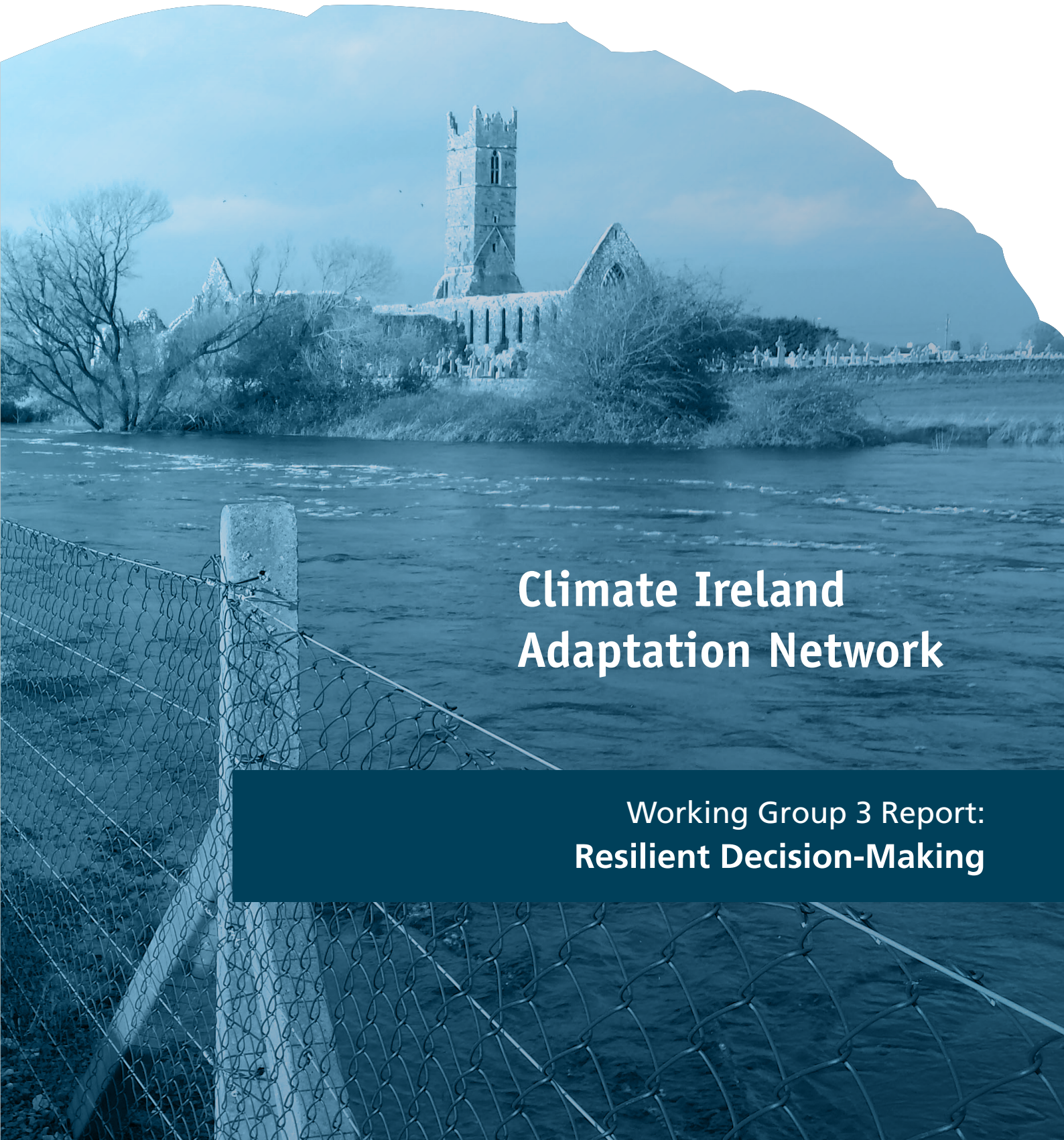
Climate Ireland



Climate Ireland Adaptation Network

Working Group 3 Report:
Resilient Decision-Making

Environmental Protection Agency

The EPA is responsible for protecting and improving the environment as a valuable asset for the people of Ireland. We are committed to protecting people and the environment from the harmful effects of radiation and pollution.

The work of the EPA can be divided into three main areas:

- **Regulation:** Implementing regulation and environmental compliance systems to deliver good environmental outcomes and target those who don't comply.
- **Knowledge:** Providing high-quality, targeted and timely environmental data, information and assessment to inform decision making.
- **Advocacy:** Working with others to advocate for a clean, productive and well-protected environment and for sustainable environmental practices.

Our responsibilities include:

LICENSING

- Large-scale industrial waste and petrol storage activities;
- Urban wastewater discharges;
- The contained use and controlled release of genetically modified organisms;
- Sources of ionising radiation;
- Greenhouse gas emissions from industry and aviation through the EU Emissions Trading Scheme.

NATIONAL ENVIRONMENTAL ENFORCEMENT

- Audit and inspection of EPA-licensed facilities;
- Drive the implementation of best practice in regulated activities and facilities;
- Oversee local authority responsibilities for environmental protection;
- Regulate the quality of public drinking water and enforce urban wastewater discharge authorisations;
- Assess and report on public and private drinking water quality;
- Coordinate a network of public service organisations to support action against environmental crime;
- Prosecute those who flout environmental law and damage the environment.

WASTE MANAGEMENT AND CHEMICALS IN THE ENVIRONMENT

- Implement and enforce waste regulations including national enforcement issues;
- Prepare and publish national waste statistics and the National Hazardous Waste Management Plan;
- Develop and implement the National Waste Prevention Programme;
- Implement and report on legislation on the control of chemicals in the environment.

WATER MANAGEMENT

- Engage with national and regional governance and operational structures to implement the Water Framework Directive;
- Monitor, assess and report on the quality of rivers, lakes, transitional and coastal waters, bathing waters and groundwaters, and measurement of water levels and river flows.

CLIMATE SCIENCE AND CLIMATE CHANGE

- Publish Ireland's greenhouse gas emission inventories and projections;
- Provide the Secretariat to the Climate Change Advisory Council and support to the National Dialogue on Climate Action;
- Support National, EU and UN climate science and policy development activities.

ENVIRONMENTAL MONITORING AND ASSESSMENT

- Design and implement national environmental monitoring systems: technology, data management, analysis and forecasting;
- Produce the State of Ireland's Environment and Indicator Reports;
- Monitor air quality and implement the EU Clean Air for Europe Directive, the Convention on Long Range Transboundary Air Pollution and the National Emissions Ceiling Directive;
- Oversee the implementation of the Environmental Noise Directive;
- Assess the impact of proposed plans and programmes on the Irish environment.

ENVIRONMENTAL RESEARCH AND DEVELOPMENT

- Coordinate and fund national environmental research activity to identify pressures, inform policy and provide solutions;
- Collaborate with national and EU environmental research activity.

RADIOLOGICAL PROTECTION

- Monitoring radiation levels and assess public exposure to ionising radiation and electromagnetic fields;
- Assist in developing national plans for emergencies arising from nuclear accidents;
- Monitor developments abroad relating to nuclear installations and radiological safety;
- Provide, or oversee the provision of, specialist radiation protection services.

GUIDANCE, AWARENESS RAISING, AND ACCESSIBLE INFORMATION

- Provide independent evidence-based reporting, advice and guidance to government, industry and the public on environmental and radiological protection topics;
- Promote the link between health and wellbeing, the economy and a clean environment;
- Promote environmental awareness including supporting behaviours for resource efficiency and climate transition;
- Promote radon testing in homes and workplaces and encourage remediation where necessary.

PARTNERSHIP AND NETWORKING

- Work with international and national agencies, regional and local authorities, non-governmental organisations, representative bodies and government departments to deliver environmental and radiological protection, research coordination and science-based decision making.

MANAGEMENT AND STRUCTURE OF THE EPA

The EPA is managed by a full-time Board, consisting of a Director General and five Directors. The work is carried out across five Offices:

- Office of Environmental Sustainability
- Office of Environmental Enforcement
- Office of Evidence and Assessment
- Office of Radiation Protection and Environmental Monitoring
- Office of Communications and Corporate Services

The EPA is assisted by advisory committees who meet regularly to discuss issues of concern and provide advice to the Board.

Climate Ireland

Climate Ireland Adaptation Network

Working Group 3 Report:
Resilient Decision-Making

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Disclaimer

This Climate Ireland Adaptation Network (CIAN) working group report summarises discussions from working group meetings and written contributions from CIAN members. It is intended to reflect a range of perspectives shared from the group and should be treated as a working document and not interpreted as representing the official views or endorsement of individual contributors or the Environmental Protection Agency (EPA). The EPA, the CIAN working group members and the authors do not accept any responsibility whatsoever for loss or damage occasioned, or claimed to have been occasioned, in part or in full, as a consequence of any person acting, or refraining from acting, as a result of a matter contained in this publication. All or part of this publication may be reproduced without further permission, provided the source is acknowledged.

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Contents

Executive summary

The planet is warming, with Europe warming twice as fast as the global average and extreme weather events becoming more frequent and intense. In this context, there is a need to protect ecosystems, communities, and businesses from the impacts of climate change through adaptation and build resilience into the future. While adaptation refers to the actions taken to adjust to climate impacts, resilience describes the capacity of systems to withstand, absorb, recover, and learn from those impacts.

The role of the Climate Ireland Adaptation Network (CIAN), which was established by the Environmental Protection Agency (EPA) in 2023, is to provide a forum which encourages individuals and organisations to work together to deliver improvements in implementing adaptation measures. It also acts as a space where individuals share experiences, seek help from each other and learn from their peers. Following the CIAN seminar in October 2024, four working groups were convened to advance understanding of critical topics in climate adaptation and resilience: technical definitions of resilience, just resilience, resilient decision-making, and indicator development.

