epa Research

Climate - Water - Sustainability

Identifying pressures • Informing policy • Developing solutions

Using knowledge to protect and improve our natural environment and human health

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Strategy 2014-2020

EPA Research is built around 3 pillars:

1. Climate
2. Water
3. Sustainability

EPA Research has increased national understanding of our environment, the challenges it faces and responses to these. It has also developed high quality research capacity and supported innovation that is internationally respected.

EPA Research is targeted to address the needs of key governmental and non-governmental stakeholders and also encourages the researcher community to engage with these stakeholders. EPA Research has provided integrated solutions for many of the complex environmental challenges facing Ireland .

EPA Research aims to:

Identify pressures:

Providing assessments of current environmental status and future trends to identify pressures on our environment .

Inform policy:

Generating evidence, reviewing practices and building models to inform policy development and implementation.

Develop solutions:

Using novel technologies and methods that address environmental challenges and provide green economic opportunities.

Working with others

The EPA recognises the value of engagement and networking with other sectors and organisations that interact with the environment. The research programme has formed strong linkages with national and international partners over the past number of years and the research we fund is of significant value to other government departments and state agencies. We will support initiatives which will enable us to work with others to build awareness and effect behavioural changes needed in our homes, communities, businesses and at a policy level to enable us to become a low- emission, resource efficient economy and society.

What we will do in 2014-2020:

The new 2014-2020 EPA Research strategy will build on existing strengths and experience across a very broad range of activities in support of environmental policy development and implementation as outlined in our 2014 Implementation Plan.

There will be a number of new aspects to the programme, including:

1. Improved communication about our work and dissemination of our research - see 'Communication'.
2. Greater co-funding with national and international partners on shared research priorities—see 'International Links'.
3. Greater support for networking of research community initiatives in particular in relation to the National Prioritisation Exercise and European Funding leverage.
4. Enhanced, structured liaison with stakeholders on identifying key research priorities.
5. Working with others to build awareness and effect the behavioural changes needed to enable us to become a low-carbon, resilient, resource-efficient economy and society.
6. Inclusion of Natural resources/raw materials research – including linkages with the EU's 7th Environment Action Programme and Horizon 2020 Societal Challenge 5: Climate Action, Environment, Resource Efficiency and Raw Materials.
7. Piloting of innovations in the area of citizen science through scientist or citizen-led initiatives.
8. New funding for blue-skies research aimed at environmental issues.
9. More efficient research programme reporting, and financial requirements in line with best practice.
10. Actively promoting Ireland as a platform for environmental research, building on its strategic location, advantages of scale and environmental quality.
11. Greater support for Open Access and Open Data.
12. Collaboration with enterprise agencies to identify innovative environmental solutions that could support the growth of the green economy.

EPA-funded environmental research provides essential scientific support for environmental policy development, implementation and broader decision making.

Priority areas requiring concerted national action:

- Informing Ireland's transition to a low-carbon climate-resilient environment, society and economy and meeting national and international targets in this process.
- Supporting water protection, conservation and management obligations under the Water Framework Directive, Marine Strategy Framework Directive and Floods Directive.
- Reducing waste generation and treating waste as a resource in line with national and European waste policies to move towards a more resource-efficient and circular economy.
- Understanding environment–health interactions, including risks from emerging chemicals and novel materials, while highlighting the benefits to human health of a clean and well managed environment.
- Developing a better understanding of how individual and collective behaviour can either help or hinder progress towards a low-carbon, resilient, resource-efficient economy and society.
- Furthering the knowledge base on the role of the natural environment, its resources and ecological limits, and our understanding and protection of ecosystems and their role in sustaining the economy and human wellbeing.
- Understanding the environmental impacts of unconventional gas exploration and extraction.
- Developing integrated approaches and growth opportunities through management of the challenges that arise from climate change, water quality and other environmental issues.

EPA Research 2007-2013: The STRIVE Programme

Protecting our environment:

EPA Research has played a critical role in:

- Increasing understanding of the pressures on our environment and identifying suitable responses.
- Providing substantive evidence to support actions on greenhouse gas emissions, water management, waste management and protecting our natural environment.
- Contributing to addressing the biggest environmental issues facing Ireland such as climate change, waste, wastewater management and biodiversity loss.

Achievements:

- €74m in funding for Irish environmental research.
- Over 100 reports published since 2007.
- 800 researchers funded, including 100 post-doctorates and 150 scholarships.
- 80 workshops and conferences, including the public climate change lecture series.
- 2,800 data files available for use – 6.3GB of data.
- 500% increase in peer-reviewed publications by Irish environmental researchers.

Other benefits:

- Improved and increased environmental protection for water and vulnerable areas such as peatlands.
- Estimated savings of €50m in meeting greenhouse gas emissions targets under the Kyoto Protocol.
- Two spin-off campus companies established primarily as a result of EPA funding, and numerous patents filed by researchers.
- Over €46m in environment related research funding drawn down from the European Commission's Framework Programme 7.

Programme recognition:

- Cleaner Greener Production Programme cited as exemplary by European Commission (2007).
- Research programme identified as highly valuable by external review of the EPA (2011) and PA Consulting review of the EPA research programme (2012).
- The EPA is a successful project partner on five European research initiatives in the areas of Climate Change, Environment and Health & Water.

Climate change remains an unresolved collective challenge. Actions to address its causes and consequences are needed. These actions can also give rise to major societal benefits and development opportunities. The 2014-2020 period is central to advancing actions on climate change.

Targeted climate change research is needed in Ireland to inform practical response to, and strategic engagement on, climate change.

The Climate Change Research Programme

The Climate Change Research Programme (CCRP) 2007-13 advanced four thematic areas and earth observations. The programme was guided by a coordination committee hosted by the EPA which included representatives from government departments and state agencies that funded or used climate change research. Research Specialists facilitated engagement with the research community. The thematic research areas were:

- Greenhouse Gas (GHG) emissions and sinks.
- Climate change impacts and adaptation.
- Socio-economic solutions and technologies.
- Air pollutants/short life climate forcers.

Its outputs have informed national thinking, contributed to EU analysis and have been presented and used in UN forums including the Intergovernmental Panel on Climate Change (IPCC) and the United Nations Framework Convention on Climate Change (UNFCCC)

Building on achievements

The 2014-2020 programme is framed by the vision of Ireland's transition to a carbon-neutral, low emission and climate-resilient society and economy by 2050, and being a source of climate change information and solutions.

It builds on the success of the previous programme and responds to developments and emerging issues. It is shaped around two concepts; "Towards 2050" and "Laboratory Ireland".

"Towards 2050" encapsulates research that informs the transition to a carbon neutral, low emission climate resilient Ireland by 2050.

"Laboratory Ireland" promotes an experimental approach to analysis of solutions and technologies and promotes Ireland as a key location for innovation. Together these aim to leverage action and support sustainable economic growth.

