity and gas use, and to pave the way for new business models.

Building on previous research carried out by Dr Sarah Darby on the importance of feedback for energy monitoring, we have recently been involved in several ‘smart’ projects, including:

- **Supergen HiDEF** - assessing the potential for residential customers to take part in demand response in cool temperate climates; developing business models for highly-distributed electricity systems including community energy schemes.

- **Smart Meters Early Learning Synthesis for the UK Government’s Department of Energy and Climate Change**, addressing questions of ‘how’, ‘for whom’ and ‘in what circumstances?’ in relation to potential benefits from smart metering, and identifying what is needed in order to achieve them for customers in Great Britain.

Monitoring energy use by mobile phone

Dr Russell Layberry is working with ECI spin-out Pilio (pictured below) on novel energy monitoring equipment for commercial buildings.

Utilising Android based smartphones as communications and data pre-processing devices, Russell has designed and implemented a range of real-time data loggers which are currently under test.

The work was initially funded under the ADEPT smart grid project and is now being supported by a 1 year knowledge exchange secondment grant from EPSRC. ISIS technology transfer is supporting a number of patent applications.

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Sarah.darby@eci.ox.ac.uk
Modelling transport policy scenarios: from motorway speed limits to electric vehicles

Dr Christian Brand is involved in ongoing research to develop modelling tools which help test and refine transport policies for national governments in the UK and abroad. The systems modelling tools enable governments to strategise towards low carbon and low air pollution alternatives up to 2050.

The impact of the tools has been to broaden policy makers’ and researchers’ understanding of the impacts of transport policy in terms of meeting carbon reduction targets, energy security, life cycle emissions of key air pollutants, and travel demand reduction.

The modelling tools have now been applied in ten different studies in the UK, EU and South Korea. The application of the model is very diverse and includes: fiscal policies to accelerate electric vehicle uptake, lifestyle change impacts, motorway speed limits and unconventional gas for road transport.

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Improving buildings’ energy performance through the middleman

Together with co-author Dr Yael Parag, Dr Kathryn Janda has investigated a ‘middle-out’ approach to energy system change.

In this model, middle actors – such as building professionals, religious congregations, corporate real estate companies, and food service professionals – are active participants in a system with their own practices and logic for making decisions.

This lens helps us recognise their influence upstream on top actors (policymakers), downstream to bottom actors (their staff, clients, and the public) and sideways to other middle actors (competitors, suppliers, and distributors). The more common ‘top-down’ and ‘bottom-up’ models of system change often overlook middle actors or treat them as intermediaries reacting blindly to market ‘pull’ or policy ‘push.’

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DESIGNING SUSTAINABLE INFRASTRUCTURE SYSTEMS IN AN UNCERTAIN WORLD

Infrastructure systems (energy, transport, water, waste and ICT) are amongst the most visible ways in which humans interact with their environment. ECI leads the £4.7 million UK Infrastructure Transitions Research Consortium (ITRC) – developing a new generation of assessments and simulations to help plan the transition to sustainable infrastructure systems.

Infrastructure systems are essential to human wellbeing. Transformation of these systems is central to mitigation of greenhouse gas emissions. At the same time, infrastructure systems need to be adapted to deal with the impacts of climate change.

Interdependencies with the natural environment are complex, but include the role of linear infrastructures in fragmenting ecosystems, limiting natural adaptation in a changing climate.

Traditionally, infrastructure has been dealt with from sector-specific perspectives, so an integrated view of the relationship between infrastructure and food, water and energy security and ecosystem services has not been fully explored. This is now changing, thanks to a £4.7 million EPSRC grant to the ITRC, which is led by Jim Hall, ECI’s Director and Professor of Climate and Environmental Risks.

The energy demand research in the ITRC is the responsibility of ECI’s Lower Carbon Futures programme, led by Dr Nick Eyre (p20).

The modelling and simulation techniques that the ITRC is developing will enable the future performance of national infrastructure (NI) systems to be better understood and strategies for NI provision to be tested in a virtual environment.