The working groups were designed as collaborative, co-production spaces that enabled participants to openly share their views, practices, and perspectives. A core goal of the CIAN working groups was to enhance communication between stakeholders, build stronger links across Ireland's adaptation community, and provide a forum to discuss adaptation topics and identify practitioner needs and knowledge gaps. The meetings and workshops themselves were an important outcome, bringing people together, strengthening relationships, and advancing collective learning across the adaptation community.

This report summarises the output of Working Group 3, which focused on resilient decision-making, how frameworks are developed and applied across sectors and scales to support effective, long-term adaptation planning. The report is designed to capture current perspectives, opinions, challenges, and opportunities related to the working group's topic. It serves as a shared reference point for stakeholders, supporting adaptation planning and practice by consolidating insights and framing key considerations for future action. By presenting practitioner-informed views, the report aims to strengthen understanding and encourage dialogue across sectors.

The group explored six key areas:

1. Defined resilient decision-making frameworks
2. Adaptation options at different scales
3. Risk registers and risk assessments for future planning
4. Different information needs
5. Extreme event planning
6. Private sector adaptation planning

Robust frameworks are essential to reduce maladaptation, ensure investment efficiency, and align actions with future climate scenarios. Without them, adaptation measures risk being short-term, reactive, or misaligned with projected risks. The six areas mentioned here aim to move Ireland from ambition to implementation of climate adaptation measures by embedding climate resilience into national strategies, sectoral plans, and local authority actions.

The working group also identified a number of cross-cutting issues, including the need for strong coordination between national, sectoral, and local governance scales, supported by Climate Action Regional Offices (CAROs) and aligned guidelines. Adaptation must be scalable using scenario-based planning (e.g. RCP4.5 and RCP8.5 scenarios), dynamic policy pathways, and foresight tools such as horizon scanning. Risk registers and feedback loops should guide infrastructure standards and capture cascading risks, while Nature-based Solutions (NbS) and green infrastructure need wider adoption despite financial and policy constraints. Inclusive climate resilience requires identifying vulnerable populations through participatory planning and clear indicators for vulnerability and justice outcomes. Gaps in national guidance, technical standards, and socio-economic data hinder consistent decision-making, while tools like WIRE and TRANSLATE show promise but require better access and training. Emergency preparedness must improve through integrated warning systems, and investment planning should account for health, biodiversity, and social benefits alongside economic costs. Promoting evidence-based and locally anchored adaptation strategies requires access to credible evidence and local knowledge, supported by appropriate co-operation between internal and external expertise.

The working group concludes that Ireland's climate adaptation strategy must evolve into a clear, inclusive, and future-ready framework. Policy priorities include establishing integrating reference warming trajectories into planning frameworks and updating infrastructure standards to reflect projected climate impacts. Vulnerability assessments should combine technical data with community perspectives, supported by justice metrics to ensure equitable outcomes. These assessments should then inform early-warning and emergency-response systems. Scenario planning, foresight tools, and monitoring frameworks must become standard practice, alongside improved digital access and training for adaptation tools (i.e. early warning and emergency response systems). Moving forward, Ireland must transition from fragmented guidance to coordinated, equity-driven action that transforms climate resilience from policy ambition into lived reality.

1. Introduction

Purpose of the report

Following the CIAN seminar in October 2024, four working groups were convened to examine in more detail the following key adaptation and climate resilience topics:

- Working Group 1: Technical definitions of resilience
- Working Group 2: Just resilience
- Working Group 3: Resilient decision-making
- Working Group 4: Indicator development

The aims of the working groups were to:

1. Provide a forum to share, discuss, and summarise the current understanding and perspectives of sectors in relation to important climate resilience topics.
2. To identify practitioner (i.e. public agencies, semi-state bodies, private companies, academia, and civil society) needs and knowledge gaps.
3. To build stronger links between those involved in adaptation practices in Ireland.

Each working group was tasked with preparing a concise report summarising the work of the group.

Background of CIAN Working Group 3

The purpose of this working group was to explore how resilient decision-making frameworks are developed and applied across different sectors and scales. The group aimed to identify the tools, guidance, and capacities needed to support effective, long-term adaptation planning. This included considering the role of national frameworks, cross-sectoral coordination, and the development of clear, actionable guidance that supports both national and local implementation. A key focus for the group was building shared understanding amongst practitioners and capacity for resilience, including knowledge of foresight tools, risk assessments, and inclusive engagement, to ensure that climate resilience moves from aspiration to practical action.

This topic was selected because resilient decision-making enables choices that remain robust across multiple possible futures, which in turn reduces the risk of maladaptation and improves long-term investment efficiency and supports long-term flexible planning. Without robust decision-making frameworks, there is a risk of maladaptation, where measures become short-term, reactive, or misaligned with future climate scenarios, ultimately wasting resources and increasing vulnerability. The approach taken by this group reflects practitioner perspectives gathered through engagement, ensuring that the work is grounded in real-world challenges and sectoral priorities.

The group explored six key topics:

1. Defined resilient decision-making frameworks,
2. Adaptation options at different scales,
3. Risk registers and risk assessments for future planning,
4. Different information needs,
5. Extreme event planning,
6. Private sector adaptation planning.

Exploring these topics will help the adaptation community develop a clearer understanding of how Ireland can move from ambition to implementation, particularly in relation to coordinated governance, inclusive engagement, and sustained investment. Establishing resilient decision-making frameworks will also support the integration of adaptation into national strategies, sectoral plans, and local authority actions, ensuring that measures are robust, equitable, and responsive to future climate risks.

Scope and intended use of the report

This summary report is designed to capture current perspectives, opinions, challenges, and opportunities related to the working group's topic. It serves as a shared reference for stakeholders, supporting adaptation planning and practice by consolidating insights and framing key considerations for future action. By presenting practitioner-informed views, the report aims to strengthen understanding and encourage dialogue across sectors.

2. Methodology

The EPA facilitated the development of this report in partnership with members of the CIAN working group. This group consisted of representatives from diverse sectors and organisations, including public agencies, semi-state entities, private companies, academic institutions, and non-profit organisations.

The EPA organised three working group meetings in collaboration with working group members between April and October 2025 to assist in report drafting (see Figure 1 for the co-production process). An initial Table of Contents (ToC) was created through group discussions and was revised iteratively during the first two workshops based on participants' written and verbal feedback. This feedback was compiled and shared for further refinement in later meetings, with consensus being sought in each session. Consensus was established through structured discussion of each section, iterative revisions based on collective feedback, and confirmation of agreement from all participants during meetings. Where differing views arose, these were documented and considered in subsequent drafts to ensure transparency.

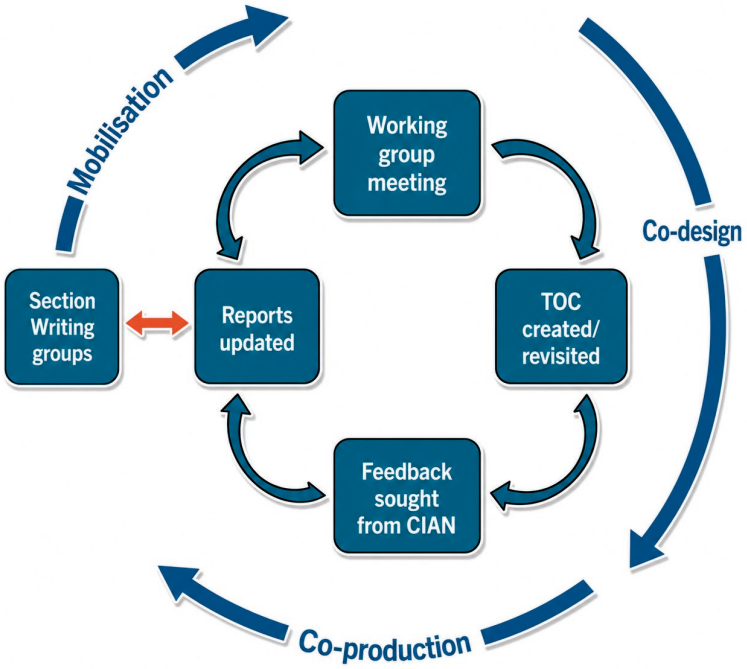

Figure 1: Co-production process with CIAN working group members. Starting with working group meetings there were three iterations of the cycle prior to the drafts being finalised.

Key themes that emerged from working group meetings were shared in the CIAN 2025 seminar, during which focused workshop sessions were organised to gather final input. This input was incorporated into the final report to ensure it represented the combined knowledge and viewpoints of practitioners within the climate adaptation community.

3. Defined resilient decision-making frameworks

In terms of the climate-resilient policy in Ireland, the National Adaptation Framework (NAF) provides a framework for guiding policy development and actions to make Ireland more resilient to the impacts of climate change through the Sectoral Adaptation Plans (SAPs) and Local Authority Climate Action Plans (LCAPs) (Department of Climate, Energy and the Environment, 2018, 2025). Figure 2 shows the six-step process to adaptation planning used in Ireland, as well as the more detailed EU guidelines on developing or updating adaptation strategies and plans (Figure 3). For new government infrastructure projects, existing guidelines provide opportunities for more dynamic and resilient decision making. Infrastructure guidelines (Department of Public Expenditure, Infrastructure, Public-Service Reform and Digitalisation, 2023) do require an assessment of the climate resilience of new infrastructure projects to the impacts of climate change, while specific appraisal frameworks have been developed for transport and flood relief schemes (OPW, 2026) and measures to enhance the climate resilience of existing critical infrastructure. Technical guidance is also available on climate proofing infrastructure from the EU Commission (2023) and through ISO 14090 and 14091 on adaptation and climate risk. However much of the existing infrastructure was developed in the absence of these frameworks and guidelines. Greater analysis is needed on how these frameworks are being applied and can be applied to existing vulnerable infrastructure, including the integration of green infrastructure solutions.