The goal for the 2014-2020 period is to enable an effective research programme that is practical, solutions-focused and strategic.

Objectives include:

- To provide essential information and analysis to inform actions on climate change.
- To maintain and develop research capacity and expertise
- To inform innovation and sustainable economic growth.
- To support and inform engagement with national and international organisations.

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Context

The Climate Action and Low Carbon Development Bill and the National Climate Change Adaptation Framework provide the national policy agenda for the programme. The EU Climate and Energy Package, the Adaptation Strategy and the Commission's "A Roadmap for Moving to a Competitive Low Carbon Economy in 2050" provide the EU context. Engagement with the work of the IPCC and the UNFCCC are seen as essential elements of the use of research.

The UNECE Convention on Long Range Trans-boundary Air Pollution (CLRTAP) and the EU CAFÉ programme provide the context for air pollution research. The recently formed Climate and Clean Air Coalition (CCAC), of which Ireland is a member, provides linkages between responses to climate change and air pollution.

Collaborative research opportunities include the national prioritisation exercise, the Prioritisation Action Group (PAG) and investments by Science Foundation Ireland. At EU level opportunities include Horizon 2020, JPI Climate as well as European Strategy on Research Infrastructures (ESFRI) projects such as the Integrated Carbon Observation System (ICOS), the Group on Earth Observations Global Earth Observation System of Systems (GEO-GEOSS), Copernicus, the European programme for the establishment of a European capacity for Earth Observation, and the World Metrological Association (WMO) on climate services.

Responding to change

Wider stakeholder engagement is needed including with the business community, NGOs, civic society and the public. Greater exploration of practical mitigation and adaptation solutions is also required. Cross-cutting, multi-disciplinary research is central to this approach and where possible should be realised through projects and pilot studies. Engagement will be facilitated though broadening the coordination structure and advancing communication processes including engagement with communities and practitioners.

Theme 1: Carbon Stocks, GHG Emissions, Sinks and Management Options

Vision: A holistic analysis of carbon stocks and GHG emissions and removals in Ireland.

Thematic goal: Advanced analysis of GHG emissions and removals, enabling improved policy development and decision making.

Research objectives include:

- To improve national GHG inventories and projections including more accurate reporting of Irish circumstances.
- To develop independent measurement and verification systems.
- To enable effective mitigation of GHG emissions.
- To improve understanding of the feedback of Climate Change on emissions and removals.
- To provide analysis of alternative metrics and approaches to accounting of emissions.

This areas is focused on-going improvement of national GHG inventory and projections. Improved analysis of the Agriculture, Forestry and Other Land Use (AFOLU) sector is central to this.

Flooding photo courtesy of Irish Examiner

Theme 2: Ireland's Future Climate, its Impacts, and Adaptation Options

Vision: Informing transition to a climate resilient Ireland.

Thematic Goal: Provision of research based information in support of risk and vulnerability analysis and adaptation actions in Ireland.

Research objectives include:

- To provide analyses of on-going and projected changes in Ireland climate system.
- To provide analyses of responses of managed and natural systems to climate change.
- To provide information on impacts, risks and vulnerabilities.
- To identify adaptation options and solutions for Ireland.

Improved information and analysis is needed to manage the transition to a climate resilient Ireland. This will inform decision making on adaptation and planning. It will include information from climate services and initiatives being developed at EU levels e.g. European Environment Agency CLIMATE-ADAPT, and the European Centre for Medium-Range Weather Forecasts - Monitoring Atmospheric Composition and Climate (ECMWF MACC) projects.

Theme 3: Climate Solutions, Transition Management and Opportunities

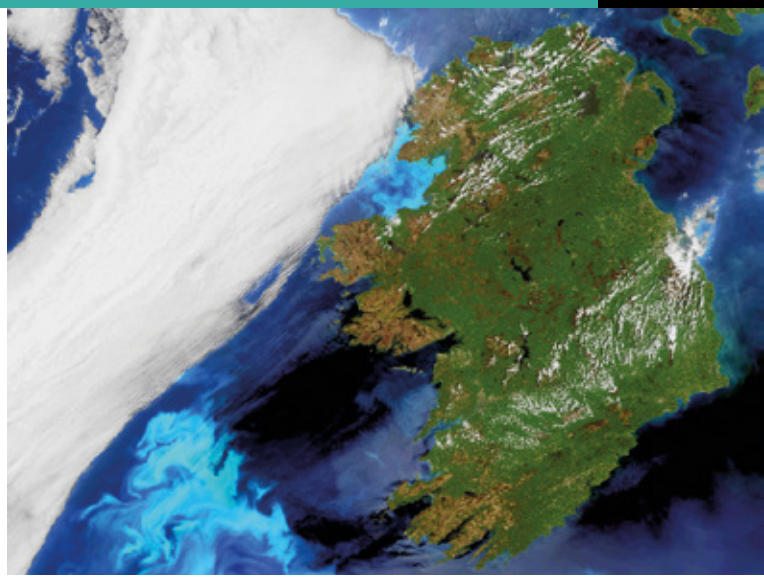
Vision: A carbon neutral Ireland by 2050, which is a source for climate information and solutions.

Thematic Goal: Achievement of 2020 targets and to identify and test solutions for achievement of societal and economic low carbon transformation to 2050.

Research objectives include:

- To advance socioeconomic modelling of cross-sectoral greenhouse gas emissions to 2050.
- To promote cross disciplinary analysis of effective options for behavioural change in businesses and households and, for each sector, to identify and assess current and future mitigation options including technologies.
- To bring together diverse research outputs to form a coherent picture of analysis for Ireland and in so doing, to identify green economy and other opportunities from international trends in policy and economics.

Models helps us assess transformation pathways at sectoral and cross-sectoral levels. Ex-post analysis of mitigation policies informs development of future options. Mobilising expertise through cross-disciplinary analysis, involving stakeholders, capturing and advancing know-how and practice in the traded and non-traded sectors, are crucial to successful mitigation strategies.



Theme 4: Air Science

Vision: Achievement of clean air and co-benefits for climate, health, environment and society.

Goal: To inform pathways for achievement of highest air quality standards in Ireland and advance integrated assessment of air pollution, short life climate forcers, and other wider environmental issues.

Research objectives include:

- To advance analyses of emissions, transport and removal of air pollutants and increase understanding and awareness of the impacts of air pollutants.
- To improve national inventories and projections of emissions over a wide range of pollutants including heavy metals and persistent organic pollutants (POPs).
- To identify and promote emissions abatement options which can enable Ireland to achieve the highest air quality standards.

Topic areas include attribution of air pollutant emissions to economic sectors in order to inform effective actions and improvement of inventory and Projections of emissions under National Emissions Ceilings Directive (NECD) and CLRTAP/Gothenburg.