These NI strategies will be assessed with respect to a range of metrics, such as reliability, security of supply, cost, carbon emissions and flexibility to adapt to demographic and climate change.

The ITRC research programme was designed in collaboration with 43 organisations in government and industry, including utility companies, engineering consultants and the insurance sector. Close collaboration with these organisations throughout the research programme is now enabling the transfer of research results into practice.

The research programme has begun with a ‘Fast Track’ analysis, based on pre-existing datasets and models, to explore the scope of future NI challenges and to demonstrate new concepts in long term analysis of infrastructure systems.

Three years of research have now resulted in the NISMOD National Infrastructure System Model. NISMOD has
Our ambition is a revolution in the strategic analysis of national infrastructure in the UK and an international landmark programme for novelty, research excellence and impact.

Further development of the NISMOD system is now under way, which will put us in the best possible position to realise our ambition of a revolution in the strategic analysis of NI in the UK, whilst at the same time becoming an international landmark programme recognised for novelty, research excellence and impact.

www.itrc.org

four components:

• NISMOD–LP: A national model of the long-term performance of infrastructure systems;
• NISMOD–RC: A national model of risk and vulnerability in national infrastructure systems;
• NISMOD–RD: A model of regional development and how it adapts to infrastructure provisions;

NISMOD–LP is being used for the ITRC’s first National Infrastructure Assessment – interim results were published in January 2014 and the full results are being written up into a book to be published by Cambridge University Press.
CONTRIBUTING TO THE IPCC 5TH ASSESSMENT

The Intergovernmental Panel on Climate Change (IPCC) Assessments provide the most up to date view of the current state of climate change and offer an opportunity for governments to interrogate experts on what the science is telling us.

Several ECI researchers have been deeply involved in the latest assessment of the Intergovernmental Panel on Climate Change: Myles Allen, Friederike Otto and Alex Otto in Working Group I (Physical Science) and Nick Eyre in Working Group III (Mitigation). Our contribution to Working Group I focussed on the detection and attribution of human influence on climate, with a particular focus on the implications for extreme weather events, and on reconciling the observed climate record with estimates of climate system properties (see right).

The IPCC Assessment process is a very important channel through which climate science is communicated to the policy community. Questions like “did climate change cause this particular storm or flood?” can mean different things to different people, so we need a forum in which governments can interrogate the scientific community to make sure everyone understands what climate science is telling us, and also, just as importantly, what it is not telling us, or not yet. ECI researchers remain firmly committed to the IPCC process, although we have also been making our voices heard on how it might be made more responsive and better suited to address governments’ concerns in a changing climate.

Global warming continues; most extreme projections ‘less likely’

In 2013, together with a team of IPCC authors, we conducted a simple modelling study to investigate whether the slower increase of global mean temperature over the last 15 years would lead to a significant revision of our understanding of the medium and long term climate response to greenhouse gas emissions.

The study, published in Nature Geoscience, concluded that the latest observations of the climate system’s response to rising greenhouse gas levels are consistent with conventional estimates of the long-term ‘climate sensitivity’, despite a ‘warming pause’ over the past decade. However, the most extreme rates of warming simulated by the current generation of climate models over 50- to 100-year timescales are looking less likely.

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Oxford climate network

Oxford University boasts a world-class concentration of research spanning the climate issue. The Oxford Climate Research Network brings together this concentration of expertise to foster innovative interdisciplinary research and direct engagement with those affected by climate change.

ECI has a prominent role in the network through Professor Myles Allen who leads the initiative and Pete Walton who coordinates the network. Visit: www.climate.ox.ac.uk
WAS IT CLIMATE CHANGE?
Citizen science project climateprediction.net allows us to answer questions about whether extreme events were caused by climate change.

To find out what local climate regimes and weather events are possible in a changing global climate we cannot rely on observations alone but need to employ large sets of complex climate model simulations to obtain statistics of the possibilities.