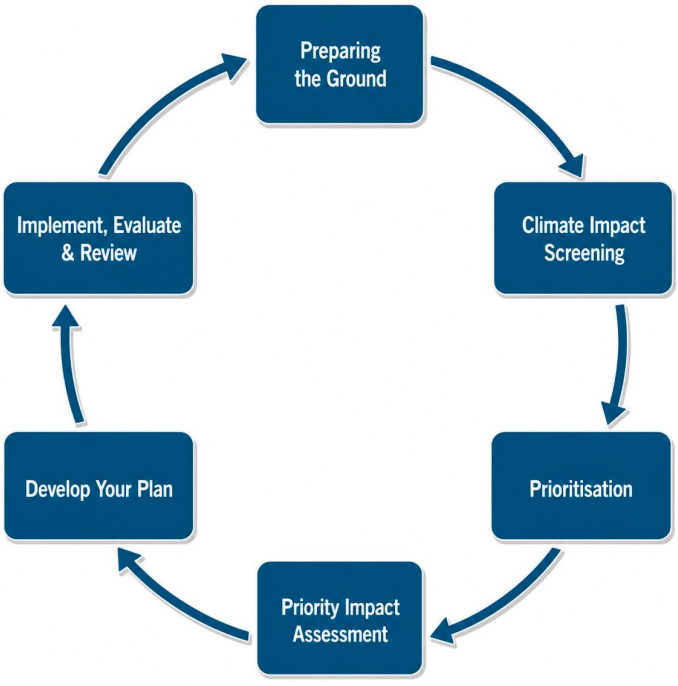

Figure 2: Guidelines for adaptation planning provided by the Irish Government.
Source: Department of the Environment, Climate and Communications. Sectoral Planning Guidelines for Climate Change Adaptation (2024)

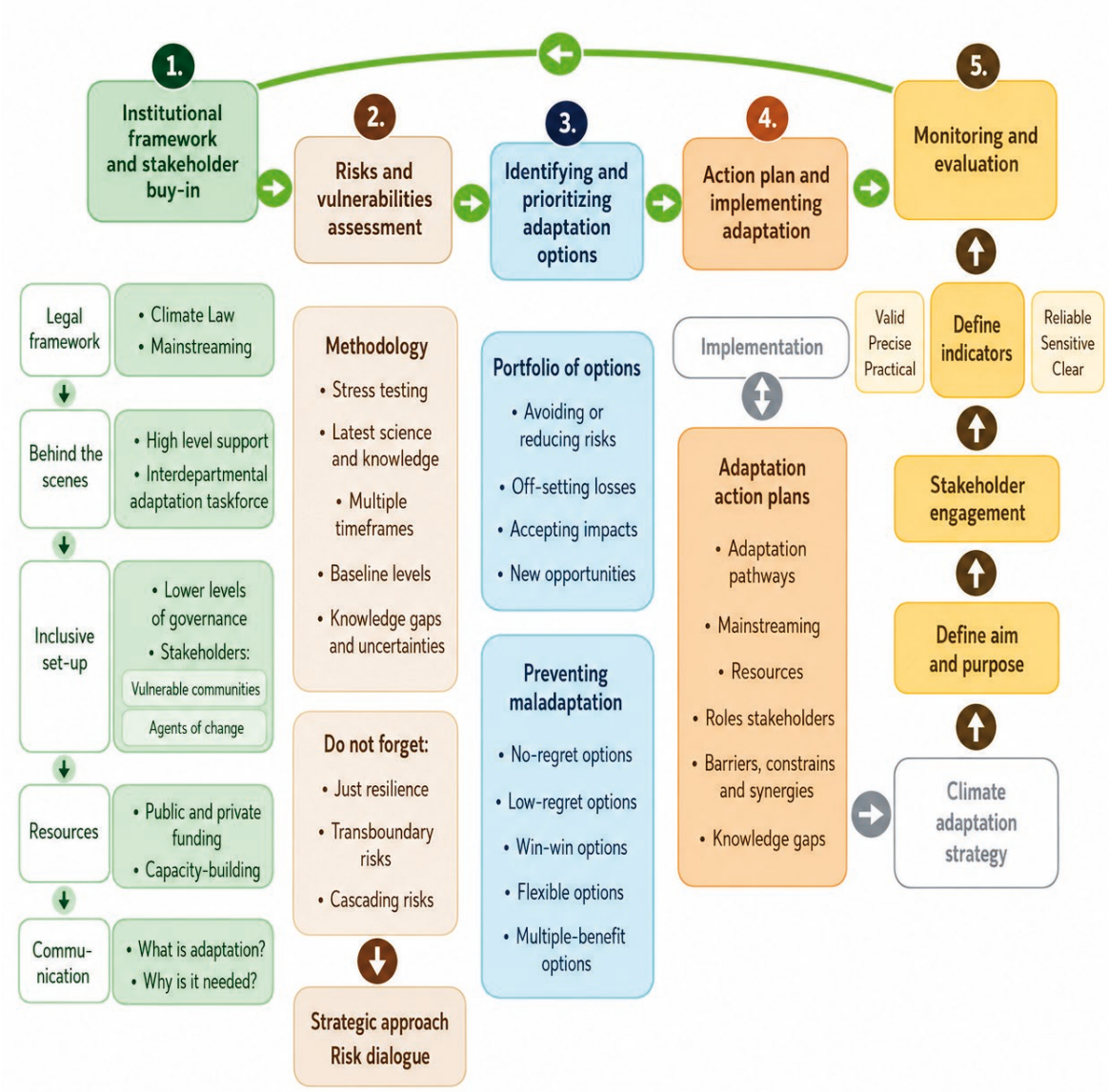

Figure 3: EU guidelines on developing and updating adaptation strategies and plans.
Source: European commission, Guidelines on Member States' adaptation strategies and plans (2023)

Government infrastructure guidelines and appraisal frameworks are already established and applied at both project and plan scales. Practitioners were also concerned about whether these are examples of resilient decision-making frameworks, or if they represent opportunities for more dynamic and resilient decision-making. It was suggested that both may be true, and a gap analysis of existing systems could be worthwhile. The Transport Infrastructure Ireland (TII) dynamic adaptation plan was mentioned, particularly in relation to the criticality of routes (Department of Transport, 2019).

A variety of more specialised resilient decision-making frameworks have also been developed linked to methodologies for risk and vulnerability assessments and identifying and prioritising adaptation actions at both project and plan level. Three examples are:

Climate stress tests – a three-step approach to climate stress-testing is provided in the EU Commission Guidelines on member states' adaptation strategies and plans (European Commission, 2023). This approach involves identifying possible risks in a designated area due to climate-related hazards, vulnerability assessment (general and in-depth) and developing climate adaptation strategies. An example of projects that undertook stress tests include the Delta Plan on Spatial Adaptation; this is a collective plan of the municipalities, district water boards, provinces, and the central government, aimed at rendering the Netherlands climate-proof and water-resilient (Deltares, 2026). Stress tests should ideally involve planning for a certain level of resilience. The UK Government also require water utilities to plan for their systems to be resilient to a 0.2% annual chance of failure caused by drought, where failure is defined as implementing an emergency drought order (Environment Agency, 2025). This is described as '1 in 500 years' level of climate resilience in this guideline and utilities must achieve this level of climate resilience by 2039.

Dynamic adaptation policy pathways – an approach that allows decision-makers to plan, prioritise and sequence investments in climate resilience actions. It promotes flexibility in planning for different future scenarios and unknowns with trigger points and thresholds used to help identify when to revisit decisions or actions. Examples of the use of the adaptation pathways approach include the Thames Estuary 2100 Plan (JBA Consulting, 2012), while Deltares in the Netherlands has applied it in Flood Risk Management (FRM), water utility planning and road infrastructure planning (Deltares, 2026). The Office of Public Works (OPW) is also applying these approaches within FRM projects, demonstrating how dynamic adaptation pathways and scheme-level climate change adaptation plans are being integrated into national flood relief schemes.

Multi-criteria decision analysis (MCDA) – a potential framework integrating MCDA into the identification and prioritisation of adaptation options. For example, MCDA can be used to rank flood-protection options by weighting criteria such as cost, effectiveness, ecological impact, and community acceptability, helping planners identify the most balanced adaptation choice. This approach allows decision-makers to explore different options' trade-offs and potential impacts, leading to more robust and well-informed decisions. It provides a structured and systematic process, beyond cost-benefit analysis and allows for a comprehensive evaluation of alternatives and helps decision-makers weigh the relative importance of different criteria. Integrating no regret options is another potential method of preventing maladaptation in the implementation of measures. This approach prioritises strategies that yield benefits even if climate does not change or does not change to the extent projected.

4. Adaptation options at different scales

Adaptation options at different scales relate to spatial (from local to national) and temporal (short-term, 5–10 years to long-term, 40–80 years) climate adaptation options for different sectors and demographics (different groups within the population). Local-level projects are also critical for climate adaptation.

Examples of local level climate adaptation include incorporating nature-based Sustainable Urban Drainage Systems (SuDS) into large and small local authority projects, such as the Cork Docklands Regeneration Project, which features integrated flood storage and management for the new Docklands Development Area, a large linear bio-swale, 62,000 cubic meters of flood water storage space, and multi-functional infrastructure combining a public park with water and flood management. In Cork City, the Office of Public Works (OPW) has provided updates on a flood-prevention plan, including that the cost has risen to €200 million, with €16.8 million already spent and work unlikely to commence until 2027. The OPW described the Lower Lee Flood Relief Scheme (LLFRS) (OPW, 2020) as "critically-needed infrastructure," representing the largest State investment in flood defence ever undertaken in the country. Funding is provided from a €1.3 billion national investment in flood-relief measures.

