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Enhancing Integration of Disaster Risk and Climate Change Adaptation into Irish Emergency Planning

Authors: Peter Medway, Dug Cubie and Martin Le Tissier

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Rialtas na hÉireann
Government of Ireland

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EPA RESEARCH PROGRAMME 2021–2030

Enhancing Integration of Disaster Risk and Climate Change Adaptation into Irish Emergency Planning

(2019-CCRP-DS.23)

EPA Research Report

Prepared for the Environmental Protection Agency

by

MaREI, the SFI Research Centre for Energy, Climate and Marine, Environmental Research Institute, University College Cork

Authors:

Peter Medway, Dug Cubie and Martin Le Tissier

ENVIRONMENTAL PROTECTION AGENCY
An Ghníomhaireacht um Chaomhnú Comhshaoil
PO Box 3000, Johnstown Castle, Co. Wexford, Ireland

Telephone: +353 53 916 0600 Fax: +353 53 916 0699
Email: info@epa.ie Website: www.epa.ie

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This report is based on research carried out/data from June 2020 to May 2021. More recent data may have become available since the research was completed.

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Project Partners

Peter Medway
MaREI, the SFI Research Centre for Energy, Climate and Marine
Environmental Research Institute
University College Cork
Co. Cork
Ireland
Tel.: +353 21 486 4300
Email: pmedway@pjmconsulting.online

Dr Dug Cubie
School of Law
University College Cork
Co. Cork
Ireland
Tel.: +353 21 490 2220
Email: d.cubie@ucc.ie

Dr Martin Le Tissier
MaREI, the SFI Research Centre for Energy, Climate and Marine
Environmental Research Institute
University College Cork
Co. Cork
Ireland
Tel.: +353 21 486 4300
Email: martin.letissier@coastalmatters.com

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Executive Summary

The need to enhance the integration of knowledge, policies and practices between climate change adaptation and disaster risk reduction/management to ensure that the actions of one do not conflict with the other is recognised at Irish, EU and international levels. This research aimed to identify ways to enhance such integration in practice.

Key informants from relevant governmental and non-governmental institutions were interviewed to provide a snapshot of the current state of policy and planning, implementation and integration. Information collected allowed the development of a research hypothesis, based on the use of the EU-funded ESPREssO project's SHIELD model as an analytical and implementation tool, to enhance the integration of disaster risk and climate change adaptation into Irish emergency planning.

The hypothesis was shared with staff in governmental and non-governmental agencies working in the broad areas of climate action, emergency management and risk reduction. Three local authority areas were prioritised (Dublin Metropolitan area, Cork City and County Mayo) for focus groups and the completion of an online survey investigating perceptions of current weather-related risk, performance of principal response agencies, and impressions of the integration of adaptation and disaster risk reduction.

This report argues that there is a need to more comprehensively integrate the existing planning for emergency response with the development of longer-term disaster risk management policies that acknowledge the increasing vulnerability of Ireland to the climate crisis. We propose a roadmap to facilitate the objective of preparing for and responding to the climate crisis, and to more readily achieve integration of climate change adaptation and disaster risk reduction into Irish emergency planning (Figure ES1).

To implement the roadmap, we make six overarching conclusions to facilitate integration of climate change adaptation and disaster risk reduction into the Irish emergency planning frameworks:

1. The existing five-stage emergency planning model in the Major Emergency Management (MEM) and Strategic Emergency Management (SEM) Frameworks promotes integration of the five stages, with a strong focus on planning for response. However, longer-term mitigation and recovery, the areas of greatest relevance for climate change adaptation, could be better integrated into policy and planning at all levels.
2. Increasing focus on the three objectives of preventing new risk, reduction of existing risk and management of residual risk may facilitate clarity for lead government departments and support organisations under the SEM Framework to integrate more effectively climate change adaptation into policies and procedures.
3. The main adaptation challenge for agencies is balancing known and projected risks arising from changing levels of climate change-influenced hazards, and community exposure and vulnerability, with their existing and future capacities for service provision and operational responsibilities.
4. Emergency management and climate change adaptation are currently two discrete systems for governance, management and coordination at the national level. Identifying ways to promote coordination and align incentives, priorities and planning processes will facilitate a more holistic and comprehensive approach to disaster risk management at all levels of government.
5. There is a need to sequence research, policymaking and planning so that initiatives at different levels of government are coherent, mutually reinforcing and, consequently, easier to implement.
6. To achieve effective integration, all future policies and plans should be specific about the six pathways of sharing knowledge, harmonising capacity, institutionalising coordination, engaging stakeholders, leveraging investment and developing communications.

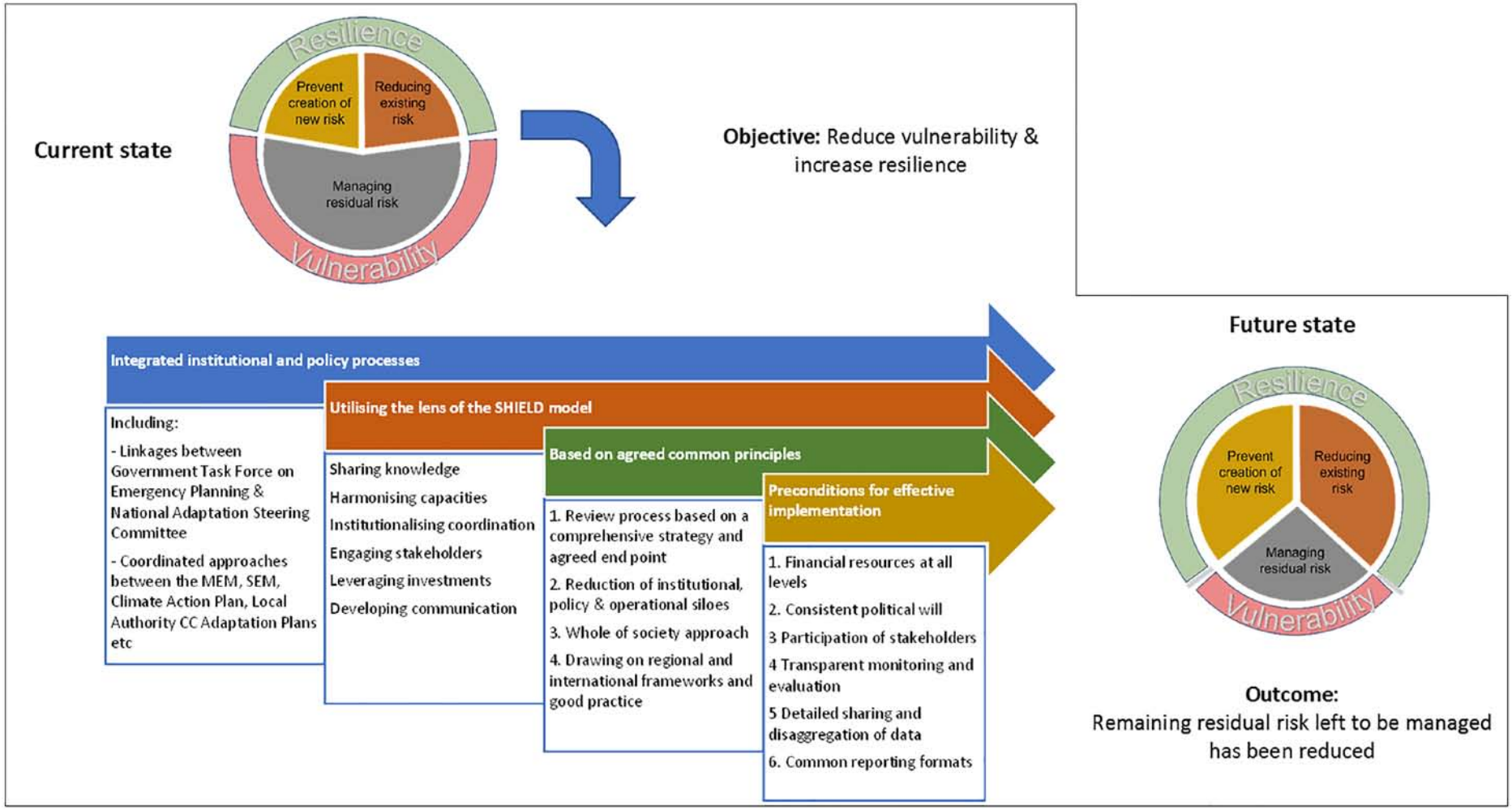

Figure ES1. Roadmap for achieving integration of climate change adaptation and disaster risk reduction. For the full list of guided actions, see Appendix 1. CC, climate change.

Finally, we recommend that the EPA, Government Task Force on Emergency Planning and other relevant government bodies consider:

- increasing end user involvement when commissioning future research into climate change adaptation to facilitate the implementation of findings and recommendations;
- sequencing future research with climate change adaptation planning timetables;
- analysing how climate change adaptation assessments can complement emergency planning and capacity requirements, thereby facilitating local authorities and other agencies to implement coordinated strategies;
- undertaking research to measure residual risk in the context of disaster risk management;
- conducting stakeholder analysis to identify barriers to sustained engagement of non-state actors, and societal expectations regarding state versus individual and community action to adapt to climate change;
- researching green budgeting methods to facilitate and incentivise integrated climate change adaptation and disaster risk reduction;
- reviewing outcome indicators for climate change adaptation with those used internationally to augment process indicators;
- fully engaging with the priorities and targets of the Sendai Framework for Disaster Risk Reduction and participating in the Sendai Framework Monitor.

1 Introduction

> [T]he impacts of weather- and climate-related hazards on the economy, human health and ecosystems are amplified by socio-economic changes and environmental changes. Efforts to reduce disaster risk and at the same time adapt to a changing climate have become a global and European priority. (EEA, 2017)

In Ireland, a significant amount of ongoing policy development and planning for climate change adaptation (CCA), mitigation (or disaster risk reduction; DRR), emergency planning, development of response capacity and information management has taken place at national, regional and local levels (Medway *et al*., 2022). Much of this policy development recommends the integration of CCA and DRR.

The EU's new Strategy on Adaptation to Climate Change (EC, 2021) highlights both how the importance of adaptation is increasingly recognised globally and the lack of preparedness for it. The strategy emphasises that actions to address CCA must make better use of synergies with broader work on DRR by enhancing coherence in practices, standards, guidance, targets, resources and knowledge. Moreover, such coherence requires closer coordination across multiple levels (EEA, 2017), including between different stakeholders at the national level, at the EU level under the Civil Protection Mechanism (EC, 2020), and internationally under the United Nations' (UN) Sendai Framework for Disaster Risk Reduction (UNISDR, 2015a). Ireland's National Adaptation Framework (NAF), published in 2018, built on the European Environment Agency's prioritisation, noting that:

> there is a growing recognition at EU/ international level of the need for greater integration of emergency planning (particularly disaster risk reduction) and climate change adaptation … [T]his has already begun in Ireland. Under this Framework, it is foreseen that these relationships will continue to strengthen over time. (Department of Communications, Climate Action and Environment, 2018a)

However, the draft fiche for Ireland in the European Commission's Directorate-General for Climate Action's Preparedness Scoreboard finds that *"*There is not an integration of [disaster risk reduction] and [climate change adaptation] policies in Ireland, although there are plans to promote it*"* (Shine, 2018). Therefore, the question is not should CCA and DRR be better integrated within Irish law, policy and practice, but how should it be done?

The "Enhancing Integration of Disaster Risk and Climate Change Adaptation into Irish Emergency Planning" (EPA Reference Number 2019-CCRP-DS.2) project under the Climate 2019 Call, Project 3, "Climate Proofing the Emergency Management Sector" specifically addressed the call's scope to:

- review institutional challenges/barriers in Ireland to better integration of disaster risk and CCA;
- provide a roadmap for mainstreaming climate change considerations for the emergency management sector in the immediate and long term;
- examine the implications of climate change for the emergencies identified within the Strategic Emergency Management (SEM) National Structures and Framework (Department of Defence, 2017) and assist in ensuring that emergency plans developed in line with national policy are climate-proofed.

The project's overarching purpose was to provide a series of observations and recommendations, drawn from a review of current policy and practice and stakeholder interviews, for more in-depth integration of CCA and DRR in future iterations of relevant policies and plans, including the SEM National Structures and Framework and its associated guidelines; the Major Emergency Management (MEM) Framework; and sectoral or local authority adaptation strategies. To underpin this purpose, the project used as its starting point the five-stage model for emergency

management, used in the SEM and MEM Frameworks (Figure 1.1), to explore the degree of coherence and connectedness between its elements of hazard analysis, mitigation, planning and preparedness, response and recovery.

1.1 Objectives

The project's purpose was addressed through three objectives organised across four work packages, focused on (1) project coordination and management, (2) a desk review of institutional interlinkages for integration of climate adaptation policy and emergency planning, (3) stakeholder input for integrating emergency planning and CCA in the context of vulnerability/resilience to extreme events now and in the future and (4) communication and dissemination of the results.

1.1.1 Specific objectives

Objective 1: Identify the institutional and policy linkages and barriers to coordination and integration of disaster risk management (DRM) and CCA planning in Ireland building on previous research on CCA, risk and resilience by the EPA, the International Red Cross and Red Crescent Movement and others, as well as relevant government policies, such as Ireland's National Adaptation Framework.

Figure 1.1. Five-stage model for emergency management used in Ireland's SEM and MEM Frameworks showing coherence with the primary objectives of disaster risk management.

Objective 2: Provide a roadmap for integrating emergency planning and CCA in the context of existing policy instruments and approaches (e.g. local and sectoral adaptation strategies) to provide recommendations for policymakers on integration and coordination structures and policy approaches.

Objective 3: Provide guidelines for mainstreaming CCA assessments into the SEM National Structures and Framework to climate-proof emergency planning.

1.2 Project Outcomes

The research process highlighted the complexity of the institutional structures and relationships between the different stakeholders in Ireland working on adaptation, mitigation and risk reduction, and the dedication of governmental agencies and staff working to prepare for and respond to major emergencies and the climate crisis. The project analysed the current legal and policy structures and examples of good practices from around the country to provide six overarching recommendations and a roadmap with suggested actions for further consideration by the EPA and relevant governmental and non-governmental stakeholders. The roadmap identifies options to implement and evaluate the closer integration of CCA into emergency planning in Ireland (see Figure 6.1 and Appendix 1). The roadmap includes proposals to ensure that emergency planning in Ireland not only includes preparedness and response to existing threats and vulnerabilities but is also fit for purpose, to address future threats and vulnerabilities. The roadmap also recognises that the distinctions between CCA, DRM and emergency planning are often, in practice, blurred.

1.3 Definitions

Differing disciplinary understandings of the terms "integration", "alignment" and "coherence" in the context of law and policies on climate change, disasters and sustainable development have led to various interpretations of this key terminology. The project draws on research undertaken by Cubie and Natoli (2022), which examines the legal relationships between the three topics of sustainable development, CCA and DRR, to define key definitions derived from

relevant Irish legislation, policy and plans or, where no such definition exists in Irish documentation, from authoritative international definitions (see Greene *et al*., 2020, and the glossary in this report). Therefore, for the purposes of this research:

- *Coherence* describes the effective coexistence of relevant global frameworks[1] facilitated by their shared logic and consistency of regulatory effect.
- *Alignment* describes the vertical relationships between global, regional and national decision-making bodies whose structures and initiatives may act as a fulcrum to facilitate the two-way flow of knowledge, experience and norms between the national and the international levels.
- *Integration* describes the concept of cross-sectoral integration at the national level, building on an assessment of how different national laws and policies are drafted and implemented as part of an overall administrative/institutional system.

1 For example, as the Sendai Framework for Disaster Risk Reduction 2015-2030, the Paris Agreement and the UN's 2030 Agenda for Sustainable Development and the Sustainable Development Goals.

2 Research Methods

The project is a desk review that used a multistage research methodology as illustrated in Figure 2.1. A literature review and qualitative data collection techniques were used to assess the current state of integration of CCA and DRR at national and subnational levels (Greene *et al*., 2020). The data collection process was implemented in two phases. The first, using semi-structured key informant interviews, ascertained perspectives from key informants of the SEM/MEM process and their current integration with CCA. Interviewees were drawn from national institutions listed in the SEM National Structures and Frameworks with responsibilities as either lead government departments or principal support agencies (PSAs)/principal response agencies (PRAs), as well as regional coordinators from the four Climate Action Regional Offices (CAROs), local authorities for urban and rural areas and the private sector. A full list of the 19 key informants and interview questions used is included in Appendices 2, 4 and 5.

The results of the key informant interviews and literature review facilitated the formulation of a research hypothesis (see Figure 4.1). This was then validated through a second phase of data collection, which included practitioners in local authorities and other stakeholders representing a broad cross-section of functions, to identify regional case studies to illustrate challenges, opportunities and local-level experience and innovations for integrating CCA and DRR. A full list of the 24 survey respondents/focus group discussion participants, and the survey and focus group discussion questions, are included in the supplementary material to this report.

This final report has also taken into consideration developments that occurred after the end of the data collection period and submission of the draft report in May 2021, such as the publication of the new SEM Guideline on a national emergency coordination group (Department of Defence, 2021a) and the revised SEM Guideline on critical infrastructure resilience (Department of Defence, 2021b), both of which were approved by the Government Task Force on Emergency Planning on 14 July 2021.

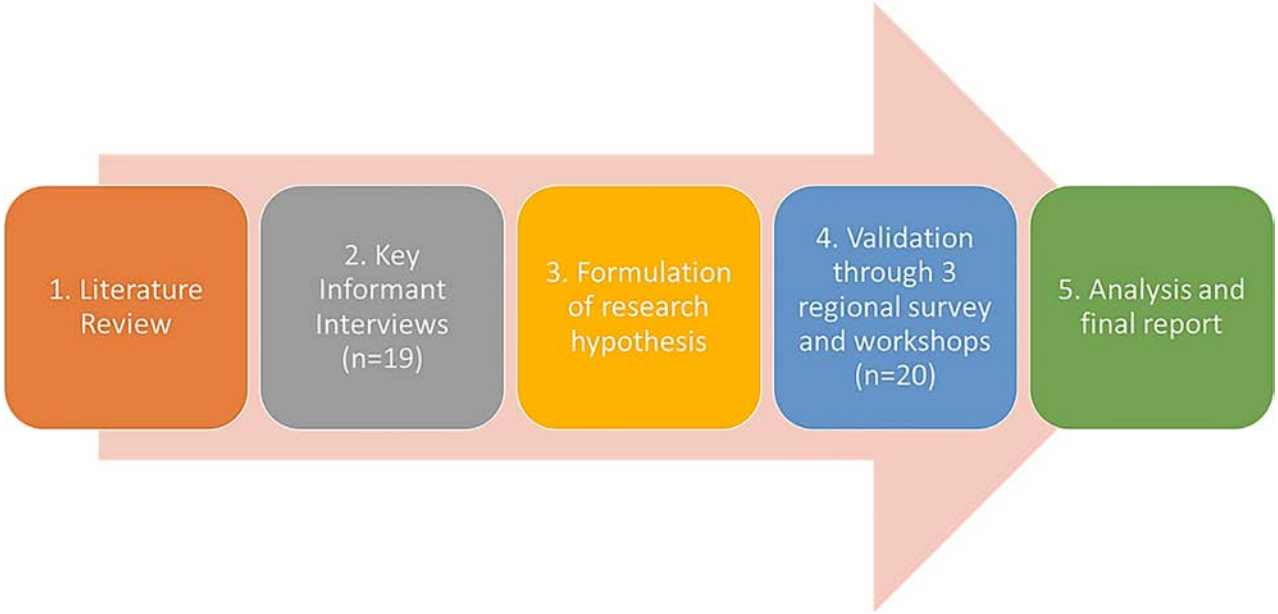

Figure 2.1. Summary of the research process.

2.1 Identifying a Tool to Explore Integration: the ESPREssO SHIELD Model

The EU-funded Horizon 2020 ESPREssO project[2] "Enhancing Risk Management Capabilities Guidelines" (Lauta *et al*., 2018) proposed the SHIELD model to develop integrated approaches for reducing risk in the context of CCA and DRR (Figure 2.2). The pathways to integration proposed by the SHIELD model summarise the most important areas for action that contribute to a robust and effective risk governance mechanism. The SHIELD pathways are relevant to all the critical responsibilities of DRM that address not only existing risk, but that also seek to prevent creating new risk and reducing residual risk that cannot be avoided and/or managed (illustrated in the centre of Figure 2.2).