With the citizen science project climateprediction.net, coordinated by Dr Friederike Otto, we use thousands of private computers to run exceptionally large ensemble simulations. The simulations allow us to answer questions about changing risks of droughts or floods in today’s sub-Saharan Africa (ACE-Africa project), potential reasons for the much-discussed ‘warming pause’ in the last 15 years (RAPID project) or to explore the causes of extreme rare events at the beginning of the 20th century (TITAN project).

In close collaboration with other scientists around the world the climateprediction.net team are leading the field to improve methods of attributing these rare events to external climate drivers. Through the EUCLEIA project we are developing the capacity to answer the question “was it climate change?” when a damaging weather event occurs and the world is listening to the answer.

“Global warming makes very wet winters ‘more likely’.”

In early 2014 the climateprediction.net team ran a Weather@Home citizen science project to assess the effects of global warming on the probability of wet winters in southern England. The results reported a small but statistically significant increase in such events.

Over 33,000 computer model simulations were run in the experiment. Each one used different climate models to estimate the pattern of global warming, which provided a range of possible changes in risk. In several cases the models gave no change or even a reduction in risk, but overall the simulations showed a small increase in the likelihood of extremely wet winters in the south of England. The results showed that a one-in-100-year winter rainfall event is now estimated to be a one-in-80 year event, suggesting the risk of a very wet winter has increased by around 25%.

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It will never be possible to say that any specific flood was caused by human-induced climate change. We have shown, however, that the odds of getting an extremely wet winter are changing due to man-made climate change.
ADAPTING OUR WORK TO MAKE ADAPTATION HAPPEN

The UK Climate Impacts Programme has been at the forefront of international approaches to adaptation to climate change since 1997. Taking a position between academic enquiry, national and local policy-making and on-the-ground action, we build and foster networks, enable knowledge exchange and support the creation and application of new evidence.

As befits an organisation working on adaptation, the UK Climate Impacts Programme (UKCIP) has evolved since its launch in 1997. We began with a remit to pull together and support academic research into the impacts of climate change, but increasingly our priority shifted to the need for well-informed adaptation actions to deal with the impacts of unavoidable climate change.

More recently, as we better understood the barriers to implementing adaptation, we have focussed on the mutual benefits of academic researchers and sector stakeholders working together to pool their knowledge and experience. This can create a new body of knowledge - for reviewing our current approaches and for informing new ones - that is more directly relevant to those responsible for adaptation decisions and action.

UKCIP leads the Adaptation and Resilience in the Context of Change (ARCC) network of research projects and stakeholders exploring adaptation to environmental, social and technological change in the areas of built environment and infrastructure. This Engineering and Physical Sciences Research Council-funded programme is designed to provide research projects and their stakeholders with an opportunity to share their work at all stages so that there can be learning and opportunities for joint-working and complimentary approaches to building and disseminating evidence.

UKCIP work with partners from around the world. This includes collaborations in the EU (e.g. European Topic Centre, JPI Climate) and further afield (e.g. SEA-Change, coffee & climate, Griffith University and NCCARF in Australia, CSAG in South Africa and Ouranos in Canada).

The UK Climate Impacts Programme has played a leading role in supporting effective monitoring and evaluation (M&E) of climate adaptation interventions. We developed one of the first toolkits for adaptation M&E and also contributed to the UNFCCC Adaptation Committee’s work in this area. Working alongside the Cambodia-based SEA-Change Community of Practice, we published a synthesis of tools, frameworks and approaches for adaptation M&E. This provides an overview of the latest approaches in this field, and is accompanied by a series of Guidance Notes for those implementing adaptation projects in developing countries.

www.ukcip.org.uk
UKCIP works at the boundary of climate research, policy and practice, providing support and advice on adapting to climate change. Our work falls into three main categories.

**Decision-making for adaptation**

Climate adaptation is about good decision-making — we have helped a wide range of organisations understand their vulnerability to climate change and how best to respond to the risks they face. In doing so, we have supported the development of robust public policies and business decisions.