In Cork's Glanmire, a SuDS retrofit along the Glashaboy River has mitigated a flood hotspot (Cork City Council, 2023). Since 2018, swales, detention basins, and permeable paving have slashed local runoff by 40%, sparing homes after heavy rain events in 2022. In East Cork, the Midleton and East Cork Individual Property Protection (IPP) Scheme provides property owners with flood barriers, funded by the Council with OPW support (Cork County Council, 2023). Floodgates are being delivered to properties following surveys, though market and contractor constraints have slowed progress. A retrospective application scheme was available for those who purchased their own flood defences following Storm Babet (October 2023), but the application window has now closed. OPW Minister Kevin Moran has vowed to speed up the roll-out of this €5.8 million scheme, which has huge potential for coastal areas nationwide, though scaling up may face financial and policy constraints (Michael, 2025).

In Dublin, the Northwest Business Park in Blanchardstown, built in the early 2000s, was a SuDS pioneer, using permeable paving and ponds to manage 80% of its stormwater on-site. Adamstown, a Strategic Development Zone since 2003, blends green roofs and tree pits across its 7,000 homes, cutting runoff by 30% compared to traditional estates (South Dublin County Council, 2014). Along Clontarf Promenade, a 2022 retrofit added rain gardens that soak up 500 cubic meters of water per storm, easing pressure on Dublin Bay. However, the OPW's National Flood Risk Management Plan (2023) calls for €1 billion in sustainable flood solutions by 2030, but SuDS uptake lags at just 10% of new developments (OPW, 2023). Met Éireann-supported research (Nolan & Flanagan 2020) shows that winter precipitation is projected to increase under high-emissions scenarios (RCP 8.5[1]), with more heavy rainfall events expected by mid-century (2041–2060).

1 Representative Concentration Pathways (RCPs) are scenarios that include time series of trajectories of greenhouse gas concentrations, aerosols, and land-use change that lead to specific levels of radiative forcing by 2100; they are representative pathways rather than predictions and are used as inputs for climate model simulations (IPCC AR5).

Source: IPCC, Fifth Assessment Report (AR5), Glossary – Representative Concentration Pathways (RCPs)

The Climate Change Advisory Council (CCAC), in its 2025 Annual Review of the Built Environment, highlights the need for a Just Transition Plan, including a coordinated Government assessment of the skills required to achieve the National Climate Objective (CCAC, 2025). Under the Climate Action and Low Carbon Development (Amendment) Act 2021 (Government of Ireland, 2021), each local authority is required to prepare a Local Authority Climate Action Plan (LACAP), consistent with the most recent approved climate action plan and the National Adaptation Framework. LACAPs are statutory five-year plans that include mitigation and adaptation actions to provide pathways toward a decarbonised society. Each local authority has prepared a Climate Action Plan that identifies the climate risks facing its area. Established in 2018, CAROs support local authorities in Ireland with climate adaptation through coordination, guidance, and advice, and by supporting cross-sector engagement between local authorities, government departments, and sectoral adaptation processes.

The measures above highlight top-down approaches to climate adaptation; however, alignment with bottom-up approaches is necessary, where individual and household-level resilience, as well as regional resilience, need further consideration. An attempt to close this gap was the EU research project "Bottom-Up Climate Adaptation Strategies Towards a Sustainable Europe" (BASE). The knowledge and methods developed by this four-year EU project, which concluded in 2016, have been incorporated into current EU climate adaptation efforts, including the EU Adaptation Strategy and the Climate-ADAPT platform.

5. Risk registers and risk assessment for future planning

In line with Intergovernmental Panel on Climate Change (IPCC) best-practice guidance, climate risk is understood as the potential for adverse consequences arising from the interaction between climate-related hazards, the exposure of people, assets or ecosystems to those hazards, and their vulnerability (including sensitivity and adaptive capacity), with each component ideally assessed using quantitative or semi-quantitative methods (IPCC, 2022) (Figure 4).

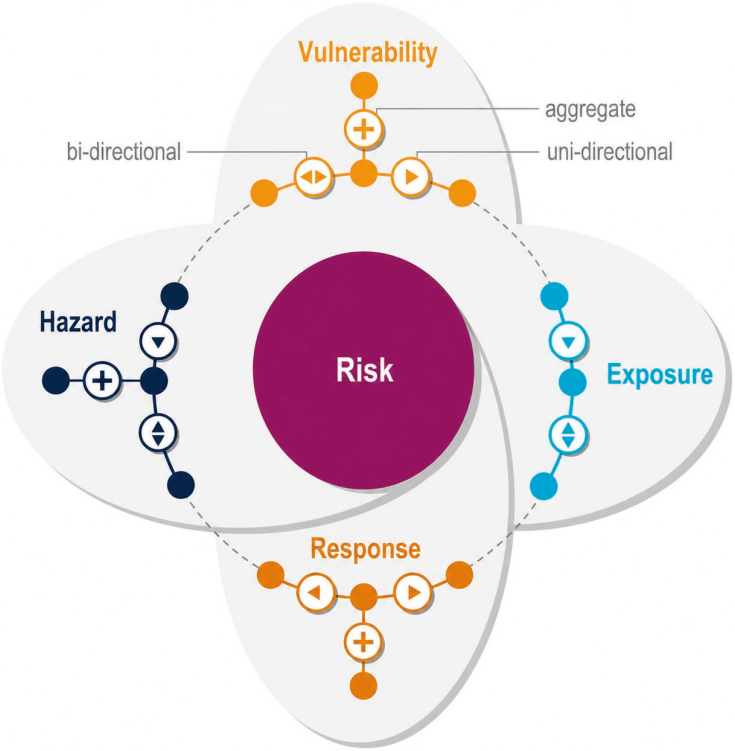

Figure 4: Risk is a result of the interaction of climate-related hazards with the vulnerability, exposure of human and natural systems, and response.
Source: IPCC, AR6 Working Group II (2022)

Assessing climate risk is a key component of risk management and strategic planning. It enables government bodies, businesses, and communities to identify, analyse and evaluate climate related hazards and vulnerabilities and to prepare for the potential impacts. Climate adaptation focuses on preparing for and responding to the direct impacts of climate change such as extreme weather events and long-term environmental shifts. The National Risk Assessment 2024: Overview of Strategic Risks, identifies Ireland's most immediate risks as: climate change, biodiversity and ecosystem loss, food safety, security and supply and extreme weather events such as floods, storms and drought (Department of the Taoiseach, 2024). By proactively adapting to these risks, Ireland can reduce vulnerabilities within the environment, infrastructure and economy and strengthen long-term national climate resilience in the face of a changing climate. For climate risks to be actively managed, they must first be explicitly identified and recorded within organisational risk registers, as risks that are not captured are unlikely to be prioritised or addressed. Risk registers enable the identification, categorisation, prioritisation and monitoring of climate-related risks (IPCC, 2022). Beyond this, mitigation measures and benefits must also be considered to inform future planning decisions for response and recovery.

The first stage of risk management is to identify and examine potential risks and opportunities. Effective risk registers assist in identifying interdependencies across systems (e.g., energy infrastructure, ecosystems and health). It is worth noting the consequences of climate physical risks and climate hazards can change over time, in terms of their magnitude, scale, distribution and reversibility. A climate hazard is a physical process or event that can harm human health, livelihoods or ecological systems. It is crucial to regularly screen for and revise the management strategies for each identified risk. As outlined in the 'Transport Infrastructure Ireland, Risk Analysis and Management Workshop Handbook', risks should be assessed and prioritised, providing a greater understanding of where, how and when the risk is likely to occur, based on their 'probability' of occurring' and 'impact' of the occurrence (Transport Infrastructure Ireland, 2023). However, the values provided in this handbook may vary from organisation to organisation. The European Climate Risk Assessment (EUCRA) has developed a tool outlining metrics to consistently quantify, compare and manage annualised impacts and risks across Europe, as seen in Figures 5, (European Environment Agency, 2024), and used as a basis for the National Climate Change Risk Assessment (NCCRA) (see Figure 6).

Risk severity (adjusted)	**High likelihood** (>50% during 5-year period)	**Medium likelihood** (10-50% during 5-year period)	**Low likelihood** (2-10% during 5-year period)
Catastrophic	**Catastrophic**		
Critical	**Critical**	**Catastrophic**	
Substantial	**Substantial**	**Critical**	**Catastrophic**
Limited	**Limited**	**Substantial**	**Critical**

Figure 5: Risk severity for considering the magnitude of the impact and likelihood of the event.
Source: European Climate Risk Assessment (EUCRA) (2024)

Risk Severity	Damage	System Functionality	Extent and Pervasiveness	Cascading Effects
Catastrophic	Very large and frequent	Irreversible loss	Very large extent or very high pervasiveness	Irreversible cascading effects beyond system boundaries
Critical	Large and frequent	Long-term disturbance	Large extent and high pervasiveness	Long-term cascading effects beyond system boundaries
Substantial	Substantial losses	Temporary or moderate disturbance	Moderate extent or pervasiveness	Temporary cascading effects beyond system boundaries
Limited	Limited or rare losses	No significant disturbance	Limited extent or pervasiveness	No cascading effects beyond system boundaries

Figure 6: Magnitude of consequence criteria based on the EUCRA (2024) applied in NCCRA.
Source: Environmental Protection Agency, NCCRA (2025)

The SAPs identify the need to screen current and potential future sectoral impacts (including those which result from cross-sector dependencies and interdependencies) to best manage the consequences of climate changes and impacts on each sector. Sector-specific standards are key to understanding the most urgent climate impacts and vulnerabilities so they can be prioritised and further analysed on the impact depending on the sector itself. Prioritisation can be decided using criteria such as the timing, magnitude, and the relevance of the impact to activities within the sector.