Smart systems are increasing providing information at a range of temporal and spatial scales across key terrestrial, atmospheric and oceanic domains and at city and local scales. These challenge data processing and management systems. However, they can provide information that is essential to better decision making or in warning or alert systems. This aim is to further develop Ireland as a platform for advanced observation systems which are integrated via systems models into decision support and management systems.

Observation Systems, Big Data and Systems Models

Vision: Ireland as a leader in advanced observations and systems models.

Goal: To use advantages that arise from Ireland's size geography and location to develop it as a platform for advanced observations/systems models.

Research objectives include:

- To used advanced in-situ and space based observation systems to enhance current systems and integrate observational data with domain and systems models.
- To provide information, analysis and forecasts/projections to support decision making.
- To link to EU and global initiatives that are developing observation systems and downstream services.

Conclusion

Climate change and air quality research will respond to on-going challenges and emerging issues.

The aim is to identify, inform and enable actions, and to provide timely and innovative research and analysis that supports policymakers and other stakeholders.

The programme will address issues specific to Ireland, complementing other Irish work, EU Horizon 2020 and work under the JPI. It will build on Ireland's strengths and enable economic and societal opportunities and solutions.

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Ireland's waters are one of our major natural resources. Plentiful availability of good quality water offers a significant competitive advantage to sectors such as agriculture, industry and tourism. Water is a resource that must be carefully managed, and improving water quality status is a national priority for Ireland.

EPA Research's water pillar deals with groundwater, surface water, transitional and coastal water; as well as wastewater, drinking, bathing and shellfish waters.

It will support the emerging policy & implementation research needs in relation to the implementation of the Water Framework Directive (WFD), as well as marine research considerations to support to the formulation and implementation of policies. In addition, the EPA is coordinating a multi-agency transboundary programme of research on Environmental Impacts of Unconventional Gas Exploration & Extraction (UGEE), which has significant water elements, and is included under Thematic area 5: Emerging and Cross-cutting Issues.

The overall aim of the water pillar is to support relevant water policy and to protect our water environment, contributing to achieving excellent water quality in Ireland

EPA Research's Water Pillar

EPA Research's water pillar has a strong focus on policy and has been driven by national regulations and European Directives. Policy-related research plays a vital role in ensuring that EU and national policies are implemented in the most cost-effective manner. A long-term water research programme is an essential component of Ireland's role in protecting its water resources and meeting its requirements under water-related EU directives and national policies. Ireland has a high-quality research, technical and scientific base in the water sector but this needs to be further strengthened if we are to meet the major environmental and socio-economic challenges ahead. Technology and innovation have a significant role to play in meeting the environmental challenges and can also deliver economic benefits through enhanced competiveness and improved efficiency. Behavioural change is another key area that requires focus .

Between 2007-2013, the EPA STRIVE Programme funded over 100 research projects with a budget over €10,000 related to water with a total commitment from the EPA of approximately €19.5m. The range of projects funded includes desk-studies, scholarships, fellowships and large-scale multi-annual and multi-partner awards.

Thematic areas

The thematic areas under EPA Research's Water Pillar for 2014-2020 will be:

1. Safe Water;
2. Ecosystem Services and Sustainability;
3. Innovative Water Technologies;
4. Understanding, Managing and Conserving our Water Resources
5. Emerging and Cross-cutting Issues

Multi- and inter-disciplinary research is required on these themes, with expected social, economic, technology, environment and policy impacts.

These thematic areas also reflect EPA Research's effort to align, where relevant, its programme with the international Strategic Research Agenda which was launched by the Water Joint Programming Initiative in May 2013.

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Theme 1: Safe Water

Water quality and human health may be threatened by emerging pollutants, priority substances, endocrine disruptors and emerging risks such as pathogens (including antibiotic resistant bacteria and viruses), cyanotoxins and nanomaterials. Key knowledge gaps remain concerning their environmental behaviour in surface water, treated waters and groundwater, and their impact on human health through the irrigation of crops, water supply, distribution and storage in rural or urban environments. In addition, water quality and supply can be threatened by climate change, natural hazards and extreme events such as droughts and floods.

This thematic area will:

- Provide a better understanding of the fate and behaviour of new or poorly understood contaminants and their impacts on water quality with a particular emphasis on drinking and bathing waters, and on ecosystems and human health.
- Improve our resilience to climate change, extreme events and natural hazards. It will support the implementation and refinement of the relevant policies and also develop new tools and best practices in relation to water infrastructure and the prediction & management of natural hazards to ensure that economic investments in this area will result in the on-going availability and delivery of high quality water.
- Develop a better understanding of the socio-economic aspects, governance and behavioural changes associated with this area, including impact of water charges on water consumption, as well as behavioural changes in relation to water conservation and consumption.

Theme 2: Ecosystem Services and Sustainability

Water demand and availability pressures, amplified by climate change (including the apparent changing frequency and severity of extreme events such as floods and droughts) have increased the stress on water bodies and associated ecosystems. The environment doesn't exist in isolation; it both affects and is affected by many aspects of our lives. Environmental resources and ecosystem services are direct inputs into the economy (EPA, 2012). The concept of ecosystem services is based upon the assumption that there is a connection between good ecological status and the provision of several benefits, such as water supply, food supply, biodiversity, landscape value, and others, and it is already used by some managers and decision makers as a powerful tool for building and implementing programs of measures. Approaches using ecosystem services could therefore potentially support WFD objectives.

This thematic area will:

- Further our understanding of ecosystems context, functions and processes, and safeguard natural resources for future generations by identifying measures to help the adaptation and reaction to current and future pressures on the aquatic environment.
- Develop new tools in the field of ecological engineering and early-warning systems.
- Develop a better understanding of the socio-economic aspects, governance and behavioural changes associated with this area, including issues of preservation vs. restoration costs and the demonstration of the economic value and social benefits of aquatic ecosystem services.

Theme 3: Innovative Water Technologies

Innovative technologies are required by the water industry to create products and services. This thematic area will contribute to improving the quantity and quality of water bodies, such that our resources will be used in a more efficient way; and gain a better understanding of the socio-economic aspects, governance and behavioural changes associated with this area. The objectives of this research area are aligned with the aims of the European "Resource Efficiency Roadmap".

This thematic area will:

- Develop novel treatment and distribution options and improve water systems efficiency focusing on aspects such as new materials and processes, new management tools, Information and Communication Technology (ICT), energy efficiency, and small scale water storage.
- Develop problem-solving research leading to the development of market-orientated solutions such as the development of sensor networks and real-time information systems in the water cycle and improved water treatment technologies.
- Improve the quantity and quality of water bodies and developing ways to use these resources more efficiently.
- Gain a better understanding of the socio-economic aspects, governance and behavioural changes associated within this area, including social acceptance of reused waste and assessing costs against beneficial outcomes to avoid disproportionate costs.