**Exchanging knowledge & ideas**

Exchanging evidence, experiences and ideas is a vital part of our work at the boundary between climate science, policy-making and practice. Our unique role enables these exchanges to improve decision-making and develop fresh responses to climate change.

**Creative adaptation**

When society or business is unable to function effectively, innovative and creative solutions are crucial. Our practical thinking on climate change issues has led to new research priorities, approaches, tools and ways of working, resulting in better ways of understanding systems and different approaches to doing business.

### Adaptation in the West Balkans

An EEA-funded project to assess the status of climate change impacts, vulnerability and adaptation in the West Balkan countries. We are assisting with the countries’ contributions to the Climate ADAPT platform.

**ARCC – Adaptation and Resilience in the Context of Change**

We manage ARCC, which brings together researchers and stakeholders involved in adaptation to technological, social and environmental change. We provide a network to help develop and exchange knowledge and evidence to inform policy and practice, and research.

### Climate Crunch

A one-year project to add value to the research of former ESRC climate change leadership fellows by generating key messages to stimulate international thinking and debate.

### JPI-Climate

JPI-Climate is a collaboration between 13 European countries to coordinate their climate research and support new transnational research initiatives. We help to integrate current and future research, and communicate with stakeholders to encourage greater participation.

**Monitoring & evaluation**

It is essential that we understand whether our adaptation efforts are working (or not), in which circumstances and for what reasons. Building upon our AdaptME toolkit, UKCIP now works with a range of national and international partners to understand better how monitoring & evaluation processes can be improved.

**Transformative adaptation**

Transformative adaptation involves managing a more fundamental change process rather than protecting or restoring an environmental and social state. We’re exploring what’s needed to translate transformative adaptation from an attractive concept to something practical and real.

**Communications**

How we communicate the often complex outputs of research and projects to a non-technical audience is an integral part of our work, through our monthly e-newsletter, website and work on visual and written dissemination.

**Training**

UKCIP has extensive experience of a range of learning options to suit a variety of audiences, from online learning to training for specific tools or sectors. We are also experienced facilitators for workshops and events.

**UKCIP tools**

Used internationally, our tools and resources have been used by many in planning adaptation strategies and convincing colleagues of the need to plan for the future.

### European Topic Centre on Climate Change impacts, vulnerability and adaptation (ETC/CCA)

We are members of the consortium of 14 partner organisations, led by the Italian Euro-Mediterranean Center on Climate Change (CMCC), supporting the development of EU policy. This includes supporting the development of Climate ADAPT, an online platform on adaptation activities across Europe.
ENHANCING FOOD SYSTEMS TO FEED THE WORLD

ECI is developing a strong capability in UK and global food systems research and training.

ECI’s food research and training builds on an internationally-recognised track record in food systems research within the Food Climate Research Network (FCRN), the Climate Change, Agriculture and Food Security (CCAFS) programme of the CGIAR, and within ECI itself. Building on expertise in food system concepts, emphasis is placed on the two-way interactions between food security and environmental change. Scenario development, science communication and stakeholder engagement, and greenhouse gas emission reduction in the context of sustainable diets are keys areas of interest.

Research partnerships are being consolidated with a wide range of stakeholders including business, policy, development agencies, NGOs and academia at large. ECI’s food system work contributes to the University-wide network on the Future of Food.

Example projects led by ECI include:

- Scenarios for transformative policy within the four-year TRANSMANGO EC FP7 project, which aims to obtain a comprehensive picture of global change effects on food demand and food production;
- a Belmont Forum project on Food System Governance, Food Security and Land Use in Southern Africa;
- food systems model development, as a contribution to the ‘Center for Integrated Modelling of Sustainable Agriculture and Nutrition Security’ (CIMSANS) project of the International Life Sciences Institute’s Research Foundation (ILSI RF);
- a UK-Global Food Security Programme (GFS) project ‘Determining the Priority Research Questions for the UK Food System’, which identified sets of ‘top five’ questions of interest to four different stakeholder communities.
- CCAFS’ Scenarios Activity (p31).