Risk assessments should be evidence-based, and climate scenarios such as the Representative Concentration Pathways (RCP), including RCP4.5 and RCP8.5 (as used in the NCCRA), can be used to test policy and infrastructure climate resilience under different future scenarios. This assists with dynamic long-term planning by assessing multiple scenarios rather than relying on a static forecast. Ireland's Sectoral Adaptation Planning Guidelines (2024) promote adaptive management and continuous learning cycles; for example, post-event evaluation can inform risk registers, thus improving decision-making and adaptation measures in place. It is important to recognise that most infrastructure was constructed before the impacts of climate change were properly understood, and feedback from risk registers can be used to inform decision-making for infrastructure design and criteria, such as cooling needs, flood adaptation and material selection, prioritising the integration of green infrastructure. Infrastructure risks are systemic and interdependent, and failure in one sector can cascade into others. Interdependencies should be identified, mapped, and potential cascading risks enumerated, such as service interruptions, supply chain breakdowns, and the amplification of social vulnerability.

The Electricity and Gas Networks (EGN) sector underpins much of Ireland's critical infrastructure, meaning climate impacts can both cascade into the sector and radiate outward across the economy and society. As highlighted in the ENG SAP, impacts originating in sectors such as communications, forestry, and water, through storm damage, falling trees, or water shortages, can disrupt electricity and gas infrastructure and reduce generation capacity. In turn, disruptions within the EGN sector can cascade across transport, health, communications, agriculture, water services, and built and archaeological heritage, with power outages affecting mobility, healthcare delivery, food production, water treatment, and public safety (Department of Climate, Energy and the Environment, 2025). These interdependencies mean that failures in one system can rapidly amplify risks across others, highlighting the need for a system-wide perspective to anticipate cascading effects and avoid maladaptation.

There is now a wealth of climate and exposure data available; previously, much of it was qualitative, but there is a growing need for quantitative risk assessments supported by improved data collection and sharing. This is especially evident in the private sector, where usable and non-complex outputs are needed to inform business planning and insurance decisions. Actionable frameworks currently in use include the Commission for Regulation of Utilities for Ireland, Transport Infrastructure Ireland (TII) Risk Analysis and Management Workshop Handbook[2] Directed project which focuses on developing an integrated climate change adaptation and disaster risk reduction and risk governance framework (Risk-Tandem) (Transport Infrastructure Ireland, 2023., Directed, n.d). At the local level, if a severe weather event will impact public safety nationally, clear evacuation and shelter protocols must be developed and executed within communities, led by Local Authorities. The Mayo Severe Event Management System and the Weather Impact Register (WIRE) app record damage and support local risk registers. The app also acknowledges barriers to uptake, such as limited training and digital access. The WIRE App was developed by CARO and funded by the Public Sector Innovation Fund. The system provides a GIS-based tool to help record and review the impacts of weather events and climate trends in their areas; however, it has had limited roll out across local authorities.

It is important to remember that adaptation planning as a process will involve an element of learning-by-doing, where each step and iteration of the process can provide opportunities and new insights. Anticipatory governance encourages flexible, future-ready policies rather than reactive adaptation. An example of this is the European Climate and Health Observatory, Climate ADAPT uses horizon scanning to identify emerging risks, trends and opportunities before they materialise (European Climate and Health Observatory, 2021).

2 MaREI is Ireland's Science Foundation Ireland Research Centre for Energy, Climate and Marine. Based at University College Cork and working in partnership with multiple Irish and international universities, institutes, industry, and policymakers, MaREI undertakes applied research to support the development of sustainable energy systems, climate action, and marine resource management in Ireland.

6. Different information needs

There is a clear need for comprehensive information to support climate adaptation planning and decision-making. This includes clarity on what level of climate resilience is desired and how it will be achieved, with defined targets and standards at national, local, or sectoral levels, as well as agreement on what constitutes an acceptable level of risk. It is essential to identify appropriate thresholds and critical levels of service to ensure continuity during extreme events. A better understanding of vulnerability is required, including how different communities are affected by climate hazards and extreme weather, so that adaptation measures can be targeted effectively and emergency management improved. Decision-makers also need guidance on identifying scenarios to explore plausible future conditions, including which scenarios to use, how to downscale them, and how to account for low-probability, high-impact events. Access to historical data and forward-looking modelling and projections is vital to predict impacts under different scenarios, considering time horizons, distributional effects, and cascading or compounding impacts.

Information on investment and financing needs is necessary to support climate-resilient actions, alongside socio-economic modelling of population change, economic activities, and access to insurance. Mapping the location of critical assets and understanding the design standards of infrastructure and equipment will help determine which are most suitable to withstand climate change. In addition, co-creative approaches for defining and accounting for non-economic benefits of investments are needed, as well as identification of mitigation-related information, particularly around co-benefits that can be achieved through integrated stakeholder-led strategies.

7. Extreme events planning

Over the last century, the effects of climate change have become more evident, with hazardous conditions becoming more frequent. According to the IPCC, an extreme weather/climate event is defined as one that is rare within its statistical reference distribution for a specific location (IPCC, 2021). Extreme events have severe consequences which are generally classified within two categories: acute, which are sudden and short term, severe events like storms or floods, and chronic, which are gradual and long-term changes like biodiversity loss and sea level rise. The impact of an extreme weather event has been seen in Ireland with Storm Éowyn in January 2025, reporting destructive gusts in excess of 130 km/h countrywide, which is correspondent to Met Éireann's red level wind warnings (Met Éireann, 2025). Projections indicate that changes to Ireland's climate will continue and intensify, posing a major risk to our environment, economy, and society and emphasising the need to adapt and build resilience. This trend is supported by Met Éireann's Annual Climate Statement for 2025, which notes that the last four years (2022–2025) are now the four warmest years on record in Ireland, underscoring the accelerating nature of climate change and the growing need for adaptation and climate resilience (Met Éireann, 2025).

In Ireland's NAF, key concepts identified for climate adaptation include *'transformative adaptation'*, *'climate resilience'*, and *'just resilience'*. The United Nations Office for Disaster Risk Reduction defines *'Resilience'* as the *'ability of a system, community or society exposed to hazards to resist, absorb, accommodate, adapt to, transform and recover from the effects of a hazard in a timely manner, including through the preservation and restoration of its essential basic structures and functions through risk management' (UNDRR, 2017)*. SAPs and local authority strategies manage this through risk assessments, hazard mapping, and adaptation plans. To ensure equitable resilience, it is crucial to reduce vulnerabilities across systems and society. The needs of vulnerable groups must be considered and heard in the decision-making process. Strengthening inclusive decision-making requires better data, community participation, and targeted support. This ensures climate adaptation protects those most at risk, mitigates the effects of hazards on infrastructure, and ensures secure, resilient, and sustainable systems for future generations. Adaptation can reduce risk by addressing one or more of the three risk factors: vulnerability, exposure, and/or hazard.

Climate risk assessments allow for a prepared approach to planning for extreme events. The National Adaptation Framework 2024 identifies various emergency planning measures. The National Risk Assessment (NRA) 2024, required by Directive (EU) 2022/2557, highlights *"The systems approach to emergency management in Ireland, involves a continuous cycle of activity. The principal elements of the systems approach are: Risk Assessment, Risk Management, Planning and Preparedness, Response, and Recovery."* Ireland's approach to climate change adaptation within emergency planning, management, and evaluation is embedded in its framework for delivering climate adaptation and resilience, with emergency planning a sector's cross-cutting requirement where climate impacts are identified. Statutory responsibilities span across various government departments in certain areas, and existing structures can facilitate cooperation (e.g., Interdepartmental Marine Coordination Group, Interdepartmental Flood Policy Coordination Group, and Government Task Force on Emergency Planning).

Adapting and futureproofing critical infrastructure such as electricity, transport, and water is essential to ensure the smooth operation of the economy and Irish society. For example, the electricity and gas sector is essential to the functioning of a modern economy and is a key enabler for many other sectors to operate. Disruptions to the energy supply have significant negative impacts on the economy and society. Therefore, climate resilience must be coordinated across sectors, recognising the interdependencies where one event could disrupt multiple sectors causing severe disruptions. Energy disruptions can affect water supply or transport networks. Furthermore, the co-location of telecommunications equipment on overhead energy networks runs the risk of cross-sector disruptions. Initiatives like the EU Programme for Critical Infrastructure Protection (EPCIP) support this integrated approach by promoting information sharing across sectors and border collaboration (European Commission, 2010). As infrastructure was constructed before the impacts of climate change were properly understood. It is crucial that climate projections and risk assessments are considered during decision-making. Risk assessments should be integrated into future planning and regulations and used to design systems with flexibility, redundancy, and equity in mind. This will also assist in identifying climate change adaptation measures that could be implemented to mitigate, compensate, or reduce the risk.

Met Éireann's main suite of weather warnings cover wind, coastal wind, rain, snow/ice, low temperature/ice, high temperature, thunderstorms, and fog (or freezing fog). Impacts from wind, rain, snow, and other hazards vary depending on location, recent weather conditions, the state of the ground, the time of year, and the duration of the event. In particular, the timing and location of extreme weather can significantly affect the impact on society and the economy. The colour coding used by Met Éireann is fully aligned with international best practice and the European Meteoalarm system.

Storm naming is another important communication tool. A storm is named when it could result in 'medium' or 'high' impacts in any one of the three partner countries (UK Met Office, Met Éireann, and the Netherlands KNMI). Naming storms allows for authoritative and consistent communications with the public to enable them to prepare for and stay safe during potentially severe weather events. The new list of names for the 2025/26 storm season marks the 10th anniversary of the storm naming initiative (Met Éireann, 2025). Fire Danger Notices are issued by the Department of Agriculture, Food and the Marine based on fire weather data courtesy of the European Commission Copernicus System, European Centre for Medium-Range Weather Forecasts (ECMWF), and Met Éireann.