Theme 4: Understanding, Managing and Conserving our Water Resources

This thematic area will contribute to better use and protection of water resources, by gaining a better understanding of the potential impacts of human activities, such as abstractions, discharges and land-use on groundwater, rivers, lakes, estuaries and coastal waters; of the views of local communities and the ways of encouraging behavioural change; and of the means of minimizing these impacts. Particular attention will be given to pressures on water arising from agricultural activities. Regulatory measures are essential tools to ensure compliance with environmental standards of water quality and quantity. Understanding the mechanisms leading to improved water management will lead to better policy design, implementation and adaptation.

This thematic area will:

- Further an integrated approach to water management by improving our understanding of the impact of pressures on water quality and quantity, looking at adaptive water management approaches, as well as socio-economic issues.
- Promote the concept of water footprinting while increasing water resource efficiency and reducing water pollution.
- Strengthen socio-economic approaches to conserve our water resources, covering governance issues such as public participation and decision support systems (DSS) as critical tools to integrate scientific knowledge into decision-making, and facilitating buy-in/ policy acceptance from the public.
- Deal with socio-economic considerations and practical measures for mitigating the impacts of pressures.

Theme 5: Emerging and Cross-cutting Issues

This thematic area will cover the emerging policy and implementation research needs in relation to the implementation of the Water Framework Directive (WFD), as well as marine research considerations in support to the formulation and implementation of policies over the period 2014-2020.

Unconventional Gas Exploration & Extraction (UGEE)

This thematic area will include the multi-agency transboundary programme of research on the environmental impacts of Unconventional Gas Exploration & Extraction (UGEE). UGEE is an emerging issue in Ireland and involves high volume hydraulic fracturing (fracking) of low permeability rock to permit the extraction of natural gas on a commercial scale from unconventional sources such as shale gas deposits, coal seams and tight sandstones. The EPA is coordinating a multi-agency transboundary programme of research on environmental impacts of UGEE, which have significant water elements. This research will involve an extensive desk-based literature review of UGEE practices worldwide and some baseline-monitoring. It has been designed assist regulators North and South in fulfilling their statutory roles regarding this activity. This research programme is funded by the Environmental Protection Agency, the Department of Communications Energy and Natural Resources (DCENR) and the Northern Ireland Environment Agency (NIEA).

National and International linkages

Water Research Coordination Group

In 2010 the EPA and Enterprise Ireland (EI) established in a national Water Research Coordination Group (WRCG), which is a research-funders forum, where research priorities for inclusion in calls for research proposals and longer-term objectives are presented and discussed, with the aim of enhancing synergies and collaboration with other national funders, and avoiding duplication. As of 2014, the WRCG comprises of the EPA, EI, the DECLG, the Department of Agriculture, Food and the Marine, Teagasc, Science Foundation Ireland, Irish Research Council, the Geological Survey of Ireland, Marine Institute, Inland Fisheries Ireland, Office of Public Works, and Irish Water.

International Linkages

A number of critical international linkages have also been established to promote Irish environmental research into the international arena including enhanced participation in the European Research Area (e.g. Framework Programme, Joint Programming Initiatives, Horizon2020, and European Innovation Platform on Water). By ensuring that Ireland is represented in significant European initiatives related to Water, the EPA will promote an increased efficiency, critical mass and impact of water research in Ireland.

Further Information

Over 70 research reports have been published by the EPA in the past 10 years in the area of Water, including policy support for WFD, novel treatment technologies, early warning systems, monitoring of priority substances, management strategies and more. For more, see www.epa.ie/researchandeducation/research/

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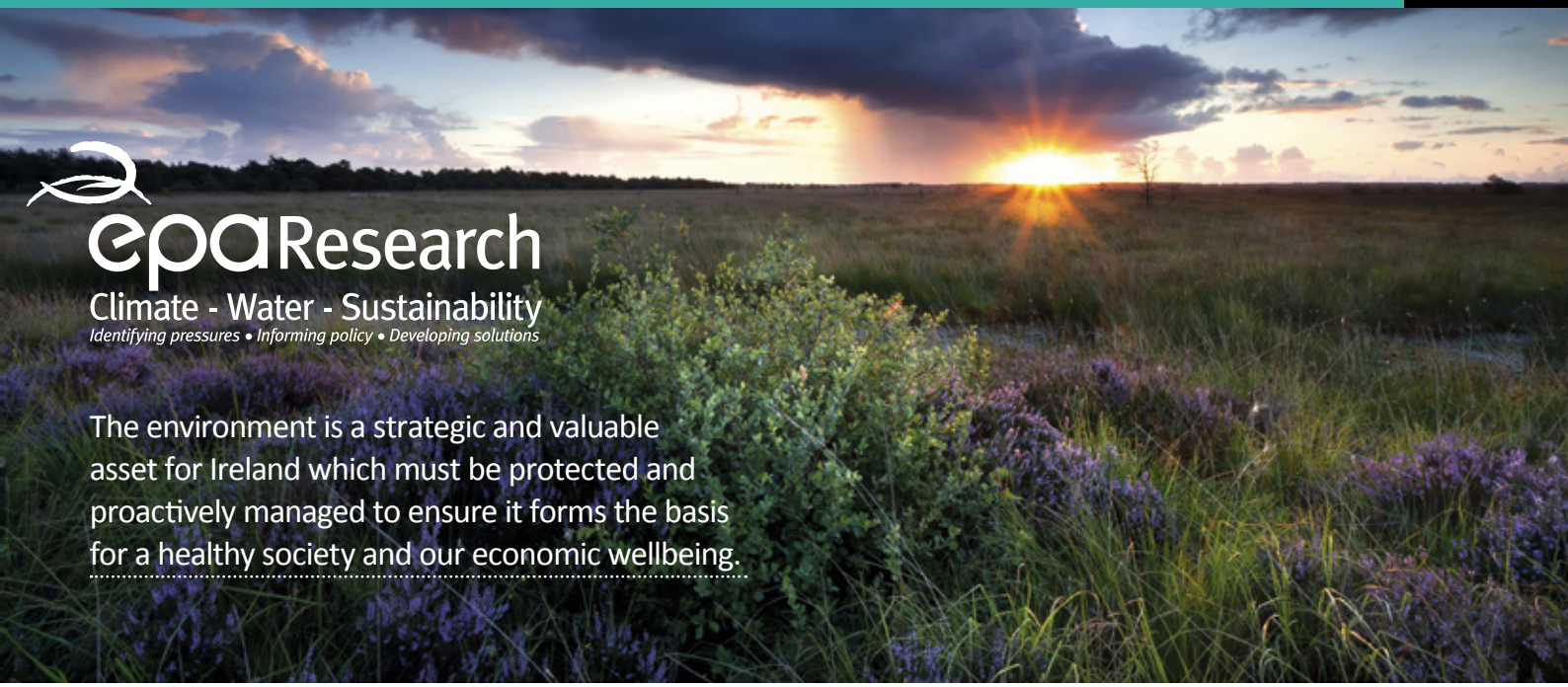

There is growing acknowledgement internationally that our current production and consumption behaviours as well as our governance and development choices cannot be sustained without posing a significant threat to the environment and to human health.