The ESPREssO guidelines suggest that, despite significant progress over the past 30 years in the management of risks in Europe, vulnerability to climate-induced disasters is increasing due to population growth, urbanisation and increasing reliance on infrastructure. To reduce future risk, the guidelines identified three overarching challenges:

1. Climate change and variability is changing countries' disaster risk profiles.
2. Societies are becoming more complex.
3. The consequences of disasters are more complex.

Figure 2.2. SHIELD model for integration of CCA and DRR. The SHIELD pathways are relevant to all the critical responsibilities of DRM, which are illustrated at the centre of the diagram (Lauta *et al*., 2018, p. 14).

2 The ESPREssO project (Enhancing Synergies for Disaster Prevention in the European Union) was a multi-year research project developed by a consortium across six European countries to develop a new strategic vision to approach coherently natural risk reduction and CCA. The project partners published their key conclusions in 2018 as guidelines and a vision paper. Irish institutions were not part of the ESPREssO consortium, but Dr Cubie participated in stakeholder forums held as part of the project.

Recognising these challenges, the ESPREssO project recommended that stakeholders should adopt a risk governance approach, aligned with the UN Sendai Framework's second priority of strengthening disaster risk governance to manage disaster risk. Governance systems can then be strengthened through the six capabilities or pathways set out in the SHIELD model. These pathways complement and build on the "traditional" risk management skills and actions, for example those set out in the SEM Framework five-stage model, to cope with the more kinetic challenges created by climate change in our increasingly complex societies.

The pathways set out in the ESPREssO project are defined below.

2.1.1 Sharing knowledge

Effective, integrated action on CCA and disaster risk draws on a wide range of knowledge and depends on public and private organisations of all kinds to effectively share knowledge and information of all types, such as forecasts and projections, risk assessments, context and policy analysis, and prior experience and lessons learned. Work to improve knowledge sharing must increase awareness of the benefits of sharing information, manage the risk of information overload, recognise the value of information and create incentives to share it, and overcome knowledge silos.

2.1.2 Harmonising capacities

Effective disaster risk governance requires the deployment of the right people and other resources, at the right time, quantity and place, to manage specific risks. Demand for specific capacities relevant to different hazards and risks requires organisations to carefully balance, for example, central and local requirements, and capacity development priorities. Work to harmonise capacities with risks must consider the availability of skilled personnel at different levels, multitasking and getting the most from existing capacity, ongoing adaptation of capacity to match evolving risk and vulnerability patterns, the transboundary nature of risks, and the need for continuous maintenance of capacity in readiness for periodic disaster events.

2.1.3 Institutionalising coordination

Managing risk requires effective and sustained communication and cooperation between organisations and individuals. Disasters can and do overwhelm coordination mechanisms. Although significant effort has been made to enhance coordination among response organisations in Ireland, the challenge remains to facilitate coordination between the organisations bearing primary responsibility for preventing and reducing risk and those that plan for and execute the management of the residual risk. The focus for institutionalisation of coordination mechanisms must be on organisational mandates, coordination across different levels of governance and jurisdictional boundaries, and the coordination of task implementation across the interconnected disciplines and management systems of CCA and disaster risk.

2.1.4 Engaging stakeholders

Creating a resilient society able to absorb and bounce back from the negative impact of increasing climate-induced disaster risks requires the effort and engagement of the whole community. Comprehensive governance of disaster risks is beyond the capability of the state alone. Calls for stakeholder inclusion and engagement are at the heart of international agreements and frameworks on DRR, including the Sendai Framework. The government's role in enabling and convening stakeholder engagement remains critical and must evolve beyond merely mentioning stakeholder participation in plans and projects to become more meaningful mobilisation that can be sustained over time. Work in this area must involve the identification of all stakeholder groups, understanding and aligning different stakeholder interests (especially when they are in competition), needs and motivations, and transparently address how engagement can be sustained over time.

2.1.5 Leveraging investments

It is widely accepted that investing in CCA and DRR will help to reduce the costs of response, recovery and economic losses to climate change-induced disasters in the long term. CCA and DRR investment strategies can also benefit the economy of a country, region, city

or town even before a disaster has struck. Economic and political investment is needed. Here, economic investments in CCA and DRR are taken to be the allocation of the necessary financial resources to fund specific action-oriented projects, from the construction of sea walls to public risk awareness campaigns. Political investment is the willingness of elected officials and governments to commit to the aims, strategies and policies necessary for implementing DRR actions and sustaining that commitment over time. Work in this area must address, among other things, who pays for risk reduction and adaptation, how short-termism can be overcome, expanding the investment case beyond a primary focus on response and recovery, how adaptation and DRR are costed and their economic benefits measured, and investing in resilience building.

2.1.6 Developing communication

Ireland and other developed economies are knowledge societies. Effective communication is therefore essential to the effective management of disaster risk. However, one of the main issues that is reported repeatedly in the literature and by research participants is that the population at large lacks an updated awareness of the risks, adaptive measures and responses. The need to develop more comprehensive and efficient forms of communication between experts, government entities and the public is extremely important. This relates not just to communicating information in one direction but also to creating dialogue and triggering action while avoiding information overload. Issues to address include the ongoing low levels of awareness, building communications capacity in key institutions, influencing media priorities for communicating on adaptation and risk reduction, and better understanding of how to use social media and big data trends for enhanced communication.

2.2 Limitations

The research was designed primarily as a desk study, but it also sought to engage directly with practitioners at the local level to understand the actual and potential role played in both CCA and emergency planning and response by individuals and organisations outside government systems. Necessary actions to control the COVID-19 pandemic, including restrictions on movement between counties, working from home and social distancing, removed the researchers' ability to convene face-to-face half-day workshops in the three case study regions, as initially planned. An online-only methodology was adopted as an alternative, but this had limitations. Advice from an expert at the project's partner organisation, the Red Cross Red Crescent Climate Centre, was that the maximum useful engagement we could realistically expect from focus group participants would be between 60 and 90 minutes, and this format was adopted in each of the regional focus group discussions. Despite the limitations of online discussions, the condensed interactions with regional practitioners identified examples of good practice and areas where further work is needed and validated some ideas and initiatives emerging from both practice and the research.

3 Current State of Climate Change Adaptation and Disaster Risk Reduction Integration in Emergency Planning in Ireland

Ireland's government-led work on CCA began relatively recently, while its work on a systematic approach to emergency planning is more established. The *Climate Action Plan 2019 to Tackle Climate Breakdown* (Department of Communications, Climate Action and Environment, 2019a) notes that "the most immediate risks to Ireland which can be influenced by climate change are predominantly those associated with changes in extremes, such as floods, precipitation and storms." It builds on the foundational Climate Action and Low Carbon Development Act 2015 and the *National Adaptation Framework 2018*. The plan describes the whole-of-government climate resilience ambition and reiterates its commitment to ensuring the permanent provision of accurate and authoritative information and expertise through Climate Ireland. By the end of 2021, the first year of implementation of the country's first set of sectoral and local authority adaptation strategies had been completed. These policies, plans and operational actions represent real, measurable and relatively quick steps towards CCA, even accepting that some are still to be fully implemented. As work is in progress, real-time learning and problem solving is inevitably required to resolve emerging challenges of integration, to which this research hopes to contribute positively. This chapter reviews integration at the national policy and planning level before discussing sectoral and local authority planning. It sets out the research participants' perceptions of risk, PRAs' capacity and reflections on achievements and gaps in integration, using the six ESPREssO pathways as the analytical lens. Finally, it considers alignment of Irish policies and plans with those at the global and European levels.

3.1 Integration of Climate Change Adaptation and Disaster Risk in Irish Policy and Planning

The National Adaptation Framework (Department of Communications, Climate Action and the Environment, 2018a) identifies the need for greater alignment of strategic emergency planning and climate adaptation policy. The *Strategic Emergency Management Guideline 4 – Climate Change Adaptation* (Department of Defence, 2020) adds that this policy goal is "consistent with EU and International promotion of greater integration and coherence between stakeholders involved in emergency planning (particularly DRR) and climate change adaptation". However, the desired alignment tends to be informal, ad hoc and inconsistently articulated in national-level policy and planning documents, either as an overarching objective or as clear operational guidance to achieve integration.

Ireland has made good progress in the production of policies and plans for emergencies and for CCA over the past 15 years, as evidenced by the range of policy and guidance documents produced. Therein lies one of the main challenges to integration: policies and plans have generally been developed in an iterative but narrowly focused way, dealing with one issue at a time rather than attempting a holistic and integrated approach. The result is a series of policies, plans and initiatives that, while individually reasonable, appropriate and often benchmarked against international good practices, can be siloed and may miss opportunities for integration during implementation. This is, in large part, because of the timing of their development and the task- or priority-driven focus of the instruments. The MEM Framework from 2006 (NDFEM, 2006a), for example, includes natural hazards in the arrangements for risk assessment. This framework also addresses risk mitigation, differentiating the roles and responsibilities of PRAs from those of risk holders and risk regulators, and promoting resilient communities, services and infrastructure. It places the coordination of risk mitigation on the agenda of regional steering groups for MEM. However, the framework makes no mention of climate change or the intention to integrate climate change projections into planning or preparedness and, although sectors and local authorities engage with MEM governance, planning and coordination

structures, none of the research participants referred to the MEM architecture as the focal mechanism for integrating adaptation and DRR with emergency management; rather it is seen primarily as a mechanism for information sharing.

The SEM National Structures and Framework document itself makes very little mention of climate change or its impact on disaster risk. The approval of the additional guideline on CCA in December 2020 is a significant step forward, providing a good introductory summary of the subject in the context of emergency planning (Department of Defence, 2020). The guideline does not, however, provide any detailed guidance on how to integrate adaptation and risk reduction despite reiterating the need to achieve integration. There is reference to emergency management in the National Adaptation Framework, implying an ongoing, iterative relationship between emergency and adaptation planning. However, there is a need for further connectivity and coherence between the two areas. Detailed guidance has been explicitly left for future iterations of the SEM Framework and research. Meanwhile, the current Climate Action Plan's[3] principal focus is on mitigation of greenhouse gas emissions, with only 3 of 183 actions focusing on adaptation, although those three actions are ambitious. The second (2021) iteration of the Climate Action Plan strengthens the government's focus on adaptation. These actions included the preparation of sectoral and local adaptation strategies, which are now in place and are discussed below.

It must also be recognised that government has established the Government Task Force (GTF) on Emergency Planning, which has the overall lead responsibility in this area, and specific government departments are assigned lead responsibilities, as outlined in the SEM Framework and its annex. In addition, the Office of Emergency Planning manages various GTF subgroups that address specific areas of emergency management, including risk, communications and critical infrastructure resilience. The GTF completed the national risk assessment for Ireland 2020, which also took account of climate change, and the recently approved SEM Guideline 4 on climate adaptation is another step towards integrating CCA and DRR in an Irish context. The lead responsibility has been assigned by government to the Department of the Environment, Climate and Communications (DECC) under the National Adaptation Framework structures to address the cross-cutting nature of this work, which is specifically led by the already established National Adaptation Steering Committee chaired by the DECC. The cross-cutting emergency management elements remain the lead responsibility of the GTF on Emergency Planning.

The goal of building a resilient society in Ireland runs through policy and plans for both climate action and emergency management. However, the existing policies and plans provide little operational guidance. This may be the result of the iterative nature of adaptation planning and the recognition that the first round of climate change risk assessments found in the sectoral and local authority CCA strategies are based on first and second pass methods only (Flood *et al*., 2016). It also reflects the complexity of the governance, management and coordination systems for adaptation and DRR through different mechanisms, one focusing on emergencies, the other focusing on adaptation.

However, to achieve greater integration between these areas of adaptation and risk, consolidating the systems of governance, management and coordination at the national level would be beneficial, for example by establishing a single "nerve centre" or creating an interdepartmental working group. The outcomes expected from integrating adaptation and risk reduction are not exclusively environmental and often lie beyond the purview and capability of the DECC and the National Adaptation Steering Committee. With that in mind, responsibility for the integrated governance, management and coordination functions could be given to the Department of Housing, Local Government and Heritage as the lead government department for extreme weather-related emergencies. Co-location within this department, for example aligning with one of its existing bodies such as Met Éireann or the National Directorate for Fire and Emergency Management (NDFEM), would offer the opportunity to make delivery of policy, national planning, coordination and information sharing more integrated and more efficient. Such a change could help to produce integrated operational guidance, ensure better synchronisation of policies, plans and research, and improve the application of climate

3 https://www.gov.ie/en/publication/6223e-climate-action-plan-2021/ (accessed 11 April 2022).

and risk data, financial analysis, communication and capacity building.

It is well established that an individual's vulnerability is affected by socioeconomic characteristics such as age, income, housing and health status. Those with low socioeconomic characteristics and an associated low adaptive capacity are likely to be less resilient to the impacts of a disaster and to be more profoundly affected by it. The UN Secretary General, in his note to the General Assembly on the "Report of the Special Rapporteur on the issue of human rights obligations relating to the enjoyment of a safe, clean, healthy and sustainable environment" (United Nations Secretariat, 2019), states that the goals of adaptation "are to prevent and reduce vulnerability, strengthen resilience, minimize harm and capitalize on new opportunities." Analysis in Ireland shows that approximately 772,000 individuals (23% of the population) or 437,000 households (26% of all households) have levels of social vulnerability to climate hazards above the national average (Medway *et al*., 2022). To date, risk assessment in Ireland has primarily focused on the expected economic cost of disasters as the main factor in identifying risk reduction projects without considering a wider set of socioeconomic drivers of vulnerability. Consequently, risk reduction projects often target areas with higher-value assets, potentially to the detriment of people living in areas of greater social vulnerability and who may be disproportionally affected by risk. To achieve equitable resilience and a just transition to a low-carbon, well-adapted society, consideration of these aspects of vulnerability, through integration of vulnerability indices, is merited. The integrated, vulnerability-focused approach to adaptation and disaster risk is increasingly being adopted internationally, for example in the Philippines (Natoli, 2020), one of the countries most exposed to weather-related disasters globally.

3.2 Planning for Climate Change Adaptation and Emergency Management at Sectoral and Local Authority Levels

The first concerted policy drive towards adaptation, the National Climate Change Adaptation Framework (NCCAF) (Department of the Environment, Community and Local Government, 2012), included emergency planning as a key sector with the lead role for adaptation planning undertaken by the Department of the Environment, Community and Local Government. Local authority (Department of Communications, Climate Action and Environment, 2018b) and sectoral (Department of Communications, Climate Action and Environment, 2018c) adaptation strategies, developed in 2019 for implementation over a 5-year period, have to an extent helped to overcome the inconsistencies and lack of integration between the national-level policies and plans for climate action described above. However, emergency planning has been removed from the list of key sectors over time. While this may be considered, at face value, a potential negative, the NCCAF documentation implies that this allowed some sectors and local authority adaptation strategies choice in how emergency planning is integrated with adaptation planning, and there has been some tailoring of measures to the specific sectoral context.

The guidelines set out for the design of sectoral and local authority adaptation strategies required the development of a common framework with six steps, as illustrated in Figure 3.1. These steps were intended to standardise the planning approach taken, ensuring inclusivity and a rigorous process to identify vulnerabilities, to prioritise them and to ensure that robust implementation, monitoring and learning measures were included in the strategies.

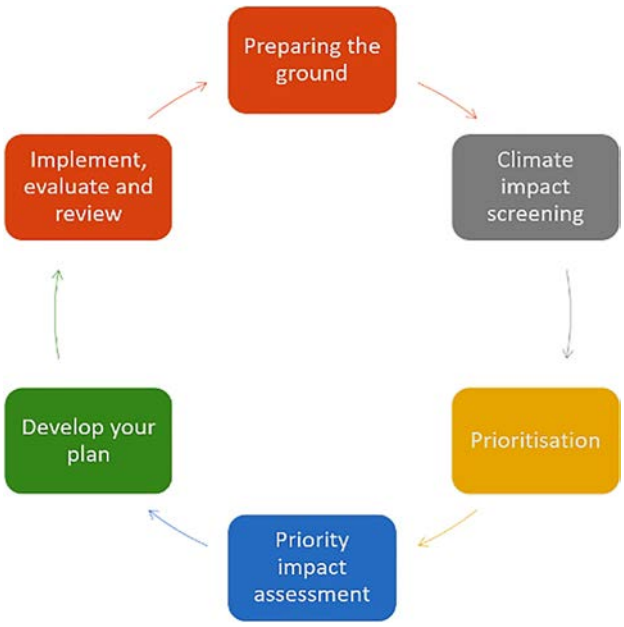

Figure 3.1. Sectoral and local authority adaptation planning process.

The high-level strategies that have been developed by relevant government departments share this basic methodological framework. However, there are considerable variations in both the approach and consequent proposed actions taken across the sectoral and local authority adaptation strategies. This mostly reflects the different sectoral and local authority assessments of vulnerability, their prioritisation and treatment. There are also a range of approaches to integration or emergency planning and interaction with PRAs. The actions to prevent and reduce new and existing risk are typically quite explicit. Those for the management of residual risk are, more often, implicit. The link between organisations responsible for the prevention and reduction of new and existing risk and those responsible for responding to residual risk are usually not articulated in detail and in some cases are entirely absent.

3.2.1 Sector adaptation planning

There is recognition at the EU[4] and national[5] levels that there is a need to continue to reduce vulnerabilities to protect economies and societies, including vulnerabilities in the critical infrastructures that are essential for their functioning. In Ireland the GTF on Emergency Planning is responsible for the oversight and coordination of national-level emergency management. The sectors that have a critical infrastructure and service provision mandate, including transport (Department of Transport, Tourism and Sport, 2019), communication (Department of Communications, Climate Action and Environment, 2019b), and electricity and gas networks (Department of Communications, Climate Action and Environment, 2018d), set out some details about the policy provisions for integrated adaptation and emergency planning. In the communications sector, for example, framework regulations (S.I. No. 333/2011) require operators to report network interruptions to the regulator, ComReg (Commission for Communications Regulation). Operators are not only required to repair infrastructure as needed, but also “have a positive obligation to take steps to guarantee the integrity of their networks and to ensure continuity of service is provided”. This obligation illustrates one type of regulatory incentive for integrated CCA and DRR measures to prevent negative impacts of new risks and to reduce the potential impact of existing risks. In practice, sectors are already planning and implementing adaptation to climate change-induced risk but typically refer to such planning under the heading of “business continuity”.

However, there are at least two areas where complex issues are still to be resolved. Irish sectoral institutions are working in a coordinated fashion under the GTF Critical Infrastructure Working Group, including the communications and energy sectors, local governments, Irish Water, Climate Ireland and the CAROs. The working group is creating a comprehensive inventory of critical infrastructure but struggling to reconcile the differing definitions of criticality across different sectors. Mapping the cascade of risks that cross the intersection of different critical infrastructure systems, for example the flood risk that threatens the critical access road for the electricity substation, hospital or fibre-optic cable, is still to be done. A mechanism to manage the cascading risk across institutional boundaries has also to be established to facilitate the financing and delivery of measures needed to prevent, reduce and manage residual risks at each intersection. For example, the *Health Sector Climate Change Adaptation Plan* (Department of Health, 2019) and the *Water Quality and Water Services Infrastructure Climate Change Sectoral Adaptation Plan* (Department of Housing, Planning and Local Government, 2019) both emphasise service continuity-based emergency planning to ensure critical infrastructure resilience, but they do not cross-reference each other.

Adaptation strategies for non-critical infrastructure sectors, including those for biodiversity, built and archaeological heritage, and agriculture, forest and seafood, also address links to emergency planning in their adaptation strategies. There is considerable variation in how, and the extent to which, this is done. The agriculture, forest and seafood sector adaptation plan (Department of Agriculture, Food and the Marine, 2019) notes the department’s role as lead on emergency planning for animal disease, animal foodstuffs and food safety. It integrates adaptation

4 https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2020:829:FIN (accessed 11 April 2022).