To support emergency planning, coordination across various existing national emergency plans is crucial. These communication channels ensure Irish citizens, and the economy can prepare for and respond to extreme weather/climate events, which are increasing in severity. The Department of Housing, Local Government and Heritage is designated as the Lead Government Department for coordinating the response to severe weather emergencies. The Department's National Directorate for Fire and Emergency Management (NDFEM), headed by the National Director, is mandated by the Secretary General to decide if and when to convene a National Emergency Coordination Group (NECG) on behalf of the Department.

Continued developments in research and data availability are critical to developing comprehensive risk assessments that inform effective adaptation strategies across sectors and communities. A resilient system is a complete, complex, and interconnected system; however, understanding these touchpoints requires study and knowledge. Data gaps limit our ability to accurately assess risks, and addressing these gaps is essential for developing a comprehensive understanding of climate-related risks. Research such as EPA's JustAdapt project has shown how social vulnerability linked to age, income, health, and housing interacts with TRANSLATE (Met Éireann), ocean climate projections by the Marine Institute, and river flow projections by the EPA are actively being updated. Met Éireann has announced €2.8 million in funding for six new university research projects focused on advancing climate services and developing improved flood-forecasting models (Met Éireann, 2025). These were awarded under this third iteration of the TRANSLATE climate services flagship programme and will expand knowledge and understanding of climate change impacts into the annual to decadal timeframe and climate hazards like flooding and heatwaves.

Research projects[3] are titled:

- T3UD (TRANSLATE-3: Underpinning Data)
- BRACE (Building Resilience and Adaptation Capacity for future extreme Events)
- EXACT (EXtremes Across Climates and Timeframes)
- CLIMB (Climate services for Multi-sector Benefits)
- ClimEnergise (Climate Informed Energy Systems Planning to Support Ireland's Net Zero Ambitions)
- IMUFF (Integrated MUlti-model multi-hazard Flood Forecasting)

They will explore how extreme events are changing and develop services that support adaptation and decision-making for greater climate resilience in Ireland.

3 These research projects can be viewed at the Met Éireann website

8. Private sector adaptation planning

Extreme weather events are increasing in frequency and magnitude across all global regions. In this context, societies and businesses must adapt and build climate resilience against growing physical risks. For the business sector, these risks include, but are not limited to, interruption of supply chains, damage to infrastructure assets, increased costs of critical inputs, energy shortages, and workforce displacement. However, opportunities exist, such as the creation of new services and the opening of new markets. To ensure business viability and competitiveness, the private sector must work on planning for, investing in, and implementing adaptation measures.

Addressing and supporting climate-resilient decision-making on a national level is critical for the private sector, both Small and Medium-sized Enterprises (SMEs) (99.8% of businesses in Ireland) and larger corporates, as they each face specific risks and regulatory expectations distinct from public sector bodies (Irish Times, 2025). For private enterprises, climate resilience directly affects profitability, supply chain continuity, and insurability. Disruptions pose material threats to business sustainability and competitiveness. Therefore, primary focus is largely around on physical climate-relevant risk within a specific site, and often operational interruptions regarding its suppliers and its own service/product delivery. In contrast, public sector bodies prioritise system-wide risk reduction and public welfare rather than firm-specific economic returns. Therefore, data is key to any company in making evidence-based future-proofing, mitigating measures, and investments towards climate resilience that become necessary.

The private sector must not be overlooked as it has the potential to be a key player in Ireland's national climate resilience. It needs user-friendly and quality data on which to base such decisions. For example, businesses can contribute through the provision of financial and technical resources, sharing risk management information (often already systematised and used in operational processes), the development of innovative solutions, and filling public sector technology gaps. Large companies have significant influence in their value chains, with the ability to establish and foster partnerships with SMEs to effectively respond to climate-related risks. They can also play a key role in engaging with other organisations, establishing public-private partnerships, and contributing to the inclusion of the adaptation agenda in public policies. The implementation of Ireland's NAF requires alignment between national planning and local initiatives, including business adaptation strategies. The insurance sector can value climate risk reduction mechanisms and include them as criteria or requirements for signing insurance contracts and policies. The financial sector can signal interest in companies' adaptation plans and consider physical climate risks when assessing investments.

It is important that companies develop their own strategies based on an understanding of climate-related risks and opportunities. These impacts vary between companies and business units, depending on their management, location, and adaptive capacity. Developing a corporate adaptation strategy can also contribute to a company's performance in the context of increased social pressure for products aligned with environmental and social practices, and stakeholders' requests for transparency of climate-related risk information. For SMEs, the primary drivers for climate resilience decisions are evolving customer and supply chain demands, requirements from investors and lenders, and compliance with policy frameworks such as the EU Adaptation Strategy, the EU Climate Law, and

national instruments. SMEs also face pressure from large corporate buyers to meet rising standards on physical risk management and business continuity. Key challenges include limited access to tailored climate data, constrained financial resources for adaptation measures, and a lack of in-house expertise for translating climate risks into actionable business strategies. Enabling SMEs towards climate-resilient decisions requires accessible, localised climate intelligence, dedicated financing mechanisms, and targeted support services such as those showcased by EU initiatives like the Climate-ADAPT platform and Enterprise Europe Network.

Larger corporates are principally driven by investor scrutiny, regulatory disclosure requirements (e.g., the International Financial Reporting Standards – IFRS and the incorporated principles of the Task Force on Climate-related Financial Disclosures – TCFD, and the European Sustainability Reporting Standards – EU ESRS), and the strategic imperative to maintain market position and operational reliability amid increasing climate volatility. While larger firms generally possess greater resources to manage climate-related risks, they still face challenges including the integration of forward-looking risk assessment, cross-border supply chain complexity, and existing data gaps in site-specific hazard projections. Mobilisation at scale depends on aligning board-level accountability for resilience, expanding the use of scenario analysis, and leveraging best practices identified in European Investment Bank (EIB) and European Environment Agency (EEA) corporate adaptation surveys and guidance materials. Some of the aspects to be considered involve, for instance, translation of climate scenarios: for internal buy-in, it is important to connect climate scenarios and impacts with how they translate to business impacts. For example, changes in resource availability leading to increased costs, or more frequent and intense weather events leading to increased insurance premiums. Management of shared resources is another consideration: while the costs of implementing adaptation measures might be borne by specific actors, the benefits are often shared across society. For example, investing in actions to protect watershed resources would benefit multiple stakeholders in the region. Business decision-making must reflect on how to split these costs and encourage collaborative efforts, including discussions around the role of business and government action. Measuring and accounting for the benefits of adaptation actions is also a challenge considering that, financially, the costs are short-term, while the benefits are long-term and often systemic or in the form of avoided impacts, which are more complex to quantify. In this context, it is recommended that businesses prioritise no-regret, low-regret, and win-win actions such as those that address both mitigation and adaptation to climate-related risks.

Data excellence, usability, and interoperability are the baseline and key leverage points to quicken climate adaptation across all sectors in the private sector. Even though there is an extensive repository of scientific publications available online, a hub for the business sector would be beneficial, providing clear, simple, and digestible information that translates climate data and scenarios into relevant business impacts to support decision-making. Such a hub could operate with sector-specific sections bringing together references to frameworks and guidance that companies can draw on when developing their climate adaptation strategies mitigating their environmental impact (e.g. carbon footprint) and adapting their operations to a changing climate. Examples include: The Business Leaders Guide to Climate Adaptation & Resilience (WBCSD, 2024), Climate R|O (Sustainability Works, 2026) and the platform Climate-ADAPT (European Environment Agency & European Commission, n.d.).

Businesses can be catalysed in national climate adaptation efforts by making the business case for climate resilience explicit, tying investments to value preservation, creditworthiness, competitiveness, cost efficiencies and long-term sustainability. Actionable mobilisation depends on bridging data gaps, mainstreaming standardised risk metrics, and fostering cross-sectoral partnerships that enable both SMEs and larger corporates to implement robust, future-facing adaptation strategies consistent with emerging global and EU best practice. It should be assumed in customer-facing data development that company staff and decision-makers do not have any climate expertise, particularly in Ireland's large SME sector.

9. Cross-cutting issues

A range of cross-cutting issues related to governance, planning, equity, infrastructure, and data gaps were identified by the working group as important to advancing Ireland's climate resilience. Strong coordination between national, sectoral, and local levels is essential, aligning guidelines, strategies, and local authority plans with support from CAROs. Adaptation must be scalable across spatial and temporal dimensions, using scenario-based planning (e.g. RCP4.5 and RCP8.5), dynamic policy pathways, and foresight tools like horizon scanning. Risk registers and feedback loops should guide infrastructure standards and capture cascading risks, while NbS such as SuDS, bio-swales, and green infrastructure need wider adoption despite financial and policy constraints.

Inclusive climate resilience requires identifying vulnerable populations through participatory planning and targeted measures, supported by clear indicators for vulnerability and justice outcomes. Current gaps in national guidance, technical standards, and socio-economic data hinder consistent decision-making, while tools like WIRE, TRANSLATE, and advanced mapping show promise but need better access and training. Emergency preparedness must improve via integrated warning systems and event management platforms, and investment planning should account for health, biodiversity, and social benefits alongside economic costs. Building internal capacity, reducing reliance on consultants, and strengthening cross-sector collaboration are vital to ensure adaptation strategies remain evidence-based, locally anchored, and responsive to Ireland's evolving climate challenges.

10. Conclusions and future considerations

The working group concluded that without coordinated governance, resilience planning risks becoming fragmented and inefficient. Ireland's climate adaptation strategy must therefore evolve into a clear, inclusive, and future-ready framework that addresses complex climate risks and diverse societal needs. This requires coordinated governance across national, sectoral, and local levels, supported by scenario-based planning and justice principles embedded in all sectors. A shared understanding of climate resilience anchored in measurable targets, updated technical standards, and practical tools like risk registers and adaptation pathways is essential for consistency and accountability. Infrastructure and emergency planning should be guided by climate projections and interdependency mapping, while NbS and local adaptation must scale rapidly to meet rising climate pressures.