In line with Irish, European and international policies, Ireland needs to transition towards a resource-efficient, low-carbon and environmentally-friendly economy in which the resources and services provided by our planet are protected and enhanced, and citizens' health and wellbeing are safeguarded.

Previous research

Between 2007 and 2013, the EPA STRIVE Programme funded 149 Sustainable Environment Research Projects with a budget over €10,000, with a total commitment from the EPA of approximately €27m. The range of projects funded includes desk-studies, scholarships, fellowships and large-scale multi-annual and multi-partner awards. The research led to increased capacity, improved knowledge and awareness. Outputs included theses, reports, peer reviewed papers, contributions to policy, workshops and seminars.

Research Programme 2014-2020

The Sustainability pillar of the EPA's Research Programme 2014-2020 is designed to identify pressures, inform policy and develop solutions to environmental challenges within the following four thematic areas through the provision of strong evidence-based scientific knowledge:

- Resource Efficiency
- Health & Wellbeing
- Natural Capital and Ecosystem Services including soils and biodiversity
- Socio-Economic Aspects of a Sustainable Environment

Some research topics may be cross-cutting over different research pillars/themes/sub-themes and will be assigned to one specific area by the EPA's research programme. EPA Research will work with other research funders in Ireland to coordinate sustainability research, and enhance synergies and collaboration.

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Theme 1: Resource Efficiency

In a world with growing pressures on resources and the environment, Ireland has no choice but to transition to a resource-efficient and ultimately regenerative circular economy. Irish and EU policy is driving this transition. This challenge presents us with many opportunities. Increasing resource efficiency is key to securing growth and jobs for Ireland as well as reducing our carbon footprint, limiting the environmental impact of resource use and increasing our sustainability.

The overall goal for this thematic area is to support research that will deliver solutions for more efficient use of resources, water and materials. In line with the Waste Framework Directive waste treatment hierarchy, prevention and minimisation should be prioritised. Where waste arises, research will be supported into approaches and technologies that recover the value in waste to yield raw materials for other processes and/or energy.

Resource Efficiency research will have four sub-themes:

- Supporting Policy and Enforcement.
- Resource Efficient Production.
- Waste as a Resource.
- Sustainable Waste Treatment Options.

Theme 2: Health & Wellbeing

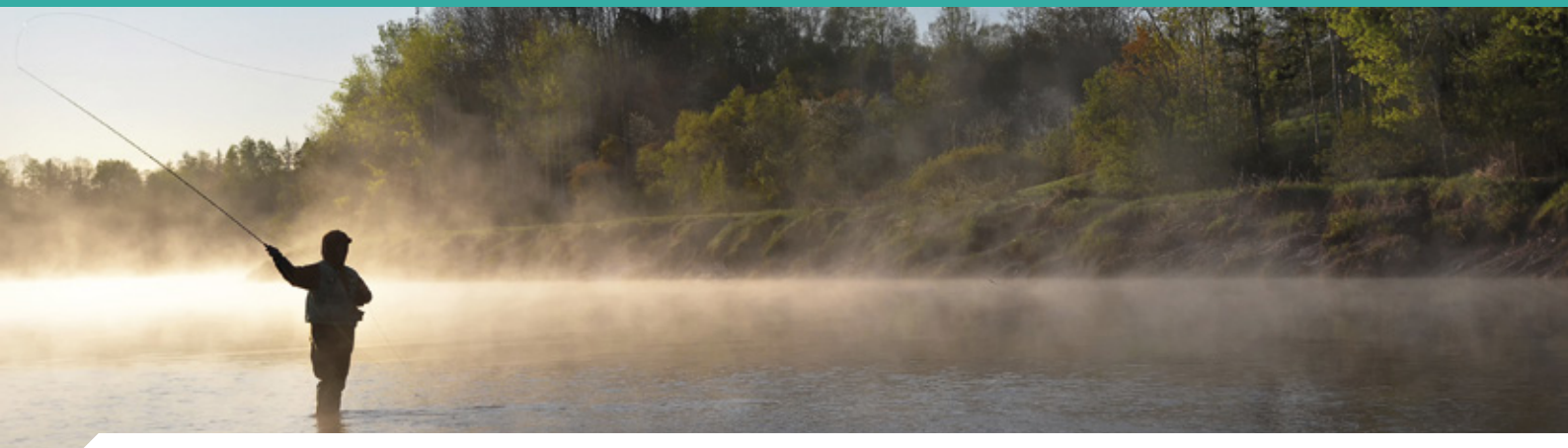
Human health is fundamentally linked to our environment since our health depends on, for instance, the air we breathe, the water we drink, the noise levels we experience, the food we eat and our sense of wellbeing.

The EPA addresses a broad range of environmental health issues including those that lie beyond its regulatory remit such as indoor air quality. The aim of the research funded under the Health & Wellbeing theme is: a) to develop national capacity in key areas; b) to generate data and make assessments of priority issues for Ireland; and, c) to mobilise this knowledge for use in environment and health protection.

Health & Wellbeing research will have four sub-themes:

- Ecosystem Benefits for Health.
- Safe Water for Drinking Food Production and Recreation.
- Clean Air & Noise.
- Chemicals and Other Threats.

Strategy 2014-2020 : **Sustainability**



Theme 3: Natural Capital and Ecosystem Services including soils and biodiversity

Natural capital refers to the elements of nature that produce value directly and indirectly to people, such as the stock of forests, rivers, land, minerals and oceans. It includes the living aspects of nature, such as fish stocks, as well as the non-living aspects such as minerals and energy resources.

Natural capital provides a huge range of benefits to us. These benefits, frequently referred to as ecosystem services, include the provision of food, materials, clean water, clean air, climate regulation, flood prevention, pollination, recreation and wellbeing. Since the flow of services from ecosystems requires that they function as whole systems, the structure and diversity of ecosystems are important components of natural capital. In this regard biodiversity, soil composition, land cover and land use are important elements to consider.

We continue to seriously degrade our natural capital, undermining our resilience to environmental shocks and jeopardising our sustainability. Sustainable management of natural capital is therefore required to protect and enhance the services we derive from it. This will require an integrated and cross-sectoral approach embedding ecosystem approaches such as natural capital, ecosystem services and green infrastructure into policy and practice.

Natural Capital and Ecosystem Services research will have three sub-themes:

- Evaluation/Assessment of our Natural Capital.
- Managing, Protecting & Restoring our Natural Capital.
- Governance & Behavioural Changes.