ECI’s food system expertise is in demand to give Key Note presentations at major conferences including those organised by the United Nations Environment Programme, the European Commission, the International Union of Food Science and Technology, and the International Association of Research Universities; and has contributed to regional and global food systems’ assessments organised by the United States Department of Agriculture, the Intergovernmental Panel on Climate Change, and UNEP’s International Resources Panel.

Oxford’s network on the Future of Food

The work carried out by ECI contributes to the university-wide Oxford Martin School’s ‘Future of Food’ programme and thereby also contributes to the ‘Oxford Networks for the Environment’ (ONE).

www.futureoffood.ox.ac.uk
Food systems are failing many. About one billion people are still hungry. Two billion people don’t have sufficient nutrients to lead a healthy life. And over two billion people are consuming too much. Meanwhile, producing, processing, distributing and consuming food all contribute to degrading the natural resources upon which our food security depends. How can food systems be better managed, and how can we build the new professions needed to do this?

Environmental change is bringing new challenges to satisfying society’s demands for a healthy and sustainable diet; and the ever increasing demand for food is further contributing to environmental change. Thinking about the food system as a whole helps identify where interventions can be made – including reducing waste throughout the food chain – and how such interventions would affect the food industry, food security and the environment.

The CCAFS Scenarios Activity continues to be led by ECI. Work engages key regional policymakers, private sector actors, civil society organisations, media and researchers to develop combined climate/socio-economic scenarios to guide policies and investments at regional and national levels.

Scenarios up to 2050 have been developed in East and West Africa, South and Southeast Asia, the Andes and Central America. Participants represented a total of 240 organisations from diverse sectors.

In 2013 international organisations, national partners and economic communities invested over $700k in the scenarios programme for creating enabling policy environments and to help shape national and regional priorities.

Oxfam Great Britain commissioned ECI to identify how the conditions that commonly weaken poor people’s access to and use of food are exacerbated by extreme weather events.

The report ‘Food and Climate Justice’ was based on four case studies (Russia’s 2010 heat wave, Pakistan’s 2010 floods, East Africa’s 2011-12 drought and the 2013 typhoon in the Philippines), and involved close collaboration among ECI’s food, climate and CCAFS groups. Outputs will support Oxfam’s food justice campaign ‘GROW’.

The Food Climate Research Network (FCRN, based in ECI) has delivered a number of substantial reports including ‘Appetite for Change’, a major report which analyses the dramatic changes in China’s food system over the last 35 years; a paper for the Skoll Forum on ‘Changing What We Eat’; and a number of discussion papers on the topic of sustainable and healthy diets. FCRN also organised a number of meetings including multi-stakeholder workshops with Oxford’s Future of Food Programme on sustainable intensification; and with the Wellcome Trust and the UK’s Global Food Security Programme on how our eating practices might be shifted in healthier and more sustainable directions.

Can we feed the world a healthy diet and maintain the environment?
ANALYSING WATER RISKS IN A CHANGING CLIMATE

Water security is defined as a tolerable level of risk at any scale and for any actor. Human and climatic changes are making societies worldwide more vulnerable to water related risks including floods, droughts and pollution. ECI is working to put the principles of water security into practice by developing concepts, methodologies and technologies that will help to manage water risks.

Floods and droughts are features of coupled human and natural systems. Climate change will influence their frequency, but the severity of the risk is shaped by a range of factors, including the way in which incidents are managed and the vulnerability of the affected populations.

These are complex problems, so in the past risk was managed by allowing an ample margin between safe operating conditions and harmful extremes. This approach is no longer tenable: we recognise more clearly the environment’s needs for water and we wish to allocate resources more fairly and avoid wasting them wherever possible.

Risk-based approaches provide a basis for more rational water management decisions. We have been working on methodology and decision-support technologies for flood risk management for many years, with an increasing emphasis upon the impacts of climate change.

We have been refining the concept of adaptation pathways, which allow forward-planning under conditions of uncertainty by including flexible alternatives which are triggered by observed or predicted changes.