It is recommended by the working group that policy action should focus on integrating reference warming trajectories into all planning frameworks and updating infrastructure standards to reflect projected climate impacts. Vulnerability assessments must combine technical data with community perspectives, supported by standardised justice metrics to ensure equitable outcomes. Building internal capacity within local authorities and small organisations is critical to enable long-term, locally driven adaptation. Investments should prioritise NbS, health-oriented adaptation, and reforms in insurance and risk-sharing to protect vulnerable communities and economic actors. Scenario planning, foresight tools, and monitoring frameworks must become standard practice, alongside improved digital access and training for tools like WIRE and TRANSLATE. Finally, investment planning should account for both economic and non-economic benefits such as health, biodiversity, and social cohesion while ensuring sustained funding for local initiatives. Ireland must move from fragmented guidance to coordinated, equity-driven action that transforms climate resilience from policy ambition into lived reality.

References

Center for Insurance Policy and Research. (2023). Back to basics: Climate risk physical resilience [Webinar]. In CIPR Resilience Resources. https://naic.soutronglobal.net/Portal/Public/en-US/RecordView/Index/26586

Ceolotto, S., Farrell, N., Kakkar, P., & Vollmer, A. (2025). Research 483: Just resilience and adaptation in Ireland (JustAdapt). Environmental Protection Agency. https://www.epa.ie/publications/research/climate-change/research-483-just-resilience-and-adaptation-in-ireland-justadapt.php

Climate Change Advisory Council. (2025). Annual review 2025: Built environment, industry and waste. https://www.climatecouncil.ie/councilpublications/annualreviewandreport/CCAC-AR2025-Built%20Environment,%20Industry%20and%20Waste-final.pdf

Commission for Regulation of Utilities. (2025). A draft risk preparedness plan for Ireland (CRU2025101). https://consult.cru.ie/en/system/files/materials/517/A%20Draft%20Risk%20Preparedness%20Plan%20for%20Ireland_0.PDF

Cork City Council. (n.d.). Glashaboy River (Glanmire/Sallybrook) drainage scheme. https://www.corkcity.ie/en/council-services/services/roads-and-traffic-management/sustainable-transport-schemes/projects-under-construction/glashaboy-river-glanmire-sallybrook-drainage-scheme/

Cork County Council. (2023). Midleton and East Cork Individual Property Protection (IPP) Scheme. https://www.corkcoco.ie/en/resident/water-services-coastal-and-flood-projects/midleton-and-east-cork-individual-property-protection-ipp-scheme

Corkdocklands. (n.d.). Corkdocklands. https://corkdocklands.com/

Deltares. (2026). Dynamic adaptive policy pathways. https://www.deltares.nl/en/expertise/areas-of-expertise/sea-level-rise/dynamic-adaptive-policy-pathways

Department of Climate, Energy and the Environment. (2024). Sectoral planning guidelines for climate change adaptation (updated 2025). https://www.gov.ie/en/department-of-climate-energy-and-the-environment/publications/sectoral-planning-guidelines-for-climate-change-adaptation-2/

Department of Climate, Energy and the Environment. (2024). National Adaptation Framework (NAF). https://www.gov.ie/en/department-of-climate-energy-and-the-environment/publications/national-adaptation-framework-naf/

Department of Climate, Energy and the Environment. (2025). Electricity and Gas Networks Climate Change Sectoral Adaptation Plan 2025 (EGN-SAP 2025). https://www.gov.ie/en/department-of-climate-energy-and-the-environment/publications/electricity-and-gas-networks-climate-change-sectoral-adaptation-plan-2025-egn-sap-2025/

Department of Public Expenditure, NDP Delivery and Reform. (2023). Infrastructure guidelines. https://www.gov.ie/en/department-of-public-expenditure-infrastructure-public-service-reform-and-digitalisation/collections/infrastructure-guidelines/

Department of the Taoiseach. (2024). National Risk Assessment 2024: Overview of strategic risks (updated 2024). https://www.gov.ie/en/department-of-the-taoiseach/policy-information/national-risk-assessment-2024-overview-of-strategic-risks/

Department of Transport. (2019). Sectoral adaptation plan for transport infrastructure. https://www.gov.ie/en/department-of-transport/publications/sectoral-adaptation-plan-for-transport-infrastructure/

Department of Transport. (2023). Transport Appraisal Framework (TAF) (updated 2025). https://www.gov.ie/en/department-of-transport/publications/transport-appraisal-framework-taf/

Department of Transport. (2025). Current climate and projected climate changes in Ireland (Summary of Chapter 3). https://www.gov.ie/en/department-of-transport/publications/current-climate-and-projected-climate-changes-in-ireland/

DIRECTED Project. (n.d.). About Directed. https://directedproject.eu/about/

Enterprise Europe Network. (n.d.). Enterprise Europe Network. https://een.ec.europa.eu/

Environment Agency. (2025). Current and future pressures on water resources: National Framework for Water Resources 2025 (updated 2025). https://www.gov.uk/government/publications/national-framework-for-water-resources-2025-water-for-growth-nature-and-a-resilient-future/2-current-and-future-pressures-on-water-resources-an-overview-national-framework-for-water-resources-2025

European Commission. (2010). European Programme for Critical Infrastructure Protection (EPCIP). https://eur-lex.europa.eu/EN/legal-content/summary/european-programme-for-critical-infrastructure-protection.html

European Commission. (2021). EC technical guidance on climate proofing of infrastructure. https://ec.europa.eu/newsroom/cipr/items/722278/en

European Commission. (2023). Guidelines on Member States' adaptation strategies and plans. https://climate.ec.europa.eu/system/files/2023-07/Guidelines%20on%20MS%20adaptation%20strategies%20and%20plans.pdf

European Environment Agency & European Commission. (n.d.). Climate-ADAPT: The European Climate Adaptation Platform. https://climate-adapt.eea.europa.eu/en

European Environment Agency. (2021). European Climate and Health Observatory. https://climate-adapt.eea.europa.eu/en/observatory

European Environment Agency. (2024). European climate risk assessment (EEA Report 01/2024). https://www.eea.europa.eu/en/analysis/publications/european-climate-risk-assessment

Government of Ireland. (2021). Climate Action and Low Carbon Development (Amendment) Act 2021, Section 15. https://www.irishstatutebook.ie/eli/2021/act/32/section/15/enacted/en/html

Intergovernmental Panel on Climate Change. (2021). Climate Change 2021: The physical science basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press. https://www.ipcc.ch/report/ar6/wg1/

Intergovernmental Panel on Climate Change. (2022). Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the IPCC. Cambridge University Press. https://doi.org/10.1017/9781009325844

International Organization for Standardization. (2019). Adaptation to climate change: Principles, requirements and guidelines (ISO 14090:2019). ISO. https://www.iso.org/standard/68507.html

International Organization for Standardization. (2021). Adaptation to climate change: Guidelines on vulnerability, impacts and risk assessment (ISO 14091:2021). ISO. https://www.iso.org/standard/68508.html

JBA Consulting. (2012). Thames Estuary 2100 Plan.
https://www.jbaconsulting.com/projects/thames-estuary-2100-plan/

Met Éireann. (2025). Storm Éowyn has been named [Meteorologist's commentary].
https://www.met.ie/meteorologists-commentary/storm-eowyn-commentary/

Met Éireann. (2025). Met Éireann announces new list of storm names for 2025/26.
https://www.met.ie/ga/met-Éireann-announces-new-list-of-storm-names-for-2025-26-2

Met Éireann. (2025). *Met Éireann awards €2.8m to projects for climate and flood forecasting research*.
https://www.met.ie/met-Éireann-awards-e2-8m-to-projects-for-climate-and-flood-forecasting-research

Met Éireann. (2026). Met Éireann warning system explained.
https://www.met.ie/met-Éireann-warning-system-explained

Met Éireann. (2026). Annual climate statement for 2025.
https://www.met.ie/annual-climate-statement-for-2025

Michael, N. (2025). [Irish Examiner article]. Irish Examiner.
https://www.irishexaminer.com/news/munster/arid-41694740.html

NDC Partnership. (n.d.). UKCIP Adaptation Wizard.
https://ndcpartnership.org/knowledge-portal/climate-toolbox/ukcip-adaptation-wizard

National Directorate for Fire and Emergency Management. (n.d.). Management Board.
https://www.gov.ie/en/department-of-housing-local-government-and-heritage/publications/national-directorate-for-fire-and-emergency-management-ndfem-management-board/

Nolan, P., & Flanagan, J. (2020). High-resolution climate projections for Ireland: A multi-model ensemble approach (EPA Research Report No. 339). Environmental Protection Agency. https://www.epa.ie/publications/research/climate-change/research-339-high-resolution-climate-projections-for-ireland--a-multi-model-ensemble-approach.php

Office of Public Works. (2023). Flood risk management plans. https://www.gov.ie/en/office-of-public-works/news/flood-risk-management-plans/

Office of Public Works. (2026). Scheme information. FloodInfo.ie. https://www.floodinfo.ie/scheme-info/

Sustainability Works. (2026). Climate R|O. https://sustainabilityworks.ie/initiatives/climate-ro/

The Irish Times. (2025). Irish SMEs have rolled with the punches in recent years. They need support to grow and thrive. https://www.irishtimes.com/special-reports/2025/01/23/irish-smes-have-rolled-with-the-punches-in-recent-years-they-need-support-to-grow-and-thrive/

Transport Infrastructure Ireland. (2023). Risk Analysis and Management Workshop Handbook (PSG-RMW-0008-01). https://www.tiipublications.ie/media/o44de5wv/psg-rmw-0008-01_risk-analysis-and-management-workshop-handbook.pdf