Theme 4: Socio-Economic Aspects of a Sustainable Environment

Environmental socio-economic research looks at the relationship between economy, society and environment. It is the study of the sociological and economic factors, policies, behaviours, instruments, interactions, interventions, etc., that exert an influence – for good or bad – on our environment. It seeks to identify opportunities for, and roadblocks to, leveraging and sustaining environmental gains through socio-economic approaches or mechanisms.

This theme will examine the role of social and economic 'forcers' that trigger, motivate, create barriers or solutions to sustainable production/provision of goods and services, and sustainable consumption choices and behaviour change. This theme is also interested in the effectiveness of existing or possible future government policies and measures in promoting sustainability in consumption and/or production.

Socio-Economic Aspects of Sustainable Environment research will have three sub-themes:

- Production & Service Provision.
- Consumption.
- Governance.

Linkages

Synergies and enhanced collaboration with other national funders is a key objective of the EPA Research Programme. This is facilitated by the Sustainability Research Coordination Group whose members include the Department of the Environment, Community & Local Government; Department of Agriculture, Food & the Marine; Department of Communications, Energy & Natural Resources; Health Research Board; Irish Research Council; National Parks & Wildlife Service; and the National Economic & Social Council.

National

A number of other linkages will contribute to the research programme:

- Health Advisory Committee.
- National Biodiversity Action Plan working group.
- National Platform for Biodiversity Research.

International

A number of international linkages have been established to promote Irish environmental research in the European Research Area. By ensuring that Ireland is represented in significant European initiatives such as Horizon 2020, Joint Programming Initiatives, and the European Innovation Partnership (EIP) on Raw Materials, the EPA will aim to increase the critical mass, reach and impact of Irish environmental research.

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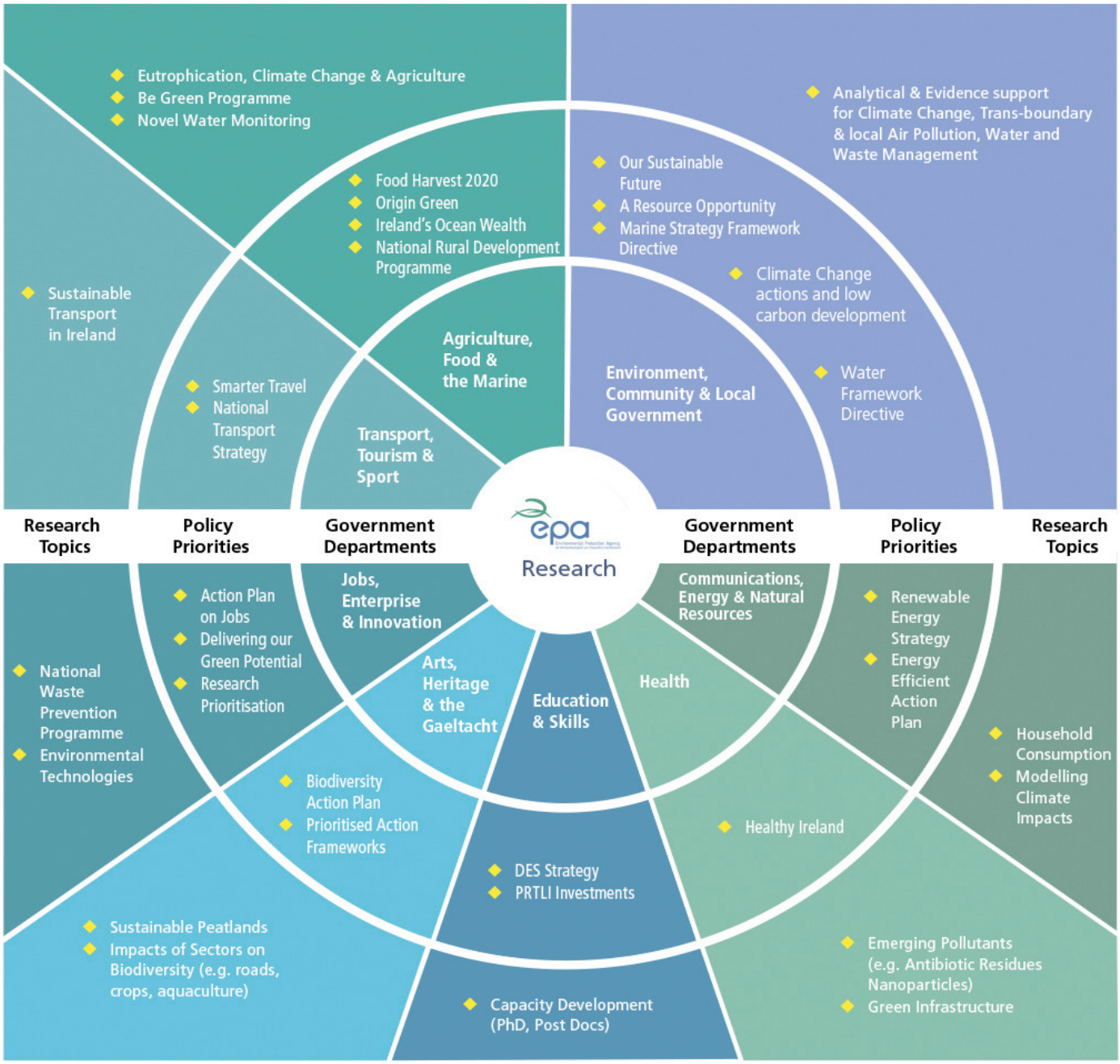
The knowledge generated by EPA Research can help Irish people make better choices about their futures - from the government using our knowledge and data to inform their policy making, to enabling individual citizens to make more sustainable and healthier decisions in their daily lives.

EPA Research will communicate our research as clearly as possible to a wide range of audiences, while ensuring the basic science is not compromised. Options for communications will range from large scientific reports and journal papers, to infographics and tweets. EPA Research also supports open data and open access and all projects funded by EPA Research will have to share their journal articles, data, analysis and all outputs wherever possible.