We are particularly concerned about the proper treatment of uncertainty in flood models and have recently developed an improved methodology to tackle this uncertainty.

With the exception of the UK’s rail infrastructure, critical national infrastructure has come through this latest set of floods pretty well, but adapting to changing climate risk is still very much a work in progress.

Jim Hall commenting on the UK’s 2014 flooding in The Guardian.
Oxford Water Network

The Oxford Water Network provides leadership in interdisciplinary water science, bringing together over 120 researchers from 15 different departments and institutes across the University. Researchers work in partnership with government, research and business communities to tackle global water risks, such as flooding, droughts and water pollution.

www.water.ox.ac.uk

A landmark collection of papers from the 2012 international conference on Water Security, Risk and Society are published in the Philosophical Transactions A of the Royal Society.

Professor Jim Hall and others from the School of Geography and the Environment compiled and edited the papers, which demonstrate the growing scale of global water security risks. Over 45% of the global population is projected to be exposed to water shortages for food production by 2050.

Collectively, these papers provide strong justification and strategic priorities for policy-driven science in the lead up to new development goals in 2015 and beyond.

Awarded new NERC funds to lead a £2million programme on droughts and water scarcity.

ECI is building capacity in relation to water research and recently won substantial funding to look into the complex drivers and impacts of droughts and water scarcity.

ENVIRONMENT AGENCY USE NEW MODEL TO ASSESS ENVIRONMENTAL RISKS TO BRITAIN'S COASTLINES

Researcher Andres Payo and fellow scientists are calculating the risks of coastal flooding and erosion along Britain's coasts as part of the iCoast project. The work will enable local authority planners to forecast the environmental risks to Britain’s coastline for decades ahead.

Alongside Professor Jim Hall and Dr David Favis-Mortlock, Dr Andres Payo is developing a coastal landscape evolution model that will explore how different adaptation pathways might reduce the risk to tolerable levels at different timeframes in the future.

The model indicates that 50+ years of active coastal management will be needed to bring the risk of flooding and erosion to an acceptable level by the end of this century.

Research from the iCoast consortium received the Lloyds Science of Risk Prize in 2013.

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22 years leading environmental change research

1991
14th February, the Environmental Change Unit (ECU) was launched with generous support from IBM UK Trust, Cohen Foundation, Dulverton Trust, Environment Now, Merton College and hundreds of Oxford alumni.

1992
ECU's first research report is published: Climate change and vulnerable places: global food security and country studies in Zimbabwe, Kenya, Senegal and Chile, and generates The Times headline: Climate shift puts 360m more at famine risk.

1993
The UK's first Fellow in Energy Efficiency, Dr Brenda Boardman, is appointed and publishes ECU's first energy report: DECADE: 2MtC – a guide to saving 2 million tonnes of carbon in the UK.

1994
New MSc in Environmental Change and Management begins, led by Dr John Boardman, and rapidly becomes Oxford’s most popular graduate science course.

1995
ECU hosts "Transport and the environment: the great debate", led by UK Secretary of State for Transport, with 500 delegates from organisations across the UK.

2003
ECI becomes founding partner in the UK Energy Research Centre and becomes conference programme host through the Meeting Place, which in its first year hosts a G8 energy conference of 200 international delegates.

2004
Under the new Directorship of Professor Diana Liverman, ECI becomes part of the Tyndall Centre for Climate Change Research and coordinates a work programme on international action on climate change post 2012.

2005
ECI launches the 40% House report – how to reduce emissions in the UK housing sector by 60% - at the Royal Society in London, receiving widespread media coverage.

2006
ECI is selected to host the Global Environmental Change and Food Systems programme.

2007
ECI hosts an international conference on climate change and the fate of the Amazon, leading to major paper in the journal Science and a thematic issue of the Philosophical Transactions of the Royal Society.

2008
Dr Brenda Boardman makes witness statement in Judicial Review against the UK Government for failing to meet its legal requirements to eradicate fuel poverty under the Warm Homes and Energy Conservation Act 2003.