Uisce Éireann. (2021). National Water Resources Plan – Framework Plan Technical Appendices: Appendix E – Drought planning [PDF]. https://www.water.ie/sites/default/files/projects/strategic-plans/national-water-resources/NWRP_FP-Appendix-E_Drought-Planning-Final-.pdf

United Nations Office for Disaster Risk Reduction. (2017). The Sendai Framework terminology on disaster risk reduction: Resilience. https://www.undrr.org/terminology/resilience

University College Cork. (2025). ClimEnergise: Climate-informed energy systems planning to support Ireland's net-zero ambitions. https://www.ucc.ie/en/epmg/research/climenergise/

University College Cork. (2025). UCC researchers receive €1.2m to develop climate services and risk-based climate adaptation tools. https://www.ucc.ie/en/research/news/2025/ucc-researchers-receive-12m-to-develop-climate-services-and-risk-based-climate-adaptation-tools.html

World Business Council for Sustainable Development. (2024). The business leaders' guide to climate adaptation & resilience. https://www.wbcsd.org/resources/the-business-leaders-guide-to-climate-adaptation-resilience/

An Ghníomhaireacht um Chaomhnú Comhshaoil

Tá an GCC freagrach as an gcomhshaol a chosaint agus a fheabhsú, mar shócmhainn luachmhar do mhuintir na hÉireann. Táimid tiomanta do dhaoine agus don chomhshaol a chosaint ar thionchar díobhálach na radaíochta agus an truaillithe.

Is féidir obair na Gníomhaireachta a roinnt ina trí phríomhréimse:

- Rialáil: Rialáil agus córais chomhlíonta comhshaoil éifeachtacha a chur i bhfeidhm, chun dea-thorthaí comhshaoil a bhaint amach agus díriú orthu siúd nach mbíonn ag cloí leo.
- Eolas: Sonraí, eolas agus measúnú ardchaighdeáin, spriocdhírithe agus tráthúil a chur ar fáil i leith an chomhshaoil chun bonn eolais a chur faoin gcinnteoireacht.
- Abhcóideacht: Ag obair le daoine eile ar son timpeallachta glaine, táirgiúla agus dea-chosanta agus ar son cleachtas inbhuanaithe i dtaobh an chomhshaoil.

I measc ár gcuid freagrachtaí tá:

CEADÚNÚ

- Gníomhaíochtaí tionscail, dramhaíola agus stórála peitril ar scála mór;
- Sceitheadh fuíolluisce uirbigh;
- Úsáid shrianta agus scaoileadh rialaithe Orgánach Géinmhodhnaithe;
- Foinsí radaíochta ianúcháin;
- Astaíochtaí gás ceaptha teasa ó thionscal agus ón eitlíocht trí Scéim an AE um Thrádáil Astaíochtaí.

FORFHEIDHMIÚ NÁISIÚNTA I LEITH CÚRSAÍ COMHSHAOIL

- Iniúchadh agus cigireacht ar shaoráidí a bhfuil ceadúnas acu ón GCC;
- Cur i bhfeidhm an dea-chleachtais a stiúradh i ngníomhaíochtaí agus i saoráidí rialáilte;
- Maoirseacht a dhéanamh ar fhreagrachtaí an údaráis áitiúil as cosaint an chomhshaoil;
- Caighdeán an uisce óil phoiblí a rialáil agus údaruithe um sceitheadh fuíolluisce uirbigh a fhorfheidhmiú
- Caighdeán an uisce óil phoiblí agus phríobháidigh a mheasúnú agus tuairisciú air;
- Comhordú a dhéanamh ar líonra d'eagraíochtaí seirbhíse poiblí chun tacú le gníomhú i gcoinne coireachta comhshaoil;
- An dlí a chur orthu siúd a bhriseann dlí an chomhshaoil agus a dhéanann dochar don chomhshaol.

BAINISTÍOCHT DRAMHAÍOLA AGUS CEIMICEÁIN SA CHOMHSHAOL

- Rialacháin dramhaíola a chur i bhfeidhm agus a fhorfheidhmiú lena n-áirítear saincheisteanna forfheidhmithe náisiúnta;
- Staitisticí dramhaíola náisiúnta a ullmhú agus a fhoilsiú chomh maith leis an bPlean Náisiúnta um Bainistíocht Dramhaíola Guaisí;
- An Clár Náisiúnta um Chosc Dramhaíola a fhorbairt agus a chur i bhfeidhm;
- Reachtaíocht ar rialú ceimiceán sa timpeallacht a chur i bhfeidhm agus tuairisciú ar an reachtaíocht sin.

BAINISTÍOCHT UISCE

- Plé le struchtúir náisiúnta agus réigiúnacha rialachais agus oibriúcháin chun an Chreat-treoir Uisce a chur i bhfeidhm;
- Monatóireacht, measúnú agus tuairisciú a dhéanamh ar chaighdeán aibhneacha, lochanna, uiscí idirchreasa agus cósta, uiscí snámha agus screamhuisce chomh maith le tomhas ar leibhéil uisce agus sreabhadh abhann.

EOLAÍOCHT AERÁIDE & ATHRÚ AERÁIDE

- Fardail agus réamh-mheastacháin a fhoilsiú um astaíochtaí gás ceaptha teasa na hÉireann;
- Rúnaíocht a chur ar fáil don Chomhairle Chomhairleach ar Athrú Aeráide agus tacaíocht a thabhairt don Idirphlé Náisiúnta ar Ghníomhú ar son na hAeráide;
- Tacú le gníomhaíochtaí forbartha Náisiúnta, AE agus NA um Eolaíocht agus Beartas Aeráide.

MONATÓIREACHT AGUS MEASÚNÚ AR AN GCOMHSHAOL

- Córais náisiúnta um monatóireacht an chomhshaoil a cheapadh agus a chur i bhfeidhm: teicneolaíocht, bainistíocht sonraí, anailís agus réamhaisnéisiú;
- Tuairiscí ar Staid Thimpeallacht na hÉireann agus ar Tháscairí a chur ar fáil;
- Monatóireacht a dhéanamh ar chaighdeán an aeir agus Treoir an AE i leith Aeir Ghlain don Eoraip a chur i bhfeidhm chomh maith leis an gCoinbhinsiún ar Aerthruailliú Fadraoin Trasteorann, agus an Treoir i leith na Teorann Náisiúnta Astaíochtaí;
- Maoirseacht a dhéanamh ar chur i bhfeidhm na Treorach i leith Torainn Timpeallachta;
- Measúnú a dhéanamh ar thionchar pleananna agus clár beartaithe ar chomhshaol na hÉireann.

TAIGHDE AGUS FORBAIRT COMHSHAOIL

- Comhordú a dhéanamh ar ghníomhaíochtaí taighde comhshaoil agus iad a mhaoiniú chun brú a aithint, bonn eolais a chur faoin mbeartas agus réitigh a chur ar fáil;
- Comhoibriú le gníomhaíocht náisiúnta agus AE um thaighde comhshaoil.

COSAINT RAIDEOLAÍOCH

- Monatóireacht a dhéanamh ar leibhéil radaíochta agus nochtadh an phobail do radaíocht ianúcháin agus do réimsí leictreamaighnéadacha a mheas;
- Cabhrú le pleananna náisiúnta a fhorbairt le haghaidh éigeandálaí ag eascairt as taismí núicléacha;
- Monatóireacht a dhéanamh ar fhorbairtí thar lear a bhaineann le saoráidí núicléacha agus leis an tsábháilteacht raideolaíochta;
- Sainseirbhísí um chosaint ar an radaíocht a sholáthar, nó maoirsiú a dhéanamh ar sholáthar na seirbhísí sin.

TREOIR, ARDÚ FEASACHTA AGUS FAISNÉIS INROCHTANA

- Tuairisciú, comhairle agus treoir neamhspleách, fianaise-bhunaithe a chur ar fáil don Rialtas, don tionscal agus don phobal ar ábhair maidir le cosaint comhshaoil agus raideolaíoch;
- An nasc idir sláinte agus folláine, an geilleagar agus timpeallacht ghlan a chur chun cinn;
- Feasacht comhshaoil a chur chun cinn lena n-áirítear tacú le hiompraíocht um éifeachtúlacht acmhainní agus aistriú aeráide;
- Tástáil radóin a chur chun cinn i dtithe agus in ionaid oibre agus feabhsúchán a mholadh áit is gá.

COMHPHÁIRTÍOCHT AGUS LÍONRÚ

Oibriú le gníomhaireachtaí idirnáisiúnta agus náisiúnta, údaráis réigiúnacha agus áitiúla, eagraíochtaí neamhrialtais, comhlachtaí ionadaíocha agus ranna rialtais chun cosaint chomhshaoil agus raideolaíoch a chur ar fáil, chomh maith le taighde, comhordú agus cinnteoireacht bunaithe ar an eolaíocht.

BAINISTÍOCHT AGUS STRUCHTÚR NA GNÍOMHAIREACHTA UM CHAOMHNÚ COMHSHAOIL

Tá an GCC á bainistiú ag Bord lánaimseartha, ar a bhfuil Ard-Stiúrthóir agus cúigear Stiúrthóir. Déantar an obair ar fud cúig cinn d'Oifigí:

- An Oifig um Inbhunaitheacht i leith Cúrsaí Comhshaoil
- An Oifig Forfheidhmithe i leith Cúrsaí Comhshaoil
- An Oifig um Fhianaise agus Measúnú
- An Oifig um Chosaint ar Radaíocht agus Monatóireacht Comhshaoil
- An Oifig Cumarsáide agus Seirbhísí Corparáideacha

Tugann coistí comhairleacha cabhair don Ghníomhaireacht agus tagann siad le chéile go rialta le plé a dhéanamh ar ábhair imní agus le comhairle a chur ar an mBord.

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