Informing Policy

One of the primary goals of EPA Research is to inform policy. Government departments are a key audience, and EPA Research outputs are relevant to policy, practice, legislation and service delivery:



How we will communicate our work in 2014

The web remains the most important communication channel for the programme. We are reducing the number of physical reports we publish to reduce our environmental impact. We are always looking for new and better ways to communicate. A selection of what we have planned for 2014 is below:

Channel	Details	Comment	Primary audience
Web	epa.ie SAFER data –repository for data and outputs generated by EPA research, Searchable database of EPA research projects	Maintain and enhance epa.ie http://www.epa.ie/researchandeducation/research/ SAFER-DATA: http://erc.epa.ie/safer/ Searchable database of projects http://erc.epa.ie/smartsimple/	Researchers EPA staff Policymakers Funders Citizens
EPA Research News – email newsletter	Quarterly e-mail newsletter	Targeted communication highlighting our work on a quarterly basis. Launched March 2014. Email research@epa.ie with the subject line 'Subscribe' if you would like to receive future issues.	Researchers Funders Policy makers Media Interested public
National/Public Events	Meetings Seminars Lectures	Horizon 2020 Info Day planned Support for events such as the ESAI ENVIRON (TCD) Climate Change Lectures planned for 2014 – May 27th Thomas Stocker	Researchers EPA staff Policy makers Citizens
International Events	Aarhus, IPCC and UNFCCC meetings, Minamata, Montreal, Nagoya, Stockholm, etc.	Number of activities planned around 5th IPPC report	EPA Staff Policy makers NGOs
Social Media	Twitter - @EPAClimateNews, @EPAResearchNews, @SaferData YouTube – videos (e.g. EcoEye, Science Squad) LinkedIn – publicising consultations, publications SlideShare – presentations Pinterest – images and infographics	Regular use of all these engagement channels planned in 2014 http://youtube.com/epaireland https://www.linkedin.com/company/502159 http://www.slideshare.net/epaireland http://www.pinterest.com/epaireland/	All
Newspapers	Press releases, Reporter briefings, Op-Eds Newspaper science supplements	Major reports will be accompanied by press releases and targeted briefings where appropriate. Researchers will also be encouraged to engage with media and wider public where possible via their research offices.	Citizens Media
Targeted Briefings	For National Policy Makers, State Agencies, North–South	Update on key projects to EPA Board & bilaterals with DECLG, Enterprise Ireland, SFI	EPA Board Policy makers
Television	Eco-Eye, Science Squad	2–3 projects featured	Citizens Media
Radio	Target mainstream & science radio shows	e.g. Futureproof on Newstalk	Citizens Media
Education	Sponsorship of various events	Significant sponsorship of Third Level events nationwide. Possible sponsorship of Science Week, , increased engagement with Young Scientists & Second Level (Irish Science Teachers Association)	Primary, Secondary Third Level
Outreach	Work with Science Technology, Engineering and Maths (STEM) organisations and NGOs	Working with other organisations (e.g Science Gallery on Strange Weather in Q3 2014), NGOs (e.g. Birdwatch Ireland, IPCC, IEN) Possible co-sponsorship of films with environmental theme for Science Week film festival	Citizens NGOs Media

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Our implementation plan lists a snapshot of activities for 2014. Items in green are indicative dates for research calls and announcements. All dates are subject to change.

For an up to date listing of environmental research events that are organised or supported by the EPA see the events calendar on http://www.epa.ie/researchandeducation/research/

Date	Item	Comment
January-March	New 2013 Projects start	Over 30 projects awarded in late 2013. Various kick off meetings held in Q1.
January 14th	Horizon2020 Roadshow in TCD	Alice Wemaere presenting
January 17th	Invitation to UGEE tender closes	
January-March	Horizon 2020 Roadshows (DIT, UCC, NUIG, IT Sligo)	Mark Sweeney (EI) presenting
January 24th	Horizon2020 Societal Challenge 5 Working Group Meeting	Meeting Held - Hosted by EPA
February 7th	Horizon 2020 Roadshow in UCD	Alice Wemaere presenting
February 26th to 28th	ENVIRON held in TCD	EPA are primary sponsor of this event which is organised by ESAI. Session chaired by Lisa Sheils
March 4th	H2020 Roadshow in DCU	Alice Wemaere presenting
March 10th to 12th	CIRCLE-2 ERA-Net – European partnership on climate change adaptation	End of project conference
March 11th	Biochar/Hydrochar workshop	Event funded by STRIVE, Eamonn Merriman. Munoo Prasad and Mike Hayes are national organisers.
March 27th	Programme Committee for Horizon 2020	Brian Donlon attending
April 3rd	European innovation Partnership on Water task force in Brussels	Brian Donlon Presenting
April 8th	HYDROFOR Workshop	Alice Wemaere presenting
April 8th	1st H2020 Call closes	
April 15th	Irish Passive Sampling Research Workshop	DCU 1st Workshop
May19th-24th	In-Country Expert Review of the 6th National Communication and 1st Biennial Report of Ireland	Custom House, Dublin - This review will be undertaken by national experts including EPA team members from the CCRP and climate research specialists
May 27th	Climate Change Lecture Series: Climate Change Now: The Facts	Dr Thomas Stocker, IPCC WG1 Co-chair and lead author
May 27th-28th	Water JPI Governing Board Meeting	EPA attending - Alice Wemaere, Dara Lynott
May 29th	Climate change adaptation guidelines workshop for local authorities	EPA Richview
May 29th	EPA Climate Change Seminar Inventories, projections, ETS and IPCC AR5 key messages	Chartered Accountants House, D2 Dr Frank McGovern, head of Climate research, will speak on IPCC AR5 key messages
June 6th	Programme Committee Meeting for Horizon 2020 in Brussels	Laura Burke who is chair of Advisory Group for Societal Challenge 5 (Climate Action) presenting at this meeting
June 10th	Climate change adaptation for sectors seminar	Custom House, Dublin
June 24th	LIFE Information Day, Dublin	Organised By DECLG
Late June	Research calls open	New call in three pillar areas
July	Updated H2020 2014/15 work programme published	
Late July	Research calls close	Proposals sent for peer review
September 1st	PATHWAYS Final Workshop	Contact EPA for further details
September 15th	Public Launch of Irish Soil Information System (ISIS)	Contact EPA for further details
September	EPA@TheMovies - Screening of film in IFI Dublin	The EPA will build on the success of the 'Chasing Ice' screening in the IFI in 2013 and in UCC in early 2014.
September 16th	2nd H2020 Call closes	
October 2nd	Horizon 2020 Societal Challenge 5 Information Day	Speakers from EC, representatives from JPIs, EIPs etc. as well as national experts
October 8th-9th	Water JPI Executive Board Meeting	EPA attending - Alice Wemaere, Brian Donlon
October 28th	SILTFLUX Project	Contact EPA for further details
October-November	Research Awards Announced	Approximately 30 new research awards will be made in 2014
November 4th	European Innovation Partnership on Water task Force Meeting	Brian Donlon attending
November 5th	European Innovation Partnership Annual Conference in Brussels	Free to attend event – details will be available on http://www.eip-water.eu/events

Research Reports :: Published January – May 2014

Report Number	Report Title	Author & Affiliation
STRIVE 109	Norovirus in Wastewater and Shellfish	Bill Dore & John Flannery, Marine Institute
STRIVE 120	Assessment and Monitoring of Ocean Noise in Irish Waters	Joanne O'Brien, Galway Mayo Institute of Technology
STRIVE 121	Mapping the spatio-temporal distribution of underwater noise in Irish Waters	Gerry Sutton, University College Cork
STRIVE 122	State of the Art Recycling Technology for Liquid Crystal Displays	Lisa O' Donoghue, University of Limerick
STRIVE 123	Management options for the collection, treatment and disposal of sludge derived from domestic wastewater treatment systems	Michael F. Joyce & Kathryn Carney, Ryan Hanley Consulting Engineers
STRIVE 124	Web-Based Monitoring of Gas Emissions from Landfill Sites using Autonomous Sensing Platforms	Dr Fiachra Collins, Dublin City University
STRIVE 125	Supporting the concept of Early warning Analysis - SCEWA	Dr Ioannis M. Dokas, University College Cork