5 https://www.gov.ie/en/publication/7ff6f-strategic-emergency-management-sem-national-structures-and-framework/ (accessed 11 April 2022).

and emergency planning through actions to "establish, and regularly review contingency plans for emergency response to exotic animal and plant disease/pest outbreaks, feed and food incidents, and deploy such response plans, as appropriate". The department further coordinates across government to plan for, mitigate and respond to fire and flood risks. It has developed the "Prescribed Burning Code" for Ireland to support landowners who use regulated burning as a land management tool and works closely with Met Éireann on the Fire Weather Index and issue of forest Fire Danger Notices. The department is also working closely with the Office of Public Works (OPW) on flood risk management, using flood maps and projections for decision-making. The department plays a role as a participant in the National Flood Forecasting Warning Service and in the Inter-departmental Flood Policy Coordination Group, which can contribute to co-benefits from adaptation across multiple sectors. Of note, the biodiversity sector integrates well with other sectoral adaptation measures to contribute nature-based solutions, for example by establishing an objective to encourage all sectors "to consider nature-based solutions as potential low cost win–win climate change adaptation and mitigation solutions" and as a "screen for maladaptation" (Department of Culture, Heritage and the Gaeltacht, 2019a). Numerous examples of such types of integration are available, for example the nature-based flood relief scheme created in 2018 by Dublin City Council in the Environmental Improvement Scheme for Crumlin Village (CARO, 2021a). The sector bears no lead responsibility for emergency management or DRR but is playing a positive role in promoting nature-based solutions to a range of hazards. Notably, the *Built and Archaeological Heritage Climate Change Sectoral Adaptation Plan* (Department of Culture, Heritage and the Gaeltacht, 2019b) is the only sectoral plan to reference the Sendai Framework as the driver for a specific objective to increase and improve DRM for heritage sites (para 5.1.2.3, Objective 3) through policy development, procedural guidelines, training for first responders and improved coordination mechanisms.

3.2.2 Local authority adaptation planning

The principle of subsidiarity is firmly embedded in the management and provision of services and assets in Ireland, with local authorities playing a critical role in the lives of citizens and the economy. Local authorities play a vital role in the prevention or reduction of and response to disaster risk and in CCA. Local authorities have always had to find ways to work in a holistic, integrated manner, given their broad range of responsibilities; however, that is not to say that such integrated working is not without challenges at the local authority level. As one research participant noted, it is at the local level where the often-siloed working of national government departments and agencies meet and where problems of policy coherence, or lack of it, manifest themselves. Establishing cross-sectoral climate action teams for formulating local authority adaptation plans is a potentially very effective model for more integrated working that is being sustained for the coordination of implementation. However, additional staff and other resources are needed, especially in the light of the growing demands on local authorities in the Climate Action and Low Carbon Development (Amendment) Bill 2021 (Government of Ireland, 2021).

The local authorities are supported by four CAROs, which are tasked with implementing supportive actions for adaptation, mitigation, communication and civic engagement, training and education, knowledge development and partnership (CARO, 2021b). Local authorities work closely with the other PRAs (An Garda Síochána[6] and the Health Service Executive; HSE) to respond to emergency events of all kinds, coordinated through a national and eight regional steering and working groups. For weather-related emergencies, the MEM Framework tasks local authorities to play the role of predetermined lead agency for response (NDFEM, 2006a). The geographical distribution of the CAROs and major emergency management regional steering and working groups is shown in Figure 3.2. Leaving aside the larger number of MEM coordination regions, the grouping is similar, but not the same as for the four CAROs. While there may be specific reasons for the difference in geographical boundaries, and while CAROs are not involved in the day-to-day aspects of emergency planning, a more integrated approach to the MEM coordination regions and the CAROs, along with the local authorities they support, is appropriate to facilitate integration of DRR and CCA through, for example, the harmonisation of regional-, county- and

6 The national police force.

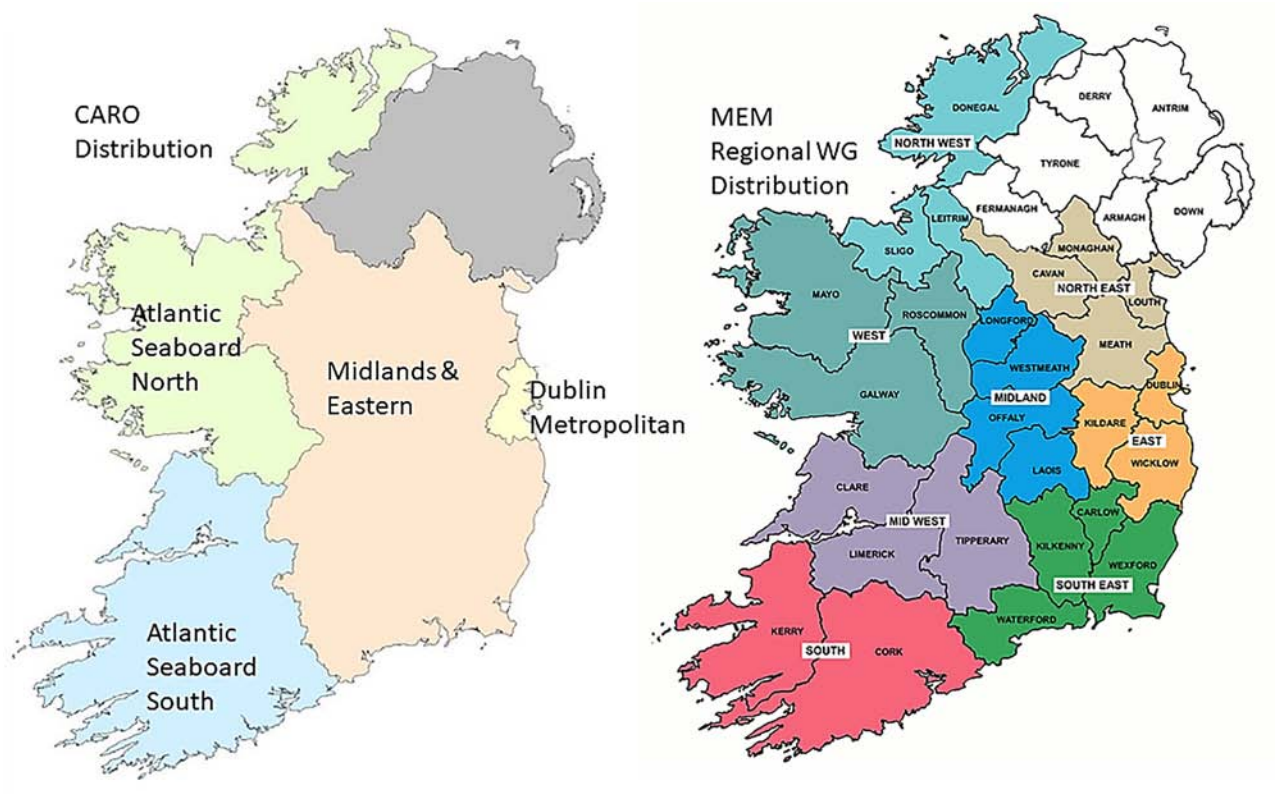

Figure 3.2. Distribution of CAROs (left) and MEM (right) regional working groups.

city-level emergency and climate change risk assessments, training and coordination mechanisms. Such a change may also enhance sector coordination with local authorities.

Local authority roles, responsibilities and planned actions are enshrined in several inter-connected commitments, strategies and plans. In 2019, local authorities signed the Climate Action Charter with the Minister for the Department for Communications, Climate Action and Environment (DCCAE) (Department for Communications, Climate Action and Environment, 2019c) as part of the national Climate Action Plan. The Charter commits local authorities to 23 wide-ranging actions. These include a commitment to "continue to identify and develop specific actions to be taken to reduce the risks associated with negative climate change impacts and build resilience to these impacts", although it does not mention integration of adaptation and emergency planning.

The overarching strategy to fulfil the commitments in the charter is set out in the City and County Management Association (CCMA) report entitled *Delivering Effective Climate Action 2030* (CCMA, 2019). The strategy "provides a roadmap with solid objectives for local authorities to work towards maximising their collective impact on Ireland's national climate targets". The CCMA roadmap comprises six goals, shown in Table 3.1, covering a comprehensive range of climate actions.

Goal 3 commits local authorities, with support from CAROs, to achieving five adaptation objectives, including playing a leading role in relevant DRM tasks such as flood risk management and supporting communities in resilience planning through the implementation of their respective CCA strategies, and supporting other agencies to deliver sectoral plans at the local level. Many examples of local authorities taking integrated action on adaptation and DRR exist. Cork County Council has mitigated the risks of coastal erosion and flooding to the R604 road at Garretstown beach using a grey adaptation approach, installing an erosion control armour block protection system to reinforce the existing sea walls, gabion baskets, rock armour and embankments (CARO, 2021c). The CCMA strategic goals for climate action place a strong emphasis on working with communities and building local resilience. In County Mayo, a community-based flood action committee was established in Crossmolina as a partnership between residents, traders and the

Table 3.1. Strategic goals from *Delivering Effective Climate Action 2030*

Strategic goal	Description
1	Fostering governance, leadership and partnership for climate action
2	Achieve carbon emission and energy efficiency targets for 2030 and 2050
3	Deliver on climate adaptation and climate resilience
4	Mobilise climate action in local communities
5	Mobilise climate action in enterprise and support transition to an inclusive, net zero and circular economy
6	Achieve a "just transition" particularly for communities that may be economically disadvantaged by decarbonising projects

Source: CCMA (2019).

county council, for disseminating early flood warnings and placing of sandbags and other defences. The partnership was instigated by the community, which had been exposed to successive floods over recent years, and has been successful enough to be replicated in other communities, including Ballina. Many other examples of good practice can be found in the Local Government Management Agency (LGMA) report *A Profile of Local Government Climate Actions in Ireland* (Clarke and O'Donoghue-Hynes, 2020).

4 Research Hypothesis

Initial analysis of responses to key informant interviews and the literature review enabled the formulation of a research hypothesis (Figure 4.1) to summarise our assumptions about the main actions related to CCA and emergency management in Ireland today. The hypothesis summarises contributions made by key informants in the first phase of the research to describe some of the main accomplishments, connections and gaps in the systems for CCA and DRM.

The hypothesis reflects that the state's primary objectives are to assess and, to the extent possible, anticipate, prevent and reduce disaster risk, including that which is exacerbated or caused by climate change. The state also has primary responsibility for managing the residual disaster risk that cannot be prevented or reduced through feasible, affordable actions. These interconnected objectives are illustrated in Figure 4.2 and these responsibilities are demonstrated within Ireland's National Risk Assessment process.[7]

These responsibilities are fulfilled, at least in part, through the implementation of the tasks described in the five-stage model for emergency management used in the SEM and MEM Frameworks (Figure 1.1), which incorporates hazard analysis, mitigation, planning and preparedness, response, and recovery. The research hypothesis recognises these existing policy and preparedness frameworks and aims to build on the existing structures as appropriate. Therefore, in broad terms, we assume that the category of activities classified as "preventing the creation of new risk" and "reducing existing risk" can be correlated with the mitigation measures described in the Strategic Emergency Management National Structures and Framework (Department of Defence, 2017). We further assume that identifying and managing residual risk correlates with the planning and preparedness, response, and recovery actions discussed in the SEM documentation.

The hypothesis is summarised in the following sections.

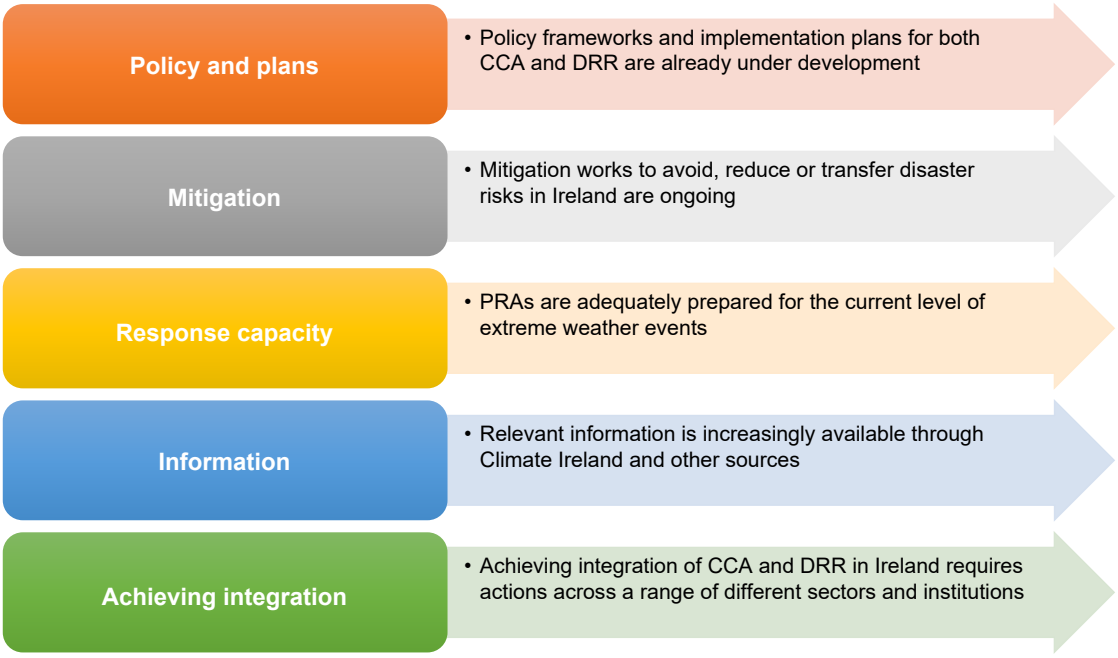

Figure 4.1. The project's research hypothesis.

7 https://www.gov.ie/en/press-release/5e685-national-risk-assessment-for-ireland-2020/ (accessed 11 April 2022).

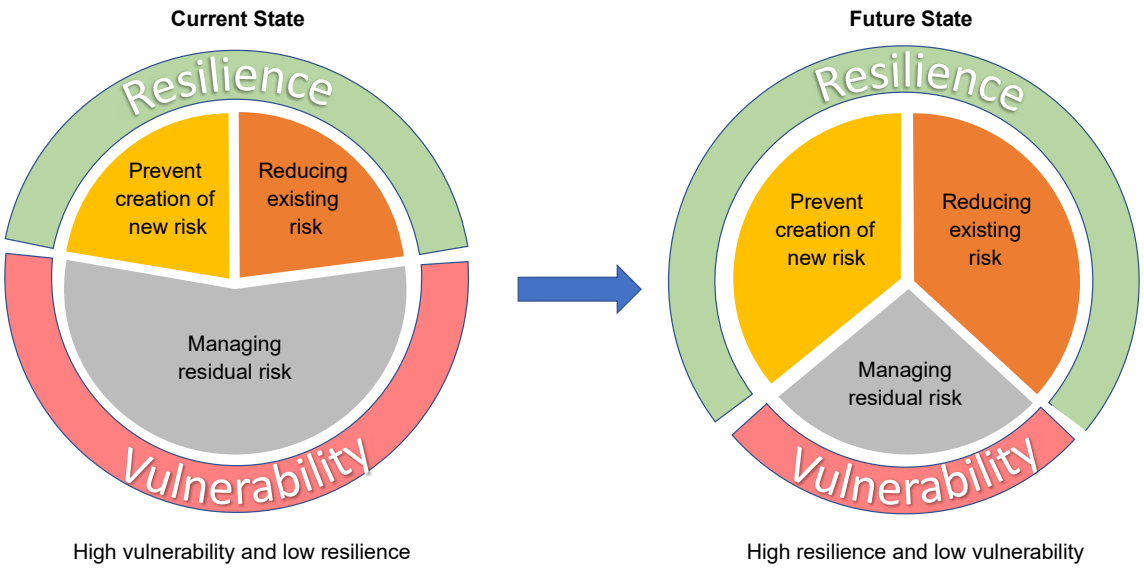

Figure 4.2. DRM objectives, as for CCA, are based on reducing existing risk and avoiding the creation of new risk and managing existing risk to increase resilience. Risk that cannot be managed or avoided is the residual risk that leads to vulnerability.

4.1 Policy and Plans (including Law)

The Climate Action and Low Carbon Development (Amendment) Bill 2021 (Government of Ireland, 2021) is the culmination of legislative efforts by successive governments for climate action. The legislation reflects evolving policy, setting the goal for a climate-resilient and climate-neutral economy by 2050, and is supported by national-, regional- and local-level action plans in a range of subject-specific areas. The legislation requires regular periodic reviews and updates of short- and long-term plans and strategies, among other initiatives to manage the causes and consequences of climate change. The legislation also incorporates actions for both mitigation of and adaptation to climate change and requires local authorities to prepare climate action plans to address both. Some local authorities, for example in the Dublin metropolitan area, have already done this. The legislation is supported by a range of strategies and plans including the Climate Action Plan (Department of Communications, Climate Action and Environment, 2018e), the National Adaptation Framework (Department of Communications, Climate Action and Environment, 2018a), sectoral adaptation plans (Department of the Environment, Climate and Communications, 2020a) and local authority adaptation plans (Department of the Environment, Climate and Communications, 2020b).[8]

Emergency management arrangements are not based on legislation, but on well-established objectives, frameworks and plans for both MEM (NDFEM, 2006b) and strategic (or national-level) emergency management (Government Task Force on Emergency Planning, 2017). The MEM and SEM Frameworks were adopted by government decision in 2006 and 2017, respectively. Four additional guidelines have been adopted covering emergency communications (2018), climate change adaptation (2020), critical infrastructure resilience (v.2, 2021), and the National Emergency Coordination Group (2021). The Framework for Emergency Management uses a five-stage model for emergency management, which was also included in the later SEM National Structures and Framework (Figure 1.1). All the stages described in the existing model used by PSAs are consistent with and necessary for achieving the DRM objectives described above in Figure 4.2.

4.2 Mitigation

Mitigation, or DRR as it is generally known in other countries, is a responsibility largely devolved to technical agencies, such as the OPW, and the owners

8 All sectoral and local authority adaptation plans are available through the Climate Ireland website at http://dev.climateireland.ie/#!/tools/adaptationStrategyExplorer (accessed 12 April 2022).

of exposed assets, services and infrastructure systems, such as Transport Infrastructure Ireland (TII), Irish Water, the Electricity Supply Board (ESB), private companies, private individuals and local authorities. Overarching, general guidance for mitigation in Ireland, as it pertains to emergencies, is provided by the MEM and SEM Frameworks, although the guidance is not detailed. In this context, mitigation (i.e. DRR) is distinct from climate change mitigation, which refers to actions to reduce harmful greenhouse gas emissions. Each sector or asset owner is responsible for developing its own design and management standards and protocols as it sees fit but is usually guided by a sector-specific policy on risk management. MEM structures, such as the regional working groups, are expected to coordinate and discuss mitigation as part of the coordination and planning processes for emergency management. The three PRAs designated in the MEM structures, An Garda Síochána, HSE and local authorities, also play an important risk regulation role.

Significant progress has been made on DRR in many sectors in Ireland. The most prominent example has been Ireland's Catchment Flood Risk Assessment and Management Programme (CFRAM), implemented by the OPW. The programme represents a comprehensive approach to flood risk management, incorporating hazard and vulnerability assessment, risk mapping, formulation of risk reduction plans incorporating grey, green and soft options, and financing and operational implementation of flood management schemes nationwide. With climate change in mind, the OPW (2018) considered "the assessment of risk for two potential future scenarios, the Mid-Range Future Scenario – increase in rainfall of 20% and sea level rise of 500 mm (20 inches), and High-End Future Scenario – increase in rainfall of 30% and sea level rise of 1000 mm (40 inches)". The OPW anticipates that 95% of properties at risk of flooding in the 300 most vulnerable areas of the country can be protected by continued investment in flood relief measures. However, it notes the important role of other measures, including individual property protection, flood forecasting and community resilience, which are integrated actions in the overall National Flood Risk Policy.

4.3 Response Capacity

Ireland's PRAs are local authorities, An Garda Síochána and the HSE. Their roles and responsibilities with respect to emergency response and management are clearly established in the MEM and SEM Frameworks. Research participants broadly agreed that the PRAs' capacity to respond to current levels of climate-induced disaster risks, including floods, droughts and heatwaves, and storms, is adequate. The NDFEM undertook a comprehensive review of responses to a series of extreme weather events in 2017 and 2018 (NDFEM, 2019) and noted positive lessons that can be learned, including Met Éireann's effective forecasting and warning systems; activation and operation of effective coordination structures at both local and national levels; visible leadership in times of crisis; effective provision of information, including official warnings, advice and safety information provided to the public; and the approach to the restoration of services and management of public information by critical infrastructure providers, principally ESB Networks, Irish Water and TII. PRAs work closely with voluntary emergency service providers, such as the Irish Red Cross Society and Civil Defence, to expand response capacity for emergencies.

PRA adaptation to climate change will mainly occur through periodic service capacity reviews. These ensure that the various agencies maintain adequate capacity and an appropriate approach relative to assessed risks. Over time, residual risk, that which cannot be avoided, transferred or reduced through mitigation measures, may grow at least partly because of climate change. Research participants broadly agreed that there is adequate understanding of climate change within PRAs to create willingness to change, but central government should take the lead in providing relevant direction, information and knowledge of CCA and incorporate an adaptation perspective into the periodic capacity reviews. The flexibility to adjust capacity and approach to a changing risk profile over time is, therefore, an essential adaptation to climate change.

4.4 Information

In general, data, research and information on climate change are proliferating globally and in Ireland. The Climate Ireland information portal (Climate Ireland, 2021), the CARO WIRE App (CARO, 2021d), the EPA's Research Programme (EPA, 2021) and the EU's Platform for Climate Adaptation and Risk Reduction (PLACARD, 2020) and "Enhancing Synergies for Disaster Prevention in the European

Union" (ESPREssO, 2020) projects are just four of the many rich sources of information on DRM, CCA and integration strategies that are well known and used in Ireland. Global institutions, not least the Intergovernmental Panel on Climate Change (IPCC), the Organisation for Economic Co-operation and Development (OECD), the UN and its specialised agencies, offices and programmes, such as the UN Environment Programme (UNEP), the UN Office for Disaster Risk Reduction (UNDRR), and the Food and Agriculture Organization of the United Nations (FAO), as well as the International Red Cross and Red Crescent Movement, universities, think tanks and the private sector, are all producing information and research that can provide examples of good practices and important lessons learned on the integration of CCA and DRR for Irish authorities and other stakeholders.

The large volume of information available to practitioners and policymakers is, in general, a boon but can create its own challenges. These relate to, inter alia, the establishment of a common climate change projection for Ireland that can be used by all institutions as a baseline for adaptation and risk management planning; effective and deliberate dissemination of essential information to practitioners in different sectors; adaptation of information to the Irish context; and quality assurance of available information.

4.5 Achieving Integration

Achieving integration of CCA and DRR in Ireland requires actions across a range of different sectors and institutions. Recognising the achievements made in Ireland in the areas discussed above raises questions about "where" and "how" further integration of CCA and DRR should take place.

5 Practitioner Perceptions of Risk, Level of Adaptation and Principal Response Agencies' Ability to Cope with Extreme Weather-related Disasters

Feedback from the perceptions survey and focus group discussions, conducted with multidisciplinary experts from local authorities and other institutions for County Mayo, Cork City and the Dublin region, provided a glimpse of progress and areas where further work may be needed to achieve integration of CCA and disaster risk. The questions posed to the groups aimed to elicit their opinions on issues such as levels of existing risk, organisational capacity and pathways for adaptation. The full list of questions is provided in Appendix 5. The project team recognises that this is a small sample size. Furthermore, the results, summarised in a consolidated form in Figure 5.1, do not show the slight differences in perception between a predominantly rural county and two urban/peri-urban areas. However, the focus group participants represented experts drawn from a broad range of roles within local authorities, had direct experience of managing disaster risk and/or adaptation as part of their job responsibilities and played an active role in adaptation planning processes. Their insights are, consequently, helpful for validating evidence and making suggestions for future progress on integration.

There was a wide range of responses to each question and one or two outlying responses. The mode (most frequent response) tended to be relatively close to the mean score across all responses. Overall, respondents provided some validation of the six SHIELD model pathways as areas to focus on to achieve integration. No dissent was recorded regarding the SHIELD model. The only alternative pathway for integration, suggested by one focus group participant, was about educating politicians on the long-term commitment to adaptation needed to achieve results.

The responses provided by the research participants clearly suggested that, while much progress has been made over recent years, there is still much to be done to reduce and adapt to the risks that are likely to be increased by climate change. In terms of the perception of different types of risk, the responses covered a wide range. Based on the mean scores, the risk of river flooding is considered to be slightly higher and less well adapted to than other type of risks. The difference between hazard types was not great enough to offer a meaningful sense that one represented an overwhelming priority; consequently, an all-hazard approach continues to be merited. Overall, respondents agreed that emergency services had done a good job in responding to the various disaster events discussed. Many focus group participants remarked on the effective ways that the emergency services reviewed responses and learned from them to improve future performance.

Respondents were mostly positive about the work their organisations had done towards integrating CCA and disaster risk around the five pathways included in the survey.[9] Their feedback in the focus group discussions suggested the need for further progress. The perceptions shared suggested that most progress has been made on communications and stakeholder engagement, knowledge management and coordination. More work is needed on capacity building and, in particular, financing. The generally very positive perception of emergency services' response performance was juxtaposed with the perceptions that significant further work is needed to reduce and prevent risk, which highlights the need to reduce the strain on emergency services in future, as overall levels of risk grow as a result of climate change. In the absence of an integrated approach to CCA and DRR, the possibility of overwhelming response capacity is real.

The current situation related to the integration of CCA and DRR in Ireland with a focus on the six SHIELD

9 To reduce the time it took respondents to complete the survey, the team condensed the six pathways into five, amalgamating the communication and stakeholder engagement pathways.

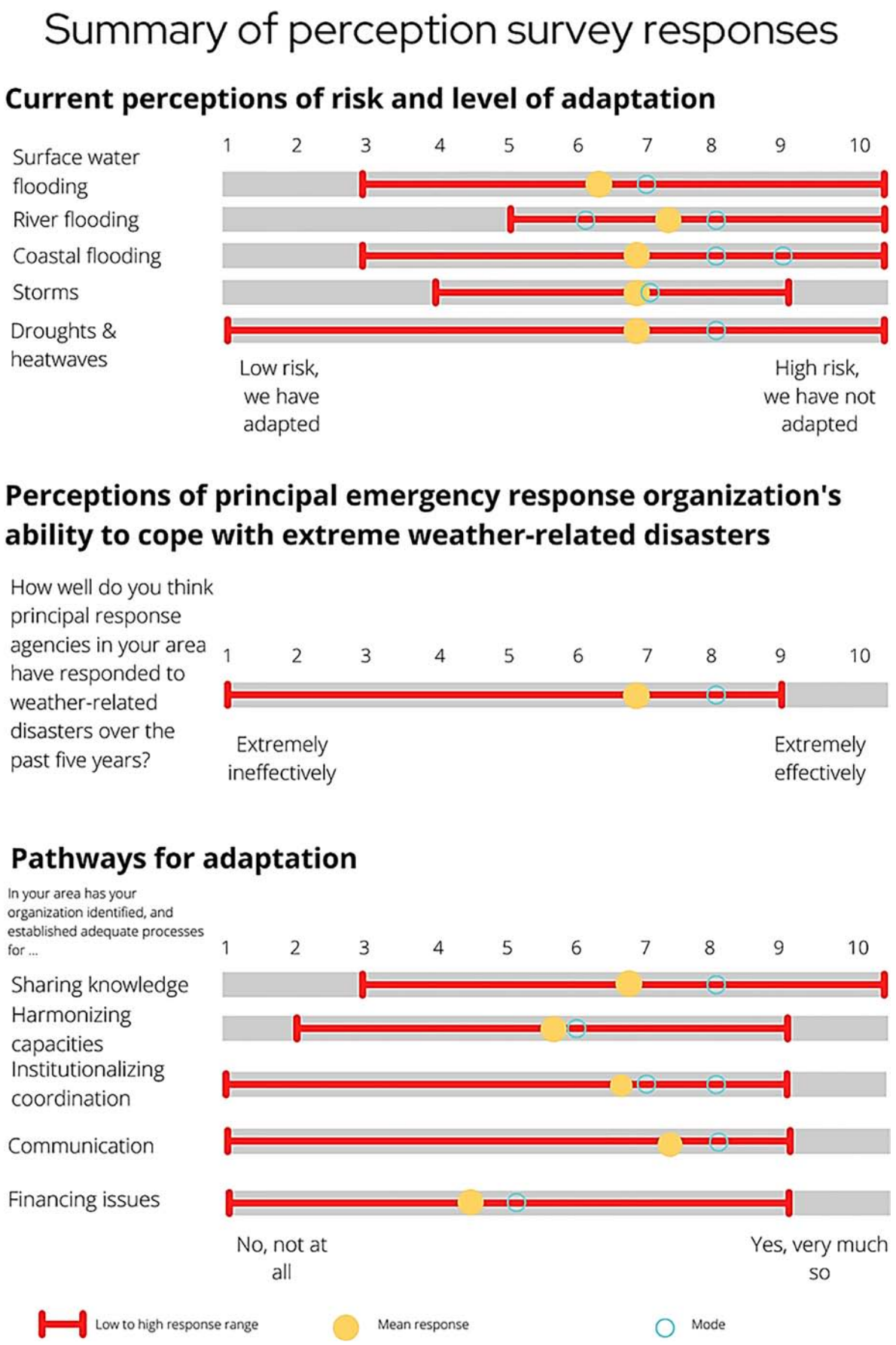

Figure 5.1. Summary of responses to the perception survey, including range of answers, mean and mode. If more than one modal average is shown this is because categories had an equal number of responses.

pathways and some of the main challenges identified by the research participants is summarised below.

5.1 Sharing Knowledge

The ESPREssO guidelines note that sharing knowledge is required to underpin any effective system for the management and reduction of disaster risk. In the online survey, the focus group participants were asked "Has your organisation established knowledge generation, sharing and application processes for climate change adaptation in your area?". A score of 1 corresponded to "No, not at all", whereas a score of 10 indicated that "Yes, a robust and comprehensive set of processes are established". The results, displayed in Figure 5.1, gave a mean average score of 6.83/10, with 8 being the most frequently selected response across a wide range of responses from 1 to 10. We believe the responses primarily reflect the large amount of information available on CCA and emergency management. Key informant interviews and focus group discussions revealed some further insights into the practical challenges of applying new information to facilitate integration, including the sheer breadth of knowledge of potential relevance to the integration of CCA and disaster risk.

The ESPREssO guidelines identify four key issues, all of which were also reported by participants in this research to varying extents. The key issues are the lack of awareness of the need to share knowledge; the risk of information overload; the value of open access data and information; and knowledge silos. Noting these challenges, we must also consider who shares knowledge, what is shared, when, how, why and with whom. The need for a curated information management system for adaptation will increasingly be met by Climate Ireland, the country's climate information platform, which became operational in 2018. The platform has been well established under the EPA as the permanent curated repository of information that connects policymakers and practitioners, at different levels, with the science, that provides support for hazard and risk analysis, policymaking and planning, and that undergoes constant improvement based on government and user requirements. It provides extensive toolkits for a wide range of requirements and links to the myriad national and international resources helping institutions to achieve their adaptation goals. Climate Ireland helps to overcome information overload, facilitates and builds support for the sharing of information, helps to stop data hoarding and, ultimately, breaks down silos between stakeholders.

Practitioners in Ireland have access to a vast range of knowledge on the projected impacts of climate change, the vulnerability of people and infrastructure to the projected impacts, and the capacity of its society to adapt or build resilience to those impacts. A review of sectoral and local authority adaptation strategies showed that Climate Ireland data on down-scaled climate change impact projections had been used in almost all strategies, suggesting an acceptably high level of coherence across the country and sectors.

The four CAROs also play an important role in sharing knowledge. Their role includes liaison with third-level research establishments, the EPA-led Climate Research Group and overseas institutions, predominantly in the UK and Europe. It encompasses advice on securing funding for climate change initiatives, and collation and publication of best practices emerging from local authority work. Combined with the practical support to local authorities for the implementation of adaptation strategies and engagement with the departments and agencies delivering sectoral adaptation, the CARO role extends to supporting the application of shared knowledge. Many participants from local authorities and departments and agencies delivering sectoral adaptation noted the relevance and importance of this role.

Research participants remarked on the low level of awareness of CCA among practitioners in local authorities as a constraint in the design of adaptation strategies. CAROs and their partners are providing training and technical assistance to local authorities and others. The local authority training plan is also working through networks such as the LGMA and the CCMA, and partners such as Climate Ireland, the EPA and Met Éireann. The training programme to raise awareness of CCA among 2900 local authority staff and approximately 900 councillors was undertaken throughout 2021 alongside an introductory course for local authority senior management. Research participants cited Climate Ireland's usefulness in the preparation of local authority and sectoral adaptation strategies, while a few suggested that there was limited awareness of Climate Ireland among practitioners in local authorities. Training should have

a secondary benefit of raising awareness of Climate Ireland's services.

A range of additional challenges related to sharing knowledge was identified by research participants, as well as in the project's initial literature review, that, if addressed, will contribute to adaptation and DRR. These are discussed below.

5.1.1 Difficulty in understanding and applying adaptation as a critical climate change action

The IPCC states with high confidence that "warming from anthropogenic emissions from the pre-industrial period to the present will persist for centuries to millennia and will continue to cause further long-term changes in the climate system, such as sea level rise, with associated impacts" (IPCC, 2018). If all carbon emissions ended today, the world would still have to adapt to the negative impacts of climate change that are considered effectively locked. However, adaptation is more difficult to articulate and to describe in terms of tangible tasks and objectives at sectoral and local authority level. It is therefore perceived to be more difficult to build support and momentum for adaptation from politicians, institutions and the public. Research participants often highlighted the need to further increase awareness of adaptation and its practical implications in sectors and local authorities and among the public and other stakeholders.

5.1.2 Commissioning research and applying its outputs

The challenge of research uptake is widespread but may be overcome through demand-led commissioning and design of research projects with adequate inclusion of end users in the validation of research methods, assumptions and findings. The EPA's Climate Research Coordination Group has clearly been successful in increasing the amount of funding for Irish research, identifying research gaps and facilitating collaboration, among other achievements (EPA, 2020). However, inclusion of the intended end users of research outputs in the commissioning process is not automatic. To improve the uptake of research findings, end user participation in the design and commissioning of research on CCA and DRR should be routine.

5.1.3 Sustaining focus and momentum

It is difficult for the relatively short-term national risk assessment to sustain focus on the long-term projected impacts of climate change. The national risk assessment must be supported with an implementation plan and resource framework. A longer-term mechanism for analysis and implementation to manage climate change-influenced risks must be incorporated into shorter-term action plans in a coherent way. Some research participants suggested that successive governments have tended to reshape policy and implementation on DRR and adaptation too frequently and that this tendency has detracted from the long-term focus needed. We need more explicit linkage between ongoing adaptation and DRR strategies and their impact on long-term risks.

5.1.4 Measuring the residual, unmitigated risk

This will enable the right decisions on scale, posture and priorities of Ireland's response capacity to be taken that will ensure it can respond to evolving climate change-induced risk without being overwhelmed. The periodic capacity reviews undertaken by the PRAs would benefit from such an evidence-based approach. Taxonomy and challenges of definition, for example in the identification of critical infrastructure and the assessment of its criticality, continue to complicate risk analysis and management. Analysing changes in exposure and vulnerability of given populations, in the light of adaptation, DRR and sustainable development actions to build resilience, can provide a more focused understanding of the residual risk that PRAs must be prepared to respond to.

5.1.5 Government support for data systems and datasets

This is needed to overcome specific challenges for data sharing and risk management. This may include the need for legislation and investment. Specific examples include data systems to facilitate a better functioning market for flood risk insurance, as suggested in a Grantham Institute/UCC policy paper in 2017 (Surminski, 2017), a single official Government of Ireland dataset of climate change projections, a centralised capacity for the preparation and analysis of

space-based geospatial data for Ireland, and common specifications for the development of interoperable databases, none of which currently exist.

5.1.6 Mainstreaming of socioeconomic vulnerability data

These data need to be an integral part of hazard analysis and planning for DRR and resilience building. The physical vulnerability of infrastructure and assets is well integrated into hazard analysis and planning processes, but adaptive capacity and the ability to become resilient to disaster risks are closely linked to individual and community exposure and vulnerability that may be exacerbated by factors such as age, gender, physical or mental disability, income, employment status and housing. These factors are not yet routinely incorporated into data collection, analysis and knowledge sharing processes to facilitate resilience building, despite SEM Guideline 4 on climate change adaptation identifying vulnerability-based assessment as a guiding principle of adaptation. Incorporating the principles of universal design to encourage the inclusion of potentially vulnerable people is important to integrate a vulnerability perspective into relevant planning processes and actions.

5.1.7 Including principal response agencies

An Garda Síochána, the HSE, voluntary emergency services and community-based risk management initiatives should be included in climate action knowledge sharing and learning systems. Knowledge sharing mechanisms for CCA and emergency management are often siloed in Ireland. Research findings, learning, policy and planning support should be routinely available to and targeted towards first response organisations, including relevant parts of local authority structures, e.g. fire services, through the same Climate Ireland one-stop-shop model. The importance of capacity multipliers, such as the Irish Red Cross Society and other voluntary emergency services, and community-based initiatives for DRM, such as the flood action committees in County Mayo, is well recognised in Irish policy. Such stakeholder groups would benefit significantly from inclusion in the established knowledge sharing systems, as actors in Ireland's DRM system rather than just as members of the general public.

5.2 Harmonising Capacity

The ESPREssO guidelines note that "identifying and ensuring the necessary expertise, equipment, and other forms of capacities within public institutions is crucial for implementing disaster risk governance." Ensuring that people with expertise and experience in hazard, risk and vulnerability analysis and management are distributed vertically and horizontally, broadly in line with risk profiles, and that investment in the development and maintenance of relevant knowledge and skills is sustained, are both important. Achieving a coherent distribution of preparedness, response and recovery resources and mandates across regions at risk is a core objective when harmonising capacities. The ESPREssO project highlighted several common capacity challenges:

- overcoming a shortage of skilled employees at different levels of government;
- the ability to flexibly adjust and deploy existing capacity in changing and uncertain hazard, risk and vulnerability contexts;
- overcoming transboundary complexities;
- ensuring continuity of capacity over the long term.

Research participants remarked on similar challenges in Ireland, for example noting the scarcity of and difficulty of retaining skilled flood risk engineers and, more broadly, people with skills for cross-functional coordination in local authorities.

In the online survey, the focus group participants were asked, "Has your organisation identified and established the human resource capacities for climate change adaptation in your area?". A score of 1 corresponded to "No, not at all", whereas a score of 10 indicated that "Yes, we have a clear understanding of what capacities are needed and are filling all the gaps, if there are any." The results, displayed in Figure 5.1, gave a mean average score of 5.5/10, with 6 being the most frequently selected response across a wide range of responses from 2 to 9. Responses suggest that local authorities, at least, consider capability, and human resource capacity, to be an issue in need of greater focus and investment. That is not to say that upskilling has not taken place. Considering that local authorities, for example, did not have climate action teams in place until 2019, they have shown genuine commitment. Their focus now will rightly be on action.

Research participants in local authorities and departments and agencies responsible for sectoral adaptation expressed concern about having insufficient capacity to accomplish their climate action goals. This was echoed by some first responders, for example in fire services, who noted that, while they were currently able to keep up with demand, they would require more human and material capacity if demand continues to grow. Local authorities note the rapid growth of policy commitments and plans on climate actions of all kinds, such as the Climate Action Charter for Local Authorities, and an increase in governance tasks including reporting and planning, but there is no significant additional capacity to deliver these new responsibilities. Some additional capacity is provided to local authorities by CAROs, which, in collaboration with the CCMA, are making the case for additional central funding to enhance capacity within the CAROs and local authorities. Participants raised questions about the availability of human resources and funds to implement the forthcoming climate action plans being prepared during 2021. Numerous contributions noted that local authorities' personnel have, in many cases, taken on CCA-related tasks as part of their regular role without a background education or training in climate services, with staff inevitably facing a steep learning curve. Those with technical backgrounds, such as engineering, reported being better prepared for such additional responsibilities.

The additional challenges related to building and harmonising capacity identified by research participants and the literature review are discussed below.

5.2.1 Capacity of principal response agencies

Ensuring that the capacity of PRAs to manage residual risk is not overwhelmed by increasing, climate change-induced risk will be important. One participant estimated 60–70% confidence in existing capacity but was concerned about their ability to cope over the coming 5–10 years assuming the current climate change trajectory. Preventing and reducing climate change-induced disaster risk is important to keep residual risk within manageable limits. Capacity building has typically prioritised task-focused competencies for response such as using new equipment. Integration with adaption should help to develop a focus on and understanding among PRAs of root causes that may be helpful. The established PRA practice of learning from experience and evaluating the effectiveness of responses, incorporating lessons learned into training, simulations and periodic internal and external appraisal of capacity and performance is impressive. However, the periodic internal and external capacity reviews that PRAs undertake should incorporate a specific climate change lens to ensure that the future human resources, facilities and equipment provisions are well adapted to climate change impacts on the residual risk profile of any given area.

5.2.2 Capacity of voluntary emergency services and community-based initiatives

Voluntary emergency services and community-based disaster management initiatives need adequate and sustained capacity to act as force multipliers for DRM, response and adaptation. Established voluntary emergency services, such as the Irish Red Cross Society and Civil Defence, have well-established roles for pre-hospital care and transport, among other things. As the hazard, risk and vulnerability profile changes in Ireland, the government may wish to consider how it can encourage and support such organisations to develop new, complementary, roles. Similarly, voluntary groups in exposed communities can play an important role but may need support from government to maintain momentum after the often short-lived motivational effect of an extreme weather event on the public's appetite for community-based action. Research participants in County Mayo talked positively of the relationships with flood action committees but noted a reduction in participation over time. Government rightly recognises climate action as a whole-of-society responsibility, but it may need to invest in community action to support sustained public engagement.

5.2.3 Changes in job objectives and methods

Adaptation tasks often require subtle changes in job objectives and methods that can be rather intangible. Consequently, responsibility for these tasks is often added to existing positions on the assumption that they do not need much additional time or effort to achieve without carrying out a thorough appraisal of

capacity requirements. It seems apparent that capacity for policymaking and planning for adaptation and DRM is currently adequate at different levels of government, given the numerous policies and plans developed in recent years; however, implementation of, for example, sectoral and local authority adaptation plans is just beginning. Capacity appraisal should therefore focus on delivery capacity primarily, including for integration, since policy ambition must be matched with implementation capacity. Capacity appraisal may also feed into human resource planning and the potential creation of new job categories at local authority level, in particular, so that recruitment focuses on future needs.

5.2.4 Professional skills and knowledge

Adaptation and DRM draw on a mix of specialist and general skills and knowledge. Although some professionals have the necessary technical skills and knowledge to readily incorporate CCA into their working practices, many do not. Basic and advanced professional development for public servants in different functional areas is at an early stage. Climate Ireland's plans to roll out basic training to 23,000 local authority staff is an important start, but arrangements must be made to cover all relevant functional areas and to sustain skills and knowledge through appropriate arrangements for continuing professional development. Some of the necessary capacity building will be the responsibility of the state, principally the GTF and DECC, whereas some capacity building may be provided by third parties such as professional bodies. Such training must also include PRA staff. SEM Guideline 4 on climate change adaptation provides some useful introductory information but must be extended. Capacity building must include those responsible for cross-cutting functions such as coordination, communications (including principles of universal design), public engagement and finance.

5.2.5 Distribution of capacity

The distribution of capacity across different levels of government and regions needs to be in line with changing regional hazard profiles. Currently, there is no overarching management mechanism to determine which regions or authorities merit additional capacity being deployed. Distribution of capacity is based primarily on population- and asset-based formulas that do not take current and future risk sufficiently into account.

5.3 Institutionalising Coordination

The ESPREssO guidelines note that post-disaster evaluations often document failures in communication and coordination. To make coordination effective for integration of adaptation and DRM it is important to go beyond effective operational coordination of responses by making connections between all steps of the disaster management cycle. Disasters cut across multiple sectors and jurisdictions, making responsibility for coordination and for managing risk, response or recovery complex. The ESPREssO guidelines highlight a number of challenges to achieving effective coordination for integration. The first relates to the often overlapping and sometimes contradictory mandates of leadership organisations, which must be clarified. The SEM and MEM Frameworks do this effectively for emergency response, although coordination for mitigation is, in practice, less well developed. Coordination structures for adaptation are more fragmented across levels of government, and jurisdictional boundaries and coordinated tasks are fragmented across and between CCA and DRR. The DCCAE recognised that while it had good contacts with adaptation actors, it has fewer contacts with emergency planners. The DCCAE, illustrating one example of where vertical coordination must be strengthened, noted that the department needed to focus on correcting this to obtain a more comprehensive picture of how CCA measures and emergency planning interact at the local level.

The focus group participants were asked in the online survey, "Has your organisation institutionalised formal internal and external coordination processes including all relevant stakeholders for climate change adaptation in your area?". A score of 1 corresponded to "No, not at all", whereas a score of 10 indicated that "Yes, we have established comprehensive and robust formal coordination mechanisms involving the most relevant internal and external stakeholders." The results, displayed in Figure 5.1, gave a mean average score of 6.6/10, with 7 and 8 being the most frequently selected response across a wide range of responses from 1 to 9. Responses suggest that coordination mechanisms are somewhat effective but that there is room for improvement.

Research participants referenced the positive impact of informal coordination and information-sharing networks using WhatsApp groups, the effective teamwork and coordination of local authority-level climate action teams in creating multi-sectoral climate adaptation plans, the supportive role of CAROs in coordination and the utility of MEM regional working groups, and coordination between state and voluntary emergency services and community groups, among other initiatives and structures. Cork City Council staff provided positive feedback on the work of their Severe Weather Assessment Team and Flood Risk Assessment Team as examples of multidisciplinary coordinated actions to address disaster risk.

Several additional challenges were also identified. These included the increased complexity of coordination across organisations and the need to understand the budgets, ways of working and priorities of a growing stakeholder group at the local authority level. Other participants reflected on the challenge of harmonising coordination mechanisms within and across local authorities with transboundary systems, such as river basins, and integrating information systems such as rain gauges to give early warnings. Finally, establishing sustainable coordination methods with a diverse range of voluntary and community-based actors for adaptation and emergency response/recovery is challenged by mandate clarity, jurisdictional levels and the diversity of adaptation-relevant tasks.

The most important national challenge for integration is to rationalise and integrate the coordination and governance mechanisms for adaptation and emergency management. If integration is the goal, then two separate systems can hamper its achievement. Adaptation is governed at the highest level by the National Adaptation Steering Committee, chaired by the DECC. Emergency planning is governed by the GTF on Emergency Planning, chaired by the Department of Defence. There are many other national- and regional-level steering committees, working groups and task teams to support and extend different aspects of adaptation and emergency planning, such as the CCMA's climate committee and the CARO management group. There is also a Climate Change Unit in the Department of the Taoiseach. The SEM Framework identifies the Department of Housing, Local Government and Heritage as the lead government department for extreme weather-related emergencies. Under its umbrella, the NDFEM leads coordination within the MEM structures. It is also the departmental home of Met Éireann, which provides early warnings, among a range of other climate services. There is no unified network diagram to summarise the governance and coordination mechanisms for emergency management and CCA. It is clear, however, that many of the same institutions are represented in both systems. One research participant stated that they were "drowning in governance" and that this was taking valuable time away from actually implementing plans.

Integrating departmental responsibilities and mandates around CCA, mitigation and emergency planning for DRR would be beneficial. A nerve centre or interdepartmental working group to bring these institutional roles and responsibilities together to enhance national coherence is likely to enhance integration. The World Meteorological Organization (WMO) developed the Global Framework for Climate Services (World Meteorological Organization, 2018) as a model, shown in Figure 5.2.

The WMO vision for the Global Framework for Climate Services is to "enable better management of the risks of climate variability and change and adaptation to climate change, through the development and incorporation of science-based climate information and prediction into planning, policy and practice on the global, regional and national scale" and includes a strong focus on DRR. It makes a clear recommendation for replication at the national level to improve "co-production, tailoring, delivery and use of science-based climate predictions and services". Ireland may choose to develop a model for such a multi-stakeholder platform that prioritises some sectors different from those suggested by the WMO, but the principle remains relevant.

The additional challenges related to institutionalising coordination identified by research participants and the literature review are discussed below.

5.3.1 Aligning regional coordination structures

The regional coordination structures for coordination and planning of adaption, DRR and emergency planning need to be aligned. Figure 3.2 shows the different footprints of the four CAROs and eight regional MEM working groups. Changing the footprint

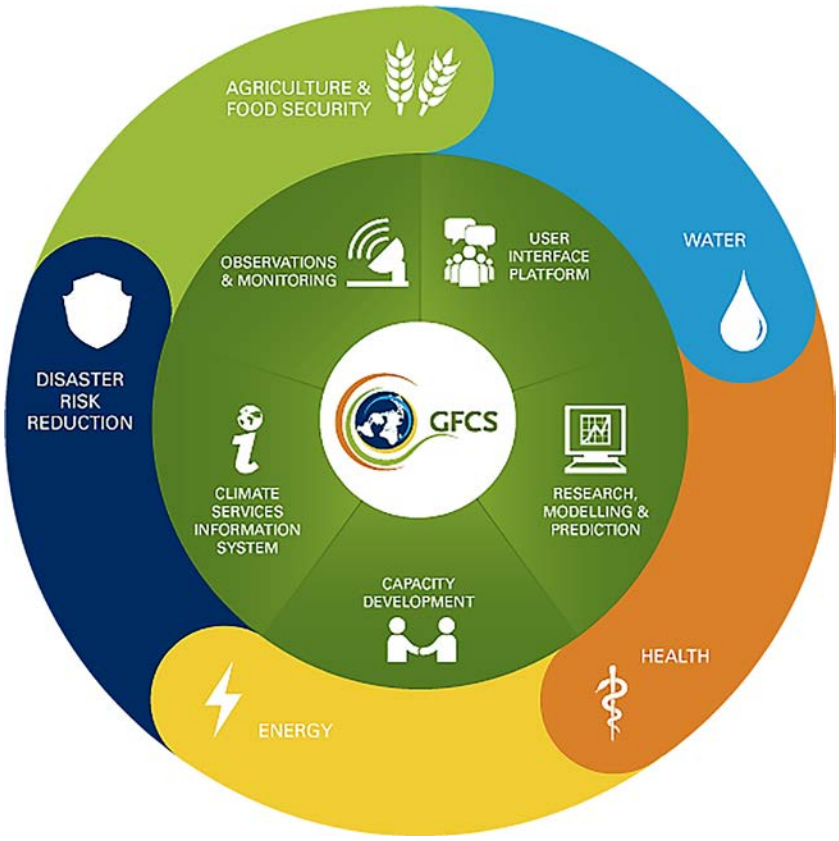

Figure 5.2. The Global Framework for Climate Services model (World Meteorological Organization, 2018).

of the CAROs or the MEM groups so that they are fully aligned brings a greater level of order to coordination across boundaries, creating relationships where they may not currently exist or are informal.

5.3.2 Ensuring resilient coordination systems

The reliance of coordination systems on informal local-level systems of information sharing, such as local WhatsApp groups, presents a risk that should be reviewed to ensure that they are inclusive, sustainable and resilient. Research participants often remarked on the usefulness of locally created networks for transmitting information such as early warnings. Such local initiatives are welcome. A review of the management systems at both the local authority and regional levels around information for coordination that considers participation and inclusion, oversight and control is advisable to ensure sustainability, effectiveness and the replication of effective systems. Scaling up and promoting the use of innovations such as the CARO-led WIRE App (CARO, 2021) represents a potentially highly effective system to share real-time information on extreme weather events and their local consequences between local authority personnel and the public for improved response, recovery and risk reduction planning.

5.3.3 Overcoming information silos

All governments face challenges in this area. The Irish government is no different and must objectively analyse the range of reasons why institutions may not share information. In some cases, this may be related to inherited practices and beliefs, security concerns, procedural or legislative barriers, or trust. Whether there are sound reasons for not sharing relevant information or not, an analysis of information flow for coordination is sensible so that institutions from across government and beyond government have the information they need to adapt to and reduce risk. Determining the necessary safeguards to ensure compliance with data protection requirements would be an important aspect of such an analysis. The Critical Infrastructure Working Group, coordinated by the Department of Transport, is an example of how institutions can collaborate to overcome silos. The Severe Weather Assessment Team and the Flood

Assessment Team in Cork City Council are other effective examples of interdepartmental collaboration to share and analyse information. These are all good case studies that may be replicated to unblock information silos in other areas, as needed.

5.4 Engaging Stakeholders

CCA and DRR are tasks that require the understanding and contribution of a wide range of stakeholders across Irish government and society. The new EU Strategy on Adaptation states that the "gravity of the adaptation challenge makes it a whole-government and whole-society endeavour". The Programme for Government,[10] agreed in June 2020, commits the government to the development of a new model of engagement with citizens, sectors and regions on the transformation to a low-carbon, digital economy as an early priority, building on the learning of recent years. However, government alone cannot deliver the changes needed to achieve a sufficient level of resilience. The stakeholder group beyond state actors is diverse, including the private sector, civil society, academia, the media and members of the general public. Of note, an enduring structure for National Dialogue on Climate Action (NDCA)[11] is being finalised and a recent public consultation carried out under the NDCA on the next iteration of the national Climate Action Plan received over 4000 responses from citizens, industry and experts. In addition, as set out in the EU strategy, the presentation of adaptation as an investment, not just a cost, is a positive and potentially powerful mobilising message that may be made more of in Ireland's efforts to engage stakeholders.

The ESPREssO guidelines articulate a clear call for diverse stakeholder inclusion, reflecting the Sendai Framework, among other international agreements. The guidelines note that engaging stakeholders in the complex agendas of DRR and CCA is not easy given the range of different issues, agendas and interests of relevance. It identifies some common challenges to be overcome, including identifying the right stakeholders to engage with in different aspects of the process and determining the right way to engage them. The guidelines go on to highlight the challenges created by a lack of shared understanding and the need for agreement on common terminology, the potential for competing interests among stakeholders to make engagement difficult, and the critical importance of sustained engagement, including the need to identify and overcome barriers to engagement.

Since the focus groups had to discuss a lot of issues in a limited amount of time, the assessments of perceptions around stakeholder engagement and developing communications were combined. The research team considered the overlap between these two issues to be sufficient to justify this decision. The focus group participants were asked in the online survey, "Has your organisation established robust, effective means of communication to engage all the most relevant internal and external stakeholders for climate change adaptation in your area?". A score of 1 corresponded to "No, not at all", whereas a score of 10 indicated that "Yes, we have established robust and varied communications channels to all of the most relevant stakeholders." The results, displayed in Figure 5.1, gave a mean average score of 7.33/10, with 8 being the most frequently selected response across a wide range of responses from 1 to 9. Responses suggest that participants are confident that local authorities were performing well with stakeholder engagement. Some positive examples of engagement were reported, including flood action committees in County Mayo, engagement through public participation networks, and the proliferation of community-led initiatives in which risk reduction co-benefits were built into collaborations, such as where public green spaces serve a flood attenuation purpose. Research participants were not complacent about the level of effort and other costs needed by both government institutions and external stakeholder groups to sustain engagement over time. Challenges arising from competing interests and the readiness of existing collaborators, such as the established voluntary emergency services, to adapt and take on new tasks related to DRR and CCA were noted by participants.

Noting the challenge of understanding and awareness of adaptation and its application, as discussed above under the sharing knowledge pathway, the literature and some of Ireland's policy and planning frameworks recommend resilience building as the ultimate goal of

10 https://www.gov.ie/en/publication/7e05d-programme-for-government-our-shared-future/ (accessed 12 April 2022).

11 https://www.gov.ie/en/publication/4bf2c-national-dialogue-on-climate-action-ndca/ (accessed 12 April 2022).

adaptation and DRR, and as the organising principle for stakeholder engagement. The SEM National Structures and Framework guideline on CCA, for example, states that "the aim of adaptation is to reduce the vulnerability of our environment, society and economy, and increase resilience." The resilience outcome can be more systematically employed to motivate and measure stakeholder engagement in Ireland through policy, communication, coordination, knowledge management, capacity building and financing mechanisms. As a starting point, a comprehensive stakeholder analysis for building a resilient Ireland is recommended. While many stakeholders are already well known and engaged, some are not. To create a whole-of-society collective effort to build resilience to extreme weather events, government should have a clear understanding of stakeholders' awareness and their information needs and how best to engage them. There are good examples of stakeholder engagement in Ireland to learn from. The Local Authority Waters Programme (LAWPRO, 2021) is a shared service to protect and restore water quality through coordination, community participation and the application of catchment science. LAWPRO has dedicated community teams across the country to build awareness and mobilise community action.

The additional challenges related to engaging stakeholders identified by research participants and the literature review are discussed below.

5.4.1 Understanding incentives for and barriers to engagement

Understanding the current incentives for and barriers to engagement for different stakeholders is essential to build positive engagement, and a review of current stakeholder engagement would help to identify strategies to promote engagement. Self-interest-based incentives for stakeholders to engage with DRM tend to be sustained well in the aftermath of a disaster event but fade over time, which is a concern when considering the long-term nature of changes caused by climate change. A creative system of incentives to promote and sustain engagement in the long term could include public recognition, training or formal partnership with state bodies through memoranda of understanding. Since engagement may require money and/or equipment to be sustained over time, considering financing and procurement or donation of equipment may also be necessary and may be cost-effective solutions for resilience building.

5.4.2 Having realistic expectations

Expectations of what different stakeholders, including government, can do for adaptation and DRR need to be realistic. Many research participants mentioned that stakeholders, including politicians and the public, often misunderstood what was technically or financially viable. An aim of stakeholder engagement should be to establish the realistic scope and the limits of potential adaptation and DRR actions.

5.4.3 Employing government capacity

Integrated adaptation and emergency management systems need to engage the full range of government capacity. The SEM National Structures and Framework identifies lead government departments as risk regulators and risk holders, allocating responsibility to lead the implementation of emergency management, including DRR, of specific hazards. They are supported by a range of other named departments and agencies (PSAs). To achieve a resilience-building outcome related to extreme weather hazards, a review of the support institutions may be merited to determine whether or not all the tools of government are applied. The role of the Department of Social Protection (Department of Social Protection, 2021a) is a good example. During the COVID-19 crisis, the Pandemic Unemployment Payment proved to be a critical safety net for those who had lost their source of income. The projection that we can expect more frequent and severe weather-related disasters makes consideration of the lessons learned from the pandemic for the existing Humanitarian Assistance Scheme (Department of Social Protection, 2021b) relevant.

5.4.4 Mapping existing and potential stakeholders

Mapping stakeholders from outside government will be important to extend engagement. Ireland is well endowed with motivated citizens, networks and interest groups undertaking action on all kinds of issues. Many may have the potential to contribute more to a whole-of-society push towards disaster resilience. Examples include local chambers of

commerce and business associations, the Tidy Towns network, nature and conservation networks, social service groups and voluntary emergency services. An online platform to communicate with, motivate, recognise and educate new and existing stakeholders and individuals would be a worthwhile investment to help catalyse further engagement. Applying the principles of universal design and the toolkit for information (National Disability Authority, 2021) in both communications and the outcomes of stakeholder engagement processes will help to ensure that everyone in society has the opportunity to participate.

5.5 Leveraging Investment and Financing

The ESPREssO guidelines highlight the critical insight that investment in DRR reduces the cost of response and recovery in the long term. However, governments are challenged by prioritising the need for investment now that will not deliver immediately visible benefits. This is highlighted in the Parliamentary Budget Office's overview of the country's work on green budgeting (Parliamentary Budget Office, 2018) and the EU's adoption of the EU Taxonomy Complementary Climate Delegated Act in June 2021 as part of the European Green Deal. The ESPREssO guidelines discuss additional challenges around determining who pays for long-term adaptation and DRR and how to share payment responsibility between society, financed by today's taxpayers, and businesses that might contribute to climate change through carbon emissions, or relying on public goods such as nature, for benefits that may be realised only in the coming decades. There are similar challenges in long-term investment decisions related to a wide range of major infrastructure procurements, such as the construction of railways or the roll-out of broadband networks. The guidelines also note the importance of balancing the need for government to solve problems today and into the future, as well as expanding the focus of investment from response to risk reduction and adaptation.

The focus group participants were asked in the online survey, "Has your organisation effectively identified and addressed the major financing issues related to climate change adaptation in your area?". A score of 1 corresponded to "No, not at all", whereas a score of 10 indicated that "Yes, we have a clear and comprehensive financing strategy to cover all of our adaptation plans over time." The results, displayed in Figure 5.1, gave a mean average score of 4.33/10, with 5 being the most frequently selected response across a wide range of responses from 1 to 9. The responses suggest that the question of financing adaptation and DRR is where most work still needs to be done. The issue is a multifaceted one that relates not only to the amount of money available for investment but also to how resources are allocated, what commitment, if any, is in place to sustain financing for the long term and what rules govern the use of particular streams of funding, among other issues. A review of current local authority adaptation plans shows that many of the actions proposed are not currently included in any specific budget lines. This may be more an issue of timing than the lack of available funds, as some of the proposed actions are not yet integrated into year-on-year budgets. However, research participants working in local authorities tended to see a lack of resources as a major constraint, whereas people working in central government or national agencies tended to consider that funding for adaptation and DRR was largely adequate. An appraisal of funding mechanisms and the amount of funds available to sectors and local authorities, given the increasingly lengthy list of tasks and investments they are expected to make for adaptation and DRR, is merited.

Ireland's commitment to green budgeting suggests that the political investment in long-term financing to achieve profound structural changes by 2050 has been made. Regular renewal of the political consensus on the need for long-term investment in adaptation and DRR is required. This helps to sustain the commitment to long-term change beyond the typically short-term planning horizons of any single government or elected representatives in local authorities, giving confidence to planners, implementers, the public and other critical stakeholder groups that Ireland will achieve its transition to a low-carbon and highly adapted economy. The consensus should set out the reciprocal responsibilities of the state and its citizens, detailing when, how and where the state will step in to deal with the consequences of climate change and when individuals and communities must take responsibility. Long-term financing solutions can then be developed based upon the agreed responsibilities. This is consistent with the OECD Green Budgeting Framework's building block 1 for a strong strategic framework, in which governments' strategic priorities

and objectives relating to the environment and climate are clearly set out to help inform fiscal planning. This in turn helps "guide tax and spend decisions so that they can support the achievement of national objectives" (OECD, 2020a). Green budgeting may offer ways to ensure that funding is targeted more effectively on needs, rather than on what one research participant identified as "quick wins", and on facilitating funding for important projects that may be less visible or politically appealing.

A significant challenge to be overcome is the improvement of cost–benefit analysis in adaptation and DRR investment. It is difficult to accurately assess the cost of present and future disaster risks to the economy and to determine what is being spent within existing funding that has an adaptation or risk reduction effect. Technical developments as part of the green budgeting process can address some of these problems. Accelerating the roll-out of green budget tagging to incorporate both positive and negative budget measures (those that either enhance or detract from adaptation and DRR outcomes) in sectors with active adaptation plans and local authorities, and tagging DRR and adaptation expenditure separately from mitigation expenditures, would help give greater clarity on financing issues. This is in line with the OECD's principle 4/10 for effective green budget tagging (OECD, 2021). Digging deeper, extending green budget tagging to a level of granularity beyond programme subheading level, would enable local authorities and other sectoral institutions to track the cost of managing climate change-related risks more easily, thus eliminating duplications in current funding. Local authorities are already developing approaches to improve the financial analysis and management of disasters that may be suitable for scaling up. For example, Cavan County Council has piloted an approach to quantifying the costs of storm damage by subcategorising all expenditure made by relevant departments (CARO, 2021e).

The additional challenges related to leveraging investment identified by research participants and the literature review are discussed below.

5.5.1 Estimating the costs of extreme weather events

Strengthening the methodologies for estimating the cost of social and economic loss and damage from extreme weather events in Ireland will help to make the case for long-term investment in adaptation and DRR. Existing datasets from, among others, Munich Re's NatCatSERVICE (Munich Re, 2021) and other indicators established and shared through the European Climate Adaptation Platform (Climate-ADAPT) may be helpful.

5.5.2 Public Spending Code

Ireland's Public Spending Code governs how public funds are used. The code exerts a powerful influence on the outcomes of both current and capital investment by shaping the design of public investment projects of all kinds. It could be an important tool for influencing the mainstreaming of adaptation and DRR. A review should be undertaken to ensure that the Public Spending Code is fully aligned and compliant with the proliferation of climate change policy and plans. Steps have been taken to ensure that mitigation is considered throughout the strategic assessment, business case development, procurement and monitoring stages of public investment projects, but there may be room to incorporate adaptation and DRR more fully.

5.5.3 Determining the balance of funding

Climate change policy and planning tends to prioritise mitigation over adaptation. This can carry forward into state financing mechanisms, such as the Climate Action Fund and other thematic or sectoral funding instruments. Determining an appropriate balance of funding for both mitigation and adaptation is important. The allocation of funds from national mechanisms to the local level, when not based specifically on population size, tends to be on the basis of equity, so that each authority receives a more or less equal share of available funding. For adaptation and DRR, applying a vulnerability criterion for funding allocation is appropriate.

5.5.4 Incentives to influence behaviour

Subsidies and incentives are used in many sectors to influence behaviour. The Sustainable Energy Authority of Ireland (SEAI) has a range of incentives to encourage consumers and businesses to mitigate climate change, for example by installing photovoltaic or solar power systems, improving insulation of

buildings and switching to electric vehicles. In a similar manner, consideration of how resilience building through adaptation and DRR at the household, enterprise and community levels may be more effectively scaled up through financial incentives, in tandem with communications, knowledge sharing and other initiatives, has potential.

5.5.5 Supporting communities and institutions

Providing support to achieve climate action and disaster resilience goals is important. The list of tasks and the urgency of undertaking them are increasing. Capacity to succeed must be adequately resourced through the relevant sectoral, regional and local authority bodies and also through citizen action. As discussed above, Ireland has been quite successful in engaging stakeholders, for example in working with community-based flood action committees in County Mayo or with members of the farming community and their heavy machinery during winter storms in County Fingal. Public investment in community action should be reviewed to ensure that those essential contributions to adaptation and DRR, which must be in place over the long term, do not lose momentum or become unsustainable because of financial barriers.

5.6 Developing Communications

The core message in the National Adaptation Framework's section on emergency is that "effective climate adaptation can minimise risks and costs and also protect lives and property by building resilience into existing systems. This can ultimately help minimise the emergency response that is necessary in response to severe weather events." This is a simple and compelling headline message. However, many of the research participants expressed the view that there is a significant lack of awareness and understanding of adaptation in Ireland. The ESPREssO guidelines note that in increasingly knowledge-based societies, such as Ireland, a failure to communicate effectively about CCA and DRR and the actions that citizens and other stakeholder groups should take will completely undermine the ability of a country to manage its risk. The guidelines go on to note a number of key challenges, including the low level of public risk awareness; a lack of media expertise in critical public entities; the importance of social media channels and analysis of big data; and the fact that the media industry prioritises coverage and communication of disaster response rather than supporting the case for adaptation and DRR through news. As noted in section 5.4 on engaging stakeholders, participant responses suggested that there has been good progress on communications on CCA and DRR. Several participants noted the effectiveness of communications in managing the COVID-19 crisis and suggested that lessons learned, such as the importance of using clear, concise language and focusing on personal behaviour, may be helpful in the further development of communications on CCA and DRR. While implementation of many of the tasks for adaptation and DRR is devolved to the local authority level, there is a strong case for long-term national-level general communication campaigns, in addition to existing campaigns, such as "Be Winter Ready" and "Be Summer Ready", to further increase the level of risk awareness among the general public. Such campaigns may bring together the various existing initiatives, such as the winter- and summer-ready campaigns, while creating new content and means of engagement through social media. As a long-term initiative, such campaigns must include an element in the education system that, in conjunction with an effective curriculum, will ensure that young people complete their education with the knowledge, skills and values to enable them to reach their full resilience potential.

A range of additional challenges related to leveraging investment were identified by research participants and the literature review. These relate to:

- Further enhancing the *dissemination of early warnings* through the use of push notifications. Met Éireann highlighted the progressive improvement of weather warnings and the naming of storms as indicators of progress in the dissemination and impact of early warnings but noted that there is room for further development. Many countries have overcome data protection concerns to make use of more proactive dissemination methods, which may be replicated in Ireland.
- Creating *performance indicators for adaptation* that connect progress with impact on national and local risk profiles that are meaningful to the general public's lived experience and that strengthen the feedback loop to implementing organisations.

- Evaluating and renewing the *National Strategy on Education for Sustainable Development 2014–2020*, restoring geography as a core junior cycle subject and reviewing teacher training to ensure that all schoolchildren have the skills, knowledge and values needed to adapt their adult lives in ways that contribute positively to a sustainable future.

5.7 Alignment with Global and Regional Drivers of Integration

Ireland's policy and planning frameworks for emergency planning and CCA are broadly coherent with global policy and planning frameworks. The climate change instruments in Ireland are aligned with the Paris Agreement on climate change and with the UN Sustainable Development Goals, with clear shared logic and regulatory effect. While implementation may be lagging behind in climate action, for example the *Sustainable Development Report – Ireland* for 2020 notes that significant challenges to achieving this goal remain (Sachs *et al.*, 2020), the alignment is clear. The SEM National Structures and Frameworks describes Ireland's participation in various international arenas for emergency management processes, mentioning the UN, the EU, the OECD and the North Atlantic Treaty Organization (NATO) Partnership for Peace.

For example, SEM Guideline 4 on climate change adaptation is both coherent with global drivers and well aligned with regional policy and guidance, sharing definitions and categorisation of actions, for example using the soft, green and grey categories of adaptation actions, as described in the European Environment Agency's report on adaptation in Europe (EEA, 2013).

The UN Sendai Framework for Disaster Risk Reduction (UNISDR, 2015a) is notable because of the absence of references to it in Irish policy and planning documents. This is despite Ireland's engagement in the negotiation of the framework. Interestingly, Ireland's policy on international development, "A Better World", commits the government to "strengthen our approach to disaster risk reduction in line with the 2015 Sendai Framework" (Department of Foreign Affairs and Trade, 2018), but domestic policy largely avoids using the concept of DRR, does not reference the Sendai Framework, and does not report to UNDRR on progress towards its achievement. This is surprising given the alignment of the framework's priorities and many of the guiding principles with the equivalent Irish policies and plans that provide important international benchmarks for consideration by all stakeholders (Table 5.1).

The concept of DRR as defined in the Sendai Framework is useful in the Irish context and goes

Table 5.1. Overview of the four priorities and eight guiding principles in the Sendai Framework for Disaster Risk Reduction that are relevant in the context of Irish policies and plans

Priority	Guiding principle
1. Understanding disaster risk	Primary responsibility of states to prevent and reduce disaster risks, including through cooperation
2. Strengthening disaster risk governance to manage disaster risk	Shared responsibility between central government and national authorities, sectors and stakeholders
3. Investing in disaster risk reduction for resilience	Engagement from all of society
4. Enhancing disaster preparedness for effective response and to "build back better" in recovery, rehabilitation and reconstruction	Empowerment of local authorities and communities through resources, incentives and decision-making responsibilities, as appropriate
	Decision-making to be inclusive and risk informed while using a multi-hazard approach
	Coherence of disaster risk reduction and sustainable development policies, plans, practices and mechanisms, across different sectors
	Addressing underlying risk factors cost-effectively through investment versus primarily relying on post-disaster response and recovery
	Building back better to prevent the creation of new, and reduce existing, disaster risks

Source: UNISDR (2015a).

Table 5.2. Comparison of definitions of disaster risk reduction and mitigation

UNDRR/IPCC	SEM Framework
Disaster risk reduction is aimed at preventing new and reducing existing disaster risk (exposure, hazard or vulnerability), and managing residual risk, all of which contributes to strengthening resilience and therefore to the achievement of sustainable development (IPCC, 2014; UNISDR, 2017)	Mitigation as a risk treatment process involves reducing or eliminating the likelihood and/or the impact of an identified hazard. This phase of the emergency management cycle seeks to treat the hazard such that it impacts society to a lesser degree (Department of Defence, 2017)

beyond the definition of mitigation in the SEM National Structures and Framework document. A comparison of the definitions is shown in Table 5.2. The UNDRR definition goes beyond that set out in the SEM documentation, specifically touching on the need to manage residual risk in addition to preventing new and reducing existing risk. Specifically, it provides a reminder of the importance of targeting the different components of risk: exposure to the risk; the relative strength and likelihood of the hazard occurring; and the vulnerability of people and assets exposed to the hazard. DRR is explicitly connected to wider efforts to strengthen resilience and to achieve sustainable development. Some may consider these connections to be implicit in the SEM Framework's definition of mitigation. However, the broader and better-integrated definition of DRR used by the UN provides direction towards a more holistic treatment of risk, which is helpful to breaking down institutional, technical and thematic silos.

Many of the research participants were familiar with the DRR term and were comfortable with its use in Ireland, with no clear understanding of why the term and, more broadly, the Sendai Framework were not commonly used in the country. The Sendai Framework pursues coherence with the other post-2015 global agendas on climate change and sustainable development and identifies measures for integration of all three at all levels. The UNDRR (formerly called UNISDR) identifies three main strategic opportunities for ensuring coherence and mutual reinforcement between agendas globally, which are also highly relevant at the national level (UNISDR, 2015b), namely:

1. to establish *political recognition* for coherence and mutual reinforcement in international agreements by, for example, seeking explicit reference to the importance of promoting coherence and mutual reinforcement in national policies and implementation measures, and for coordination within and across sectors, as well as promoting the participation of relevant stakeholders;
2. to link *mechanisms for monitoring and reporting* of linked goals and indicators, for example by ensuring that development indicators are risk informed;
3. to *promote cooperation in implementation* by prioritising programmes and partnerships that yield multiple benefits for sustainable development, DRR, financing for development, climate action and urban development; by making risk information widely available and understandable to different audiences; and by promoting inclusion and removing barriers to participation in coordination and governance.

Consideration of explicit alignment of future policies, strategies and plans and future iterations of existing arrangements with the Sendai Framework for Disaster Risk Reduction and reporting on its implementation at the national and international levels may help the Irish government to galvanise its effort to integrate CCA and DRR, and to increase institutional focus on risk reduction/mitigation and recovery (including to build back better) in planning and investment.

6 Conclusions: Developing Coherence in Integrating Climate Change Adaptation into Emergency Planning in Ireland

Research participants contributed a wide range of rich insights on integration from their institutional and professional perspectives. The laws, policies, plans, institutions and processes to adapt to climate change and to reduce disaster risk in Ireland are becoming well established. We have interpreted and summarised the participants' comments in the context of the ESPREssO framework and guidelines, which we further suggest provides a robust framework for monitoring and evaluating adaptation and DRR. The objective of integrating actions for CCA and DRR is clearly articulated in policy, although some of the practical arrangements for what, when and how have been left open. Institutions are beginning to work with their peers and collaborators at different levels of government to determine the ways forward, overcome long-established silos and share information more effectively.

Based on the literature review and interview process, the authors of this report argue that planning for emergency response is different from developing a longer-term DRM policy that acknowledges the increasing vulnerability of Ireland to the climate crisis. By increasing the ability of Irish systems to reduce, avoid or transfer new and existing risks, the result should be to reduce the impact of unmitigated residual risk and resolve the apparent contradiction between short-term shocks, presented by disasters, and longer-term impacts, presented by climate change. This recognises that although climate change presents a series of long-term management challenges it also has significant effects on the frequency and magnitude of extreme events.

The outcomes of the present study echo the OECD findings (OECD, 2020b), which noted that countries are increasingly recognising the benefits of increased coherence in CCA and DRR. The OECD found that, to increase coherence, certain enabling factors must be in place, including strong leadership and engagement of key government bodies, broad stakeholder participation and coordination, clear allocation of roles, responsibilities and resources, and monitoring, evaluation and continuous learning. This can help identify trade-offs and synergies while minimising redundancies in delivery.

We draw *six overarching conclusions* from this research for integrating CCA and DRR in Irish emergency planning, namely:

1. The existing five-stage emergency planning model in the MEM and SEM Frameworks promotes integration of the five stages, with a strong focus on planning for response. However, longer-term mitigation and recovery, the areas of greatest relevance for CCA, could be better integrated into policy and planning at all levels.
2. Increasing focus on the three objectives of preventing new risk, reduction of existing risk and management of residual risk may facilitate clarity for lead government departments and support organisations under the SEM Framework to integrate more effectively CCA into policies and procedures than at present.
3. The main adaptation challenge for agencies is balancing known and projected risks arising from changing levels of climate change-influenced hazards, and community exposure and vulnerability, with their existing and future capacities for service provision and operational responsibilities.
4. Emergency management and CCA are currently two discrete systems for governance, management and coordination at the national level. Identifying ways to promote coordination and align incentives, priorities and planning processes will facilitate a more holistic and comprehensive approach to DRM at all levels of government.
5. There is a need to sequence research, policymaking and planning so that initiatives at different levels of government are coherent, mutually reinforcing and, consequently, easier to implement.
6. To achieve effective integration, all future policies and plans should be specific about the

six pathways of sharing knowledge, harmonising capacity, institutionalising coordination, engaging stakeholders, leveraging investment and developing communications.

This analysis leads to a proposed roadmap (Figure 6.1) that provides guiding principles that the government may wish to consider for addressing the overarching conclusions and achieving greater coherence and greater connectivity between the five stages of the SEM/MEM Frameworks in Ireland. This could also lead to inculcating climate adaptation as a parallel and integral component in the Irish emergency planning system for achieving greater integration of CCA into emergency planning in Ireland.

The roadmap is based on four elements to facilitate the integration of CCA and DRR into the Irish emergency planning frameworks. It should be noted that the precise content of each of these four elements will need to be determined in partnership and consultation with a diverse range of stakeholders. The four elements are:

1. **Integrated institutional and policy processes.** As noted throughout this report, there is a need to ensure effective interconnections between a variety of institutional and policy processes. Examples include the linkages between bodies such as the GTF on Emergency Planning and the National Adaptation Steering Committee, as well as coordinated approaches such as between the MEM and SEM Frameworks, the national Climate Action Plan and local authority and sectoral adaptation plans.
2. **Using the lens of the SHIELD model.** Our research finds that each of the six pathways set out in the ESPREssO project's SHIELD model provides a robust and comprehensive monitoring and evaluation framework for future policies and plans and their implementation, which would assist Ireland to achieve the benefits of integrated CCA and DRR more readily than at present, resulting in more resilient communities.
3. **Based on agreed common principles.** To promote the active engagement of all relevant stakeholders, across both national and local government, as well as external stakeholders and civil society, a core set of agreed common principles should be identified. For example, they could include issues such as review processes being based on a comprehensive strategy and agreed end point; the need to reduce institutional, policy and operational silos; adopting a whole-of-society approach; and drawing on regional and international frameworks and good practice.
4. **Preconditions for effective implementation.** The overarching objective of achieving a durable and effective integration of CCA and DRR is to reduce vulnerability and increase resilience, thereby ensuring that the remaining residual risk can be managed. For this to occur alongside the core agreed principles, a series of preconditions is required, such as the availability of adequate financial resources at all levels; consistent political will; active participation of all relevant stakeholders; transparent monitoring and evaluation processes; detailed sharing and disaggregation of data; and common reporting formats.

Appendix 1 provides suggested actions to address gaps and challenges in each of the six pathways of the SHIELD model and which, taken together, facilitate the objective of integration and enable the planning process to progress from one of design to implementation.

Finally, we recommend that the EPA, the GTF on Emergency Planning and other relevant government bodies consider:

1. increasing end user involvement when commissioning future research into CCA to facilitate the implementation of findings and recommendations;
2. sequencing future research with CCA planning timetables;
3. analysing how CCA assessments can complement emergency planning and capacity requirements, thereby facilitating local authorities and other agencies to implement coordinated strategies;
4. undertaking research to measure residual risk in the context of DRM;
5. undertaking stakeholder analysis to identify barriers to sustained engagement of non-state actors and societal expectations regarding state versus individual and community action to adapt to climate change;

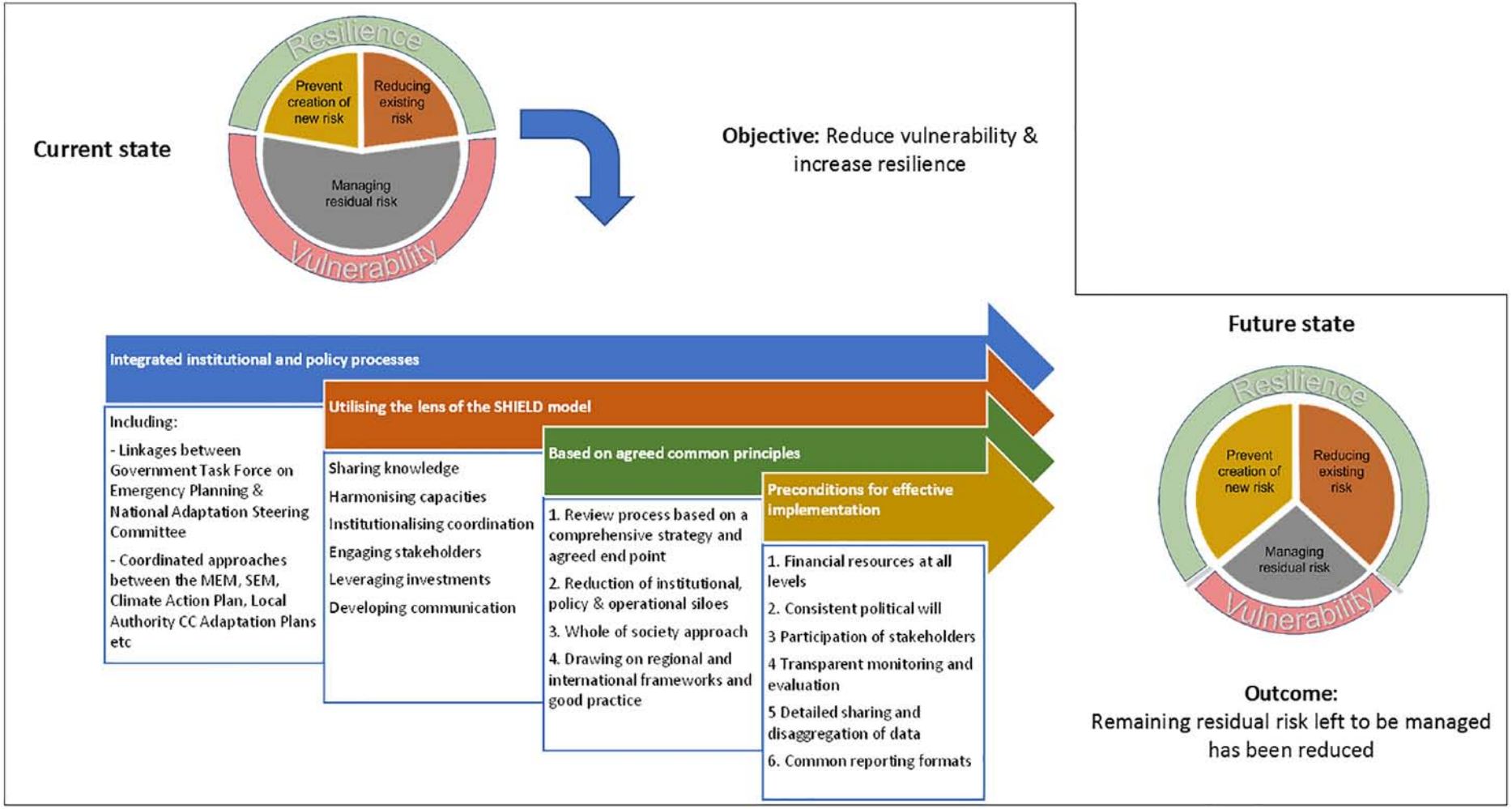

Figure 6.1. Roadmap for achieving integration of CCA and DRR.

6. conducting research on green budgeting methods to facilitate and incentivise integrated CCA and DRR;
7. reviewing outcome indicators for CCA with those used internationally to augment process indicators;
8. fully engaging with the priorities and targets of the Sendai Framework and participating in the Sendai Framework Monitor.

References

CARO (Climate Action Regional Office), 2021a. CARO case studies. Available online: https://www.caro.ie/projects-research/case-studies/nature-based-flood-relief-scheme (accessed 6 April 2022).

CARO (Climate Action Regional Office), 2021b. What we do. Available online: https://www.caro.ie/the-caros/what-we-do (accessed 6 April 2022).

CARO (Climate Action Regional Office), 2021c. Case study: beach coastal protection works. Available online: https://www.caro.ie/projects-research/case-studies/beach-coastal-protection-works (accessed 6 April 2022).

CARO (Climate Action Regional Office), 2021d. WIRE – Weather Impact Register. Available online: https://wire-climateaction.hub.arcgis.com/ (accessed 6 April 2022).

CARO (Climate Action Regional Office), 2021e. Case study: quantifying cost of storm damage. Available online: https://www.caro.ie/projects-research/case-studies/quantifying-cost-of-storm-damage (accessed 6 April 2022).

CCMA (County and City Management Association), 2019. *Delivering Effective Climate Action 2030*. CCMA, Dublin.

Clarke, D. and O'Donoghue-Hynes, B., 2020. *A Profile of Local Authority Climate Actions in Ireland*. LGMA Research, Dublin.

Climate Ireland, 2020. *Mapping Vulnerability to Environmental Hazards in Ireland*. University College Cork, Cork, Ireland.

Climate Ireland, 2021. Climate Ireland. Available online: www.climateireland.ie (accessed 6 April 2022).

Connaught Telegraph, 2016. International experts to share ideas on future of Bertra Strand. *Connaught Telegraph*, 26 September 2019. Available online: https://www.con-telegraph.ie/2019/09/26/international-experts-to-share-ideas-on-future-of-bertra-strand/ (accessed 7 April 2022).

Cubie D. and Natoli, T., 2022. Coherence, alignment and integration: understanding the legal relationship between sustainable development, climate change adaptation and disaster risk reduction. In Flood, S., Jerez Columbié, Y., Le Tissier, M. and O'Dwyer, B. (eds), *Creating Resilient Futures*. Palgrave Macmillan, Cham, Switzerland. https://doi.org/10.1007/978-3-030-80791-7_3

Department of Agriculture, Food and the Marine, 2019. *Agriculture, Forest and Seafood Climate Change Sectoral Adaptation Plan*. Government of Ireland, Dublin.

Department of Communications, Climate Action and Environment, 2018a. *National Adaptation Framework: Planning for a Climate Resilient Ireland*. Government of Ireland, Dublin.

Department of Communications, Climate Action and Environment, 2018b. *Local Authority Adaptation Strategy Development Guidelines*. Government of Ireland, Dublin.

Department of Communications, Climate Action and Environment, 2018c. *Sectoral Planning Guidelines for Climate Change Adaptation*. Government of Ireland, Dublin.

Department of Communications, Climate Action and Environment, 2018d. *Climate Change Adaptation Plan for the Electricity and Gas Networks Sector*. Government of Ireland, Dublin.

Department of Communications, Climate Action and Environment, 2018e. *Climate Action Plan*. Available online: https://www.gov.ie/en/publication/ccb2e0-the-climate-action-plan-2019/ (accessed 7 April 2022).

Department of Communications, Climate Action and Environment, 2019a. *Climate Action Plan 2019 to Tackle Climate Breakdown*. Government of Ireland, Dublin.

Department of Communications, Climate Action and Environment, 2019b. *Draft National Adaptation Plan for the Communications Sector*. Government of Ireland, Dublin.

Department of Communications, Climate Action and Environment, 2019c. *Climate Action Charter for Local Authorities and Minister for Communications, Climate Action and Environment on behalf of Government*. Government of Ireland, Dublin.

Department of Culture, Heritage and the Gaeltacht, 2019a. *Biodiversity – Climate Change Sectoral Adaptation Plan*. Government of Ireland, Dublin.

Department of Culture, Heritage and the Gaeltacht, 2019b. *Built and Archaeological Heritage Climate Change Sectoral Adaptation Plan*. Government of Ireland, Dublin.

Department of Defence, 2017. *Strategic Emergency Management National Structures and Framework*. Office of Emergency Planning National Emergency Coordination Centre, Department of Defence, Government of Ireland. Available online: https://www.gov.ie/en/publication/7ff6f-strategic-emergency-management-sem-national-structures-and-framework/ (accessed 7 April 2022).

Department of Defence, 2020. *Strategic Emergency Management Guideline 4: Climate Change Adaptation*. Government of Ireland, Dublin.

Department of Defence, 2021a. *Strategic Emergency Management Guideline 1: National Emergency Coordination Group*. Office of Emergency Planning National Emergency Coordination Centre, Department of Defence, Government of Ireland. Available online: https://www.gov.ie/en/publication/7ff6f-strategic-emergency-management-sem-national-structures-and-framework/ (accessed 7 April 2022).

Department of Defence, 2021b. *Strategic Emergency Management Guideline 3: Critical Infrastructure Resilience – Version 2*. Office of Emergency Planning National Emergency Coordination Centre, Department of Defence, Government of Ireland. Available online: https://www.gov.ie/en/publication/7ff6f-strategic-emergency-management-sem-national-structures-and-framework/ (accessed 7 April 2022).

Department of Foreign Affairs and Trade, 2018. *A Better World: Ireland's Policy for International Development*. Government of Ireland, Dublin.

Department of Health, 2019. *Health Sector Climate Change Adaptation Plan*. Government of Ireland, Dublin.

Department of Housing, Planning and Local Government, 2019. *Water Quality and Water Services Infrastructure Climate Change Sectoral Adaptation Plan*. Government of Ireland, Dublin.

Department of Social Protection, 2021a. COVID-19 Pandemic Unemployment Payment. Available online: https://www.gov.ie/en/service/be74d3-covid-19-pandemic-unemployment-payment/ (accessed 7 April 2022).

Department of Social Protection, 2021b. Humanitarian Assistance Scheme. Available online: https://www.gov.ie/en/service/12e880-humanitarian-assistance-scheme-swa/ (accessed 7 April 2022).

Department of the Environment, Climate and Communications, 2020a. Sectoral adaptation planning. Available online: https://www.gov.ie/en/collection/51df3-sectoral-adaptation-planning/ (accessed 7 April 2022).

Department of the Environment, Climate and Communications, 2020b. Local authority adaptation strategies. Available online: https://www.gov.ie/en/policy-information/37d691-adapting-to-climate-breakdown/#local-authority-adaptation-strategies (accessed 7 April 2022).

Department of the Environment, Community and Local Government, 2012. *National Climate Change Adaptation Framework: Building Resilience to Climate Change*. Government of Ireland, Dublin.

Department of Transport, Tourism and Sport, 2019. *Transport Climate Change Sectoral Adaptation Plan*. Government of Ireland, Dublin.

EC (European Commission), 2020. EU civil protection mechanism. Available online: https://ec.europa.eu/echo/what/civil-protection/mechanism_en (accessed March 2021).

EC (European Commission), 2021. *Forging a Climate-resilient Europe – The New EU Strategy on Adaptation to Climate Change*. European Commission, Brussels.

EEA (European Environment Agency), 2013. *Adaptation in Europe: Addressing Risks and Opportunities from Climate Change in the Context of Socio-economic Developments*. EEA Report No 3/2013. EEA, Copenhagen.

EEA (European Environment Agency), 2017. *Climate Change Adaptation and Disaster Risk Reduction in Europe: Enhancing Coherence of the Knowledge Base, Policies and Practices*. EEA Report No 15/2017. EEA, Copenhagen. https://doi.org/10.2800/938195

EPA (Environmental Protection Agency), 2020. *Climate Research Coordination Group: Second Report on Activities: January–December 2019*. Government of Ireland, Dublin.

EPA (Environmental Protection Agency), 2021. Research. Available online: https://www.epa.ie/researchandeducation/research/ (accessed 7 April 2022).

ESPREssO (Enhancing Synergies for Disaster Prevention in the European Union), 2020. Enhancing synergies for disaster prevention in the European Union. Previously available online: http://www.espressoproject.eu/ (accessed 2021).

Flood, S., Paterson, S., O'Connor, E., O'Dwyer, B., Whyte, H., Le Tissier, M. and Gault, J., 2016. *National Risk Assessment of Impacts of Climate Change: Bridging the Gap to Adaptation Action*. Environmental Protection Agency, Johnstown Castle, Ireland.

Government of Ireland, 2021. Climate Action and Low Carbon Development (Amendment) Bill 2020. Government of Ireland, Dublin.

Government Task Force on Emergency Planning, 2017. Strategic emergency management. Available online: https://www.emergencyplanning.ie/en/news/strategic-emergency-management (accessed 7 April 2022).

Greene, S., Medway, P., Cubie, D. and Le Tissier, M., 2020. *Literature Review on Enhancing Integration of Disaster Risk and Climate Change Adaptation in Irish Emergency Planning*. EPA, Johnstown Castle, Ireland.

IPCC (Intergovernmental Panel on Climate Change), 2014. *Climate Change 2014: Synthesis Report. Summary for Policymakers*. IPCC. Available online: https://www.ipcc.ch/report/ar5/syr/ (accessed 18 May 2022).

IPCC (Intergovernmental Panel on Climate Change), 2018. *Special Report: Global Warming of 1.5°C*. IPCC, Geneva, Switzerland.

Lauta, K.C., Albris, K., Zuccaro, G. and Grandjean, G., 2018. *ESPREssO Enhancing Risk Management Capabilities Guidelines*. European Union, Brussels.

LAWPRO (Local Authority Waters Programme), 2021. About – Local Authority Waters Programme. Available online: http://watersandcommunities.ie/about/ (accessed 7 April 2022).

Mayo County Council and CARO, 2019. *Mayo Climate Adaptation Strategy*. Available online: https://www.mayo.ie/getmedia/ede67b0e-a4e4-4e7c-a40b-fb1fcbdfd00c/Mayo-Climate-Adaptation-Strategy.pdf (accessed 7 April 2022).

Mayo News, 2014. Bertra takes another hit from Storm Brigid. *Mayo News*, 12 February 2014. Available online: https://www.mayonews.ie/?option=com_content&view=article&id=19411:storm-damage-bertra-takes-another-hit-from-storm-brigid&catid=3:news-features&Itemid=29 (accessed 7 April 2022).

Medway, P., Flood, S., Cubie, D. and Le Tissier, M., 2022. Enhancing integration of disaster risk and climate change adaptation into Irish emergency planning. In Flood, S., Jerez Columbié, Y., Le Tissier, M. and O'Dwyer, B. (eds), *Creating Resilient Futures*. Palgrave Macmillan, Cham, Switzerland. https://doi.org/10.1007/978-3-030-80791-7_5

Met Éireann, 2018. Weather extreme records for Ireland. Available online: https://www.met.ie/climate/weather-extreme-records (accessed 23 November 2020).

Munich Re, 2021. Data on natural disasters since 1980: Munich Re's NatCatSERVICE. Available online: https://www.munichre.com/en/solutions/for-industry-clients/natcatservice.html (accessed 7 April 2022).

National Disability Authority, 2021. Universal design. Available online: http://universaldesign.ie/ (accessed 7 April 2022).

Natoli, T., 2020. *Addressing Specific Vulnerabilities through Climate and Disaster Risk Governance: Lessons from the Philippines*. International Federation of Red Cross and Red Crescent Societies, Geneva.

NDFEM (National Directorate for Fire and Emergency Management), 2006a. *A Framework for Major Emergency Management*. Government of Ireland, Dublin.

NDFEM (National Directorate for Fire and Emergency Management), 2006b. Major emergency management. Available online: www.mem.ie (accessed 7 April 2022).

NDFEM (National Directorate for Fire and Emergency Management), 2006c. *Major Emergency Management Appendices (F7)*. Government of Ireland, Dublin.

NDFEM (National Directorate for Fire and Emergency Management), 2019. *Review Report on Severe Weather Events 2017–2018*. Government of Ireland, Dublin.

OECD (Organisation for Economic Co-operation and Development), 2020a. *Paris Collaborative on Green Budgeting: OECD Green Budgeting Framework – Highlights*. OECD, Paris.

OECD (Organisation for Economic Co-operation and Development), 2020b. *Common Ground Between the Paris Agreement and the Sendai Framework: Climate Change Adaptation and Disaster Risk Reduction*. OECD Publishing, Paris. https://doi.org/10.1787/3edc8d09-en

OECD, 2021. *Green Budget Tagging: Introductory Guidance & Principles*. OECD Publishing, Paris.

OPW (Office of Public Works), 2018. *Implementing the National Flood Risk Policy: Report on Measures in Place and Proposed to Address Ireland's Flood Risk*. Government of Ireland, Dublin.

Parliamentary Budget Office, 2018. *An Overview of the Green Budgeting Initiative: PBO Note 24 of 2018*. Government of Ireland, Dublin.

PLACARD (Platform for Climate Adaptation and Risk Reduction), 2020. PLACARD interchange. Available online: https://www.placard-network.eu/ (accessed 26 April 2022).

Sachs, J., Schmidt-Traub, G., Kroll, C., Lafortune, G., Fuller, G., Woelm, F., 2020. *Sustainable Development Report – Ireland*. Available online: https://dashboards.sdgindex.org/profiles/ireland (accessed 26 April 2022).

Shine, T., 2018. *Climate Resilient Ireland*. EPA, Johnstown Castle, Ireland.

Surminski, S., 2017. *Fit for the Future? The Reform of Flood Insurance in Ireland: Resolving the Data Controversy and Supporting Climate Change Adaptation*. Grantham Research Institute on Climate Change and the Environment/University College Cork, Cork, Ireland.

UNFCCC (United Nations Framework Convention on Climate Change), 2013. Warsaw International Mechanism for Loss and Damage associated with Climate Change Impacts. Available online: https://unfccc.int/topics/adaptation-and-resilience/workstreams/loss-and-damage/warsaw-international-mechanism#:~:text=The%20COP%20established%20the%20Warsaw,that%20are%20particularly%20vulnerable%20to (accessed 18 May 2022).

UNISDR (United Nations Office for Disaster Risk Reduction), 2015a. *Sendai Framework for Disaster Risk Reduction*. UNISDR, Geneva, Switzerland.

UNISDR (United Nations Office for Disaster Risk Reduction), 2015b. *Coherence and Mutual Reinforcement between the Sendai Framework for Disaster Risk Reduction 2015–2030 and International Agreements for Development and Climate Action*. UNISDR, Geneva, Switzerland.

UNISDR (United Nations Office for Disaster Risk Reduction), 2017. Terminology: online glossary. Available online: https://www.undrr.org/terminology (accessed 19 May 2022).

United Nations Secretariat, 2019. *Note by the Secretary-General to the 74th Session of the UNGA: Report of the Special Rapporteur on the Issue of Human Rights Obligations Relating to the Enjoyment of a Safe, Clean, Healthy and Sustainable Environment*. United Nations, New York, NY.

World Meteorological Organization, 2018. Global framework for climate services. Available online: https://gfcs.wmo.int/about-gfcs (accessed 26 February 2021).

Abbreviations

CARO	Climate Action Regional Office
CCA	Climate change adaptation
CCMA	City and County Managers Association
CFRAM	Catchment Flood Risk Assessment and Management Programme
DCCAE	Department for Communications, Climate Action and Environment
DRM	Disaster risk management
DRR	Disaster risk reduction
HSE	Health Service Executive
LGMA	Local Government Management Association
MaREI	Marine and Renewable Energy Ireland Centre
MEM	Major Emergency Management
NDCA	National Dialogue on Climate Action
NDFEM	National Directorate for Fire and Emergency Management
OPW	Office of Public Works
PRA	Principal response agency (set out in the MEM)
PSA	Principal support agency (set out in the SEM)
SEAI	Sustainable Energy Authority of Ireland
SEM	Strategic Emergency Management
TII	Transport Infrastructure Ireland
UN	United Nations

Glossary

This glossary lists key definitions derived, where possible, from relevant Irish legislation, policy and plans. If no such definition exists in Irish documentation, an authoritative international definition is used.

Climate change adaptation	A change in natural or human systems in response to the impacts of climate change. These changes moderate harm or exploit beneficial opportunities and can be in response to actual or expected impacts (National Adaptation Framework; Department of Communications, Climate Action and Environment, 2018a: 98)
Disaster risk management	Application of disaster risk reduction policies and strategies to prevent new disaster risks, reduce existing disaster risks and manage residual risks, contributing to the strengthening of resilience and reduction of disaster losses (UNISDR, 2017)
Disaster risk reduction	Disaster risk reduction is aimed at preventing new and reducing existing disaster risks (exposure, hazard or vulnerability), and managing residual risks, all of which contribute to strengthening resilience and therefore to the achievement of sustainable development (UNISDR, 2017)
Exposure	The situation of people, infrastructure, housing, production capacities and other tangible human assets located in hazard-prone areas (UNISDR, 2017)
Emergency	An event which, usually with little or no warning, causes or threatens to cause death, serious injury, serious disruption to essential services, the economy or critical infrastructure, or significant damage to property or the environment, and which requires the activation of national resources to ensure an effective coordinated response and recovery (SEM Framework; Department of Defence, 2017: 2)
Hazard	Any phenomenon with the potential to cause direct harm to members of the community, the environment or the physical infrastructure, or being potentially damaging to the economic and social infrastructure (SEM Framework; Department of Defence, 2017: 16)
Impact	The consequences of a hazardous event actually happening, expressed in terms of a negative impact on human welfare, economic activity, environmental welfare or societal structures (SEM Framework; Department of Defence, 2017: 16)
Loss and damage	The harms caused by anthropogenic climate change (UNFCCC, 2003)
Mitigation	Mitigation as a risk treatment process involves reducing or eliminating the likelihood and/or the impact of an identified hazard. This phase of the emergency management cycle seeks to treat the hazard such that it affects society to a lesser degree (SEM Framework; Department of Defence, 2017)
Resilience	Community resilience: 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 and efficient manner, including through the preservation and restoration of its essential basic structures and functions through risk management (SEM Framework; Department of Defence, 2017: 18)
Risk	The combination of the likelihood of a hazardous event and its potential impact (SEM Framework; Department of Defence, 2017: 16)
Vulnerability	The conditions determined by physical, social, economic and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards (UNDRR, 2017)

Appendix 1 Guiding Actions for Implementing Integrated Emergency Planning in Ireland based on the Six Pathways of the SHIELD Model

Pathway	Subsection	Suggested action	Indicative relevant stakeholders
Sharing knowledge	1.1	Retain focus of investment on Ireland's existing structures for knowledge creation, curation and dissemination for CCA and DRR, i.e. Met Éireann, Climate Ireland, the EPA and the CAROs.	DHLGH, DECC
	1.2	Extend and update common guidance and scenarios on CCA for all sectors and local authorities to increase awareness and understanding.	DHLGH, DECC, EPA, Met Éireann
	1.3	Reform the commissioning of CCA research to make it more demand led and synchronised with planning timetables to improve uptake and impact.	EPA Climate Change Research Coordination Group
	1.4	Ensure that future updates of sectoral adaptation plans, SEM and MEM Frameworks (among others) precede those of local authorities to improve coherence between them.	NASC
	1.5	Connect long-term commitments and projects for adaptation with the priorities identified in the periodic national risk assessments.	OEP, EPA Climate Change Research Coordination Group
	1.6	Mainstream measures for identifying residual risk into capacity and preparedness planning processes of the PRAs, to ensure resources are optimally targeted.	NDFEM, OEP, DHLHG
	1.7	Eliminate duplication and promote interoperability of new datasets and databases for CCA and DRR, e.g. standardised climate change projections for Ireland (Met Éireann's TRANSLATE project, or a national asset inventory of critical infrastructure).	NASC, OEP
	1.8	Incorporate socioeconomic vulnerability data into all hazard analysis and implementation planning for CCA and DRR.	EPA, OEP, sectors and local authorities
	1.9	Adopt a whole-of-society approach to sharing knowledge by ensuring that knowledge services target a wider range of stakeholders including An Garda Síochána, the HSE, voluntary emergency services, civil society and community-based risk management initiatives.	DHLGH, DECC, EPA, sectors and local authorities.
	1.10	Identify bottlenecks to information sharing, e.g. regarding security-sensitive critical infrastructure, or between the national and local level, and develop data-sharing mitigation measures that enable management of multi-sector or cascading risk in a way that does not compromise data security. Reinforce incentives to share information by showing the value gained as a result.	DHLGH
	1.11	Identify the alignment of all future Irish policies and plans for adaptation and DRR with international and regional frameworks and good practice. Fully engage with, measure and report national performance against the priorities established in the Sendai Framework for Disaster Risk Reduction 2015.	DHLGH
Harmonising capacity	2.1	Incorporate a specific CCA focus into the periodic internal and external capacity reviews for PRAs and place these reviews on a regular rather than ad hoc timetable.	NDFEM, local authorities, An Garda Síochána, HSE
	2.2	Inventory and assess value-adding capacity among voluntary emergency services, civil society, community-based disaster management initiatives and other potential public–private partners to: • identify roles and responsibilities that voluntary emergency services and/or community-based disaster management initiatives can absorb; • identify critical capacity and sustainability gaps across all stakeholders for uninterrupted performance.	Local authorities, An Garda Síochána, HSE
	2.3	Regularly appraise all job descriptions and departmental mandates at the local authority level to identify CCA responsibilities, knowledge, skills requirements and distribution relative to risk profile. Identify the level of additional responsibility and levels of effort required to determine appropriate workforce size, distribution and long-term funding. Additional capacity for climate action in CAROs and local authorities has been recommended to government and is merited given the degree of change expected.	Local authorities, sectors, DHLGH, DPER

Pathway	Subsection	Suggested action	Indicative relevant stakeholders
	2.4	Review and adjust training provision based on point 2.3, above, for: • pre-service training; • in-service training; • regular scenario-based multi-stakeholder training exercises and simulations.	Local authorities, sectors, EPA, DHLGH, DPER
	2.5	Integrate adaptation and mitigation responsibility and capacity under the heading of climate action to fully support implementation of local authority climate action plans.	CAROs and local authorities
	2.6	Appraise risk to PRA asset base (equipment and facilities) to ensure human resource capacities are appropriately adapted to the prevailing risk profile. PRA staff should have the right tools, in the right locations, to manage residual risk.	NFDEM, local authorities, An Garda Síochána, HSE
Institutionalising coordination	3.1	Review national-level governance, management and coordination for CCA and DRR and consider the creation of a "nerve centre" or interdepartmental working group led by the DHLGH, adapting the design principles of the World Meteorological Organization's Global and National Frameworks for Climate Services and lessons from the OPW implementation of the National Flood Risk Policy.	DHLGH, DECC
	3.2	Reorganise regional emergency management and climate action regional planning structures to share the same geographical/administrative footprint.	NASC, OEP
	3.3	Review the resilience, adaptability and interoperability of information systems for coordination. Formalisation of processes and mechanisms for participation, utilisation and quality assurance is merited to make informal initiatives, such as local WhatsApp groups, more inclusive, comprehensive and sustainable.	Local authorities, CAROs, sectors
	3.4	Integrate the pilot WIRE App into coordination information systems to provide real-time reporting of extreme weather impacts.	Local authorities, CAROs, sectors
	3.5	Review and adjust sectoral coordination mechanisms and incentive structures to ensure that all relevant institutions operating in specific sectors and across sectors are fully and effectively coordinating with their peers, building on lessons from the Critical Infrastructure Working Group.	DHLGH, sectors
	3.6	Appraise good examples of cross-functional coordination at the local authority and sector level, for example Cork City Council's Severe Weather Assessment Team and Flood Assessment Team, and the Critical Infrastructure Working Group, to identify practical lessons for application to other settings and sectors.	CAROs, sectors, local authorities
	3.7	Include qualified and relevant stakeholders from outside government in coordination and information exchanging mechanisms for integrated adaptation and DRM, such as the representative business community groups, voluntary emergency services and community-based disaster management groups.	CAROs, local authorities, sectors, LGMA, CCMA
Engaging stakeholders	4.1	Adopt an explicit focus on resilience building and risk management to engage stakeholders of all types. This strategy is consistent with and builds on the objectives described in the SEM Framework, the National Adaptation Framework and other national and international policies and plans for communities and individuals to become more resilient.	DECC, local authorities, CAROs, civil society
	4.2	Undertake a comprehensive stakeholder analysis to identify the actual and potential roles of each stakeholder, information needs, engagement strategies that are most likely to be successful with each and thus build on the widely held view that more stakeholder engagement for CCA and DRR is desirable. Incorporate positive experience from existing programmes such as the OPW's CFRAM programme.	CAROs, local authorities, sectors, LGMA, CCMA

Pathway	Subsection	Suggested action	Indicative relevant stakeholders
	4.3	Review and develop an incentive structure to motivate and enable sustained engagement by all stakeholders in resilience building. Incentives may include recognition, training, formal connection with state bodies through memoranda of understanding, financing or donation of equipment.	DHLHG, DECC, local authorities
	4.4	Determine realistic expectations for state action on adaptation and DRR based on hazard, risk and vulnerability profile, and available resources. Communicate both the potential for cost-effective adaptation and risk reduction and the limits or boundaries of cost-effective action.	DHLGH, DECC, local authorities
	4.5	Identify and engage a wider range of government institutions to participate in integrated adaptation and DRR planning and action. For example, the Department of Social Protection and DPER both have significant roles in creating and sustaining community resilience, but appear to engage in strategy, planning and coordination primarily at the highest level only.	NASC, DHLGH
	4.6	Make use of relevant data collated from surveys, citizen feedback and research findings from the NDCA to identify and engage a wider range of community-based networks and organisations that can contribute to resilience building, including local chambers of commerce and business associations, the Tidy Towns network, Irish nature and conservation networks, social service groups and voluntary emergency services. Establish an online platform, potentially as part of the Climate Ireland platform, to communicate with, motivate and educate existing stakeholders, to demonstrate how stakeholders' local knowledge is valued and used, and to attract the interest of new stakeholders.	Local authorities, DECC, EPA
Leveraging investment	5.1	Regularly renew the political consensus on the need for long-term investment in adaptation and DRR. This helps to sustain the commitment to long-term change beyond the typically short-term planning horizons of any single government or elected representatives in local authorities, giving confidence to planners, implementers, the public and other critical stakeholder groups that Ireland will achieve its transition to a low-carbon and highly adapted economy.	DHLGH, DECC, DPER
	5.2	Accelerate the roll-out of green budget tagging to incorporate both positive and negative budget measures in sectors and local authorities with active adaptation plans, and tag DRR and adaptation expenditure as separate from mitigation expenditures.	DPER, DHLGH, National Treasury Management Agency / New Era, local authorities, sectors
	5.3	Assess the feasibility of extending green budget tagging to a level of granularity beyond programme subheading level, enabling local authorities and other sectoral institutions to track the cost of managing climate change-related risks more easily and to eliminate duplication in current funding.	DPER, DHLGH, local authorities, sectors
	5.4	Develop a methodology for reliably estimating the cost of social and economic loss and damage from extreme weather events in Ireland to assist in making the case for long-term investment in adaptation and DRR. Use and downscale data from Munich Re's NatCatSERVICE and other indicators available through the European Climate Adaptation Platform (Climate-ADAPT).	EPA
	5.5	Equipped with improved knowledge of the costs and expenses related to adaptation and DRR, appraise the funding mechanisms and quantum of funding available to local authorities for adaptation and DRR.	DHLGH, DPER, local authorities
	5.6	Review the Public Spending Code for current and capital expenditure, including relevant priority sector guidance and real-world examples, to verify alignment and compliance with climate change policy and adequate recognition of adaptation and mitigation at the strategic assessment stage and throughout the business case development, procurement process and monitoring of implementation. Consider the usefulness of a centralised framework for CCA within the Public Spending Code to guide investment decisions. Strengthen the Public Spending Code's influence on adaptation by contrasting the potential costs of an adaptation premium for projects with the potential impact on net present value of climate change-related damage to the asset or service over its lifespan.	DPER

Pathway	Subsection	Suggested action	Indicative relevant stakeholders
	5.7	Ensure that thematic state financing mechanisms such as the Climate Action Fund prioritise adaptation as well as mitigation actions. Integrate a transparent vulnerability premium into funding allocations to move beyond a simple competition-based distribution of a more or less equal share of available funding to each eligible applicant, such as in the National Transport Authority's recent funding of 11 urban authorities. Integrate CCA criteria to as many centrally disbursed local authority funding pots as possible.	DECC
	5.8	Review and consider incentives to consumers and businesses to adapt to climate change-induced risks in similar ways to the incentives that the SEAI has created to mitigate carbon emissions, for example through grants for solar power systems for homes and businesses and the purchase of electric vehicles. Promote and incentivise private sector investment in DRR to climate-proof future growth.	DECC, DPER, local authorities
	5.9	Provide sustainable financing for additional adaptation implementation capacity (requested by CAROs and local authorities through the CCMA in 2020).	DECC, DHLGH, DPER
	5.10	To achieve a whole-of-society effort to adapt to climate change and reduce disaster risk, review and, as required, increase funding support to voluntary emergency services, civil society and community-based disaster management initiatives to sustain and increase local level action.	DECC, DHLGH, DPER, local authorities
Developing communications	6.1	Increase awareness among practitioners in government, the private sector and the public of the National Adaptation Framework's section on emergency management to reinforce the core message that "effective climate adaptation can minimise risks and costs and also protect lives and property by building resilience into existing systems. This can ultimately help minimise the emergency response that is necessary in response to severe weather events". Engage with the media sector to build its interest in constructive communication about adaptation and DRR successes and challenges.	DECC
	6.2	While local authorities take the lead role in reducing, avoiding and managing the residual risk of extreme weather events in their regions, communications is a function that transcends administrative boundaries. This is especially true in a small country where the risk profile is broadly the same throughout the country. Creating a national strategy for CCA and emergency planning communications should be considered as a cost-effective approach, potentially building on the NDCA model.	DECC, local authorities, EPA, Climate Ireland, CAROs
	6.3	Invest in expanding the dissemination of early warnings through push notification systems that the public can opt in to and receive automated alerts.	DECC, Met Éireann
	6.4	Review DECC's performance indicators for adaptation, which primarily focus on process targets, and augment them with real-world indicators that connect progress with impact on national and local risk profiles that are meaningful to the general public's lived experience and strengthen the feedback loop to implementing organisations.	DECC, EPA.
	6.5	Post COVID-19 pandemic, evaluate the communications strategy for pandemic management to identify effective approaches and messages that might be co-opted for CCA communications.	DECC, HSE, Department of the Taoiseach
	6.6	Evaluate and renew the National Strategy on Education for Sustainable Development 2014–2020, restore geography as a core junior cycle subject and review teacher education to ensure that all schoolchildren have the skills, knowledge and values needed to adapt their adult lives in ways that contribute positively to a sustainable future.	Department of Education and Skills

DHLGH, Department of Housing, Local Government and Heritage; DPER, Department of Public Expenditure and Reform; NASC, National Adaptation Steering Committee; OEP, Office of Emergency Planning.

Appendix 2 List of Key Informants

No.	First name	Surname	Organisation
1	Mark	Adamson	Office of Public Works
2	Ken	Cleary	Department of Public Expenditure and Reform
3	Justina	Corcoran	Department of the Environment, Climate and Communications
4	Edward	Crean	National Disability Authority
5	Ciarán	Desmond	Department of Defence
6	David	Dodd	CARO Dublin Metropolitan
7	Liam	Dromey	CARO Atlantic Seaboard South
8	Olga	Grant	Department of the Environment, Climate and Communications
9	Maurice	Harnett	Department of Transport
10	John	Healy	Irish Red Cross Society
11	David	Joyce	Cork City Council
12	Eadaoin	Joyce	Irish Water
13	Keith	Lambkin	Met Éireann
14	Keith	Leonard	National Directorate for Fire and Emergency Management
15	David	Mellett	CARO Atlantic Seaboard North
16	Billy	O'Keefe	Transport Infrastructure Ireland
17	Seosamh	O'Laoi	Department of the Environment, Climate and Communications
18	Derek	Rafferty	National Directorate for Fire and Emergency Management
19	Neil	Walker	Irish Business and Employers Confederation

Appendix 3 List of Survey Respondents/Focus Group Discussion Participants

No.	First name	Surname	Organisation
1	Denise	Cahill	Health Service Executive
2	Liam	Casey	Cork City Council
3	John	Condon	Mayo County Council
4	Joe	Craig	Dún Laoghaire–Rathdown County Council
5	Sabrina	Dekker	Dublin City Council
6	David	Dodd	CARO Dublin Metropolitan
7	Theresa	Durkin	Mayo County Council
8	Mary Rose	Fitzgerald	Health Service Executive
9	Conrad	Harley	Mayo County Council
10	Martin	Keating	Mayo County Council
11	Sean	Lynch	Cork City Council
12	Micheál	Lyons	Cork City Council
13	Tom	McDonnel	Mayo County Council
14	David	Mellett	CARO Atlantic Seaboard North
15	John	Nestor	Mayo County Council
16	Cian	O'Brien	Health Service Executive
17	Gerry	O'Connell	Dublin City Council
18	Tim	O'Herlihy	Cork City Council
19	Gerard	O'Hora	Cork City Council
20	Helena	O'Riordan	Cork City Council
21	Celine	Reilly	Dublin City Council
22	Tony	Shevlin	Mayo County Council
23	David	Spillett	Cork City Council (Fire Service)
24	Kevin	Vallely	Fingal County Council

Appendix 4 Key Informant Interview Format

1. What is the role of your organisation in the management of disaster risk or climate change adaptation?
2. What national and local policies and implementation frameworks govern the work of your organisation?
3. Are you familiar with any of the international policy agreements on climate change and disaster risk?
   (a) If yes, which?
   (b) Are they relevant to national, local or organisational policies?
4. Are there any policy gaps or inconsistencies that hamper your ability to manage risk by 2030 and beyond?
5. Is the concept of disaster risk reduction used by your organisation? [Yes/No/Don't know]
   (a) If yes, in what manner?
6. How does your organisation assess risk and are there any ways your organisation is seeking to change or improve its risk assessment?
7. How does your organisation determine when the risk load is effectively managed?
8. Can you describe the coordination mechanism used? Is it effective for both vertical (national to local) and horizontal (cross-sectoral) coordination? How do you coordinate with vulnerable communities and at-risk groups/sectors?
9. Is there anything that your organisation is doing or recommending to strengthen systems of coordination?
10. How does your organisation finance the management or reduction of climate-induced risks?
11. Is there anything your organisation is doing or recommending to improve the financing of climate change adaptation and disaster risk reduction?
12. Does your organisation have the people with the right skills and knowledge for adapting their risk management approach considering climate change?
13. What else would help?

Appendix 5 Full List of Survey Questions

Top of Form

Integrating Climate Change Adaptation (CCA) and Disaster Risk (DR) in Irish Emergency Planning

Survey to understand how CCA and DR is integrated in your organisation's work and its interactions with related bodies

*Required

1.

Email address*

Consent

This survey has been approved by UCC's Ethical Committee. Please indicate your consent to voluntarily participate in our research. Your responses to this survey are confidential. You may withdraw permission for the research team to use the data you provide here within 2 weeks of taking this survey.

2.

Do you consent to participate in the research? Your answers will be confidential.

Mark only one oval.

Yes

No

3.

Are you over 18 years of age?*

Mark only one oval.

Yes

No

Current perceptions of risk and level of adaptation

The IPCC projections indicate the likelihood of more frequent and intense extreme weather events in Ireland. How do you perceive these risks and the level of adaptation for them in your area?

4.

Surface water flooding

Mark only one oval.

Low risk, we have adapted

1–10

High risk, we have not adapted

5.

River flooding

Mark only