Earthwatch opens its European Climate Centre, partnering with the ECI on a five-year climate change and forestry research programme.
1996
ECU is awarded £1 million from the EC to continue leadership of Europe’s largest network on climate change and agriculture.

1997
UK Government appoints ECU to host the UK Climate Impacts Programme – the first of its kind in the world – and it publishes their first report on regional climate change impact and response studies in East Anglia and North-West England.

1997
ECU leads EU project on institutional preparedness for drought and floods in Europe.

1997
ECU changes name to Environmental Change Institute (ECI) in recognition of its role in promoting Oxford’s environmental work.

1999
The Trapnell family fund the Trapnell Fellowship in African Terrestrial Ecology. ECI’s first permanently endowed post, as a flagship for Oxford’s considerable activities in researching the African environment.

2000

2001
Professor Andrew Goudie, ECI’s founder, delivers his final lecture to ECI students, who include Indonesian environmental leader and ECM graduate Yuyun Ismawati, recipient of the first Ancora Foundation Graduate Fellowship.

2009
ECI ideas are selected for the Sustainable Development Commission’s event: Breakthroughs for the 21st Century and presented to Prince Charles.

2010
ECI hosts the “4 Degrees and Beyond” international conference, leading to papers in Nature and the Philosophical Transactions of the Royal Society.

2011
Professor Jim Hall takes over as Director of ECI. He brings with him the £4.7 million Infrastructure Transitions Research Consortium.

2012
ECI coordinate Oxford University’s presence at London’s Planet under Pressure conference – the world’s largest gathering of experts to provide scientific leadership for the UN Summit, Rio +20 later in the year.

2013
ECI benefit from Oxford University’s successful application to join the NERC Doctoral Training Programme, one of 15 Universities to be awarded funds amounting to £10 million.

2014
ECI launches a new Sustainability Internship Programme offering Oxford students summer business placements in companies including: GlaxoSmithKline, Nestle, Unilever and Coca Cola.

2009
ECI hosts a side event at the 2009 UNFCCC COP conference in Copenhagen on the implications of 4°C of climate change.

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Transforming world-class research into genuine impact doesn’t happen overnight. It involves building relationships with influential individuals and organisations to help them identify sustainable options when confronted with complex problems. We are constantly adapting to the needs of decision-makers and the changing policy and economic landscapes.

Photo: Tom Weller www.tomwellerphotography.com
The University of Oxford is immensely grateful to the benefactors who enabled the founding of the Environmental Change Institute in 1991 and have invested in its development.

Ancora Foundation
Andrew W Mellon Foundation
BOC Foundation
Charterhouse Charitable Trust
ClimateCare
Dr James Martin
Dulverton Trust
EcoSecurities
Environment Now Foundation
Esmée Fairbairn Foundation
The Frank Jackson Foundation
IBM United Kingdom Trust
John S Cohen Foundation
Loke Wan Tho Foundation
Merton College, Oxford
MOA International
Mr and Mrs Colin Trapnell
Nuclear Electric
Powergen plc
Rhodes Trust
Riche Monde
Solar Century
Santander
Thames Water plc
The Higgins-Trapnell Family Foundation
The Strachan Donnelley Family Trust
TSB Lloyds Bank plc

and over 1,000 graduates of the University of Oxford.
Policy...
Financing Transformation
Supply & Demand

China, Africa & EU

Power & Electricity

Dr. Christine Loh: CNIC Exchange (China)

Investing Heavily...
- Solar, wind, grid...
- Distributed power

China knows...
If we crack the energy mkt... we will play a big role in future...

Developing skills - education & job generation

Land use & Water

Dr. Tony Ribbink

Are there models for low CO2 growth?

It's not CO2's that have the IPs...
We can't rely on government (maybe to convene)

Infrastructure

Deals

... to reward efficiency
- Power Gen/Dis. CHP
- Encourage CHP

REDCO
- Deals for all users
- Building codes tightened

Wind power capacity

At what point are we ready to say "no more coal plants?"

Red to rev the

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