Research Reports :: Scheduled for publication in 2014

Report Number	Report Title	Author & Affiliation
EPA Research Report 118	Interactions of soil hydrology, land use and climate change and their impact on soil quality (SoilH)	Gerard Kiely, University College Cork
EPA Research Report 126	The Application of Geophysics to a Number of Threats to Irish Soil	Shane Donohue, University College Dublin
EPA Research Report 127	Estimating the value to Irish society of benefits derived from water related ecosystem services: A discrete choice approach	Stephen Hynes, National University of Galway
CCRP 31	Influence of transboundary air pollution on acid sensitive ecosystems	Julian Aherne, Trent University
CCRP 32	Towards a national hedgerow biomass inventory for the LULUCF sector using LiDAR remote sensing	Kevin Black
CCRP TBC	Irish Climate Change Information Portal	Barry O'Dwyer and Jeremy Gault, Coastal and Marine Research Centre, University College Cork

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Research plays a pivotal role in environmental protection by providing the knowledge to better understand and manage issues such as climate change and water quality & availability. In parallel, the development of innovative and environmentally friendly technologies can offer sustainable economic opportunities through the responsible management of both natural and man-made resources. Often, environmental challenges go beyond national frontiers and require a coordinated approach at European and often global level.

Horizon 2020

Horizon 2020 is the EU's main instrument for funding research and development which runs from 2014 to 2020. There are a variety of funding mechanisms in Horizon 2020 (e.g. individual fellowships, infrastructural awards and collaborative research projects).

EPA Research's 2014-2020 strategy will align closely with Horizon 2020, in particular Societal Challenge 5: Climate action, environment, resource efficiency and raw materials. At least 60% of the overall Horizon 2020 budget is expected to be related to sustainable development. In addition, climate-related expenditure is expected to exceed 35% of the Horizon 2020 budget, as part of the multi-annual financial framework commitment to allocate 20% of all EU spending to the mainstreaming of climate action.

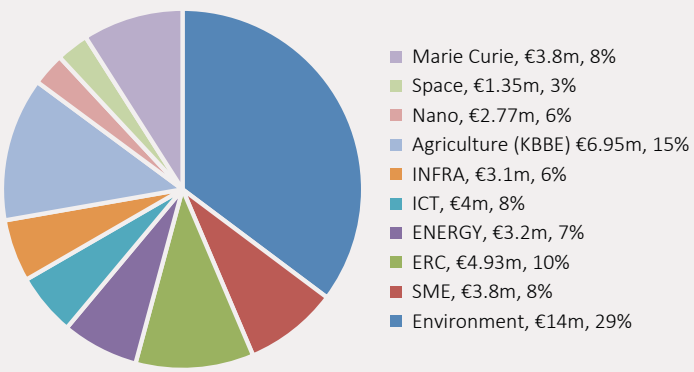
This presents specific opportunities for Ireland's researchers and companies in the areas of climate change, waste-as-a-resource and water. There is significant opportunity to transform societal challenges into innovation opportunities for businesses, communities and other groups. This will involve networking our social scientists, engineers and innovators to influence positive behavioural change to enable us to become a resource efficient, low-carbon society.

The EPA is participating at national level with the Horizon 2020 National Support Network, including a National Delegate and a National Contact Point, and has developed a Catalogue of Environmental Research Expertise in Ireland to support engagement with national and European research activities. **http://erc.epa.ie/h2020catalogue**

Framework Programme 7 (FP7)

Under FP7, the predecessor of Horizon 2020, Ireland's environmental researchers have been successful in over 100 projects worth approximately €46m across the entire FP7 programme. Irish researchers ability to compete for this research at European level has been significantly enhanced by long-term investment in environmental research by Ireland, including the EPA's STRIVE programme.

Breakdown of the €46m worth of FP7 projects awarded to Irish environmental researchers under various areas of the programme up to mid-2013



Joint Programming Initiatives

Joint Programming Initiatives (JPIs) aim to enhance collaboration between national research programmes in Europe to address key societal challenges in a more efficient and effective manner. The EPA is involved with two JPIs at Governing and Executive Board Level. JPI implementation involves harmonising national/regional research agendas and developing joint activities in response to the identified societal challenges and jointly funding new transnational research initiatives.

Water challenges cannot be successfully tackled through the isolated effort of individual national research and innovation programmes. The JPI "Water challenges for a changing world" is a collaboration between 19 European countries and deals with research in the field of water and hydrological sciences. The availability of water in sufficient quantities and adequate quality is indeed a public issue of high priority and addresses a pan-European and global environmental challenge.

JPI Climate is a collaboration between 14 European countries to coordinate jointly their climate research and fund new transnational research initiatives. It connects scientific disciplines, enables cross-border research and increases the science-practice interaction. JPI Climate contributes to the overall EU objective of developing a European Research Area and is coordinated with the EU's Horizon2020 programme in support of excellent science, industrial leadership and the European response to climate change - one of the great societal challenges of our times.

The EPA is involved with two recent joint transnational calls –

- Emerging Water Contaminants – anthropogenic pollutants and pathogens
- Societal Transformation in the Face of Climate Change

European Innovation Partnerships

European Innovation Partnerships (EIPs) are a new approach to EU research and innovation focusing on societal benefits and a rapid modernisation of the associated sectors and markets. EIPs streamline, simplify and better coordinate existing instruments and initiatives and complement them with new actions where necessary. They act across the whole research and innovation chain, bringing together all relevant actors at EU, national and regional levels, making it easier for partners to co-operate and achieve better results.

The EPA is represented on the recently established task forces for the European Innovation Partnership (EIP) on Water and on Raw Materials.

EIP Water

The EIP Water facilitates the development of innovative solutions to address major European and global water challenges and supports the creation of market opportunities for these innovations, both inside and outside of Europe. It aims to remove barriers by advancing and leveraging existing solutions. Its implementation has started in May 2013 with the main objective to initiate and promote collaborative processes for change and innovation in the water sector across the public and private sector, non-governmental organisations and the general public. **http://www.eip-water.eu/**

EIP on Raw Materials

The EIP on Raw Materials has a number of objectives: to reduce the EU's dependency on imports of raw materials; to promote production and exports both by improving supply conditions from within and outside the EU, and by providing resource efficiency and alternatives in supply; and to bring Europe to the forefront in the raw materials sector, whilst also mitigating the sector's negative environmental, social and health impacts. **https://ec.europa.eu/eip/raw-materials/en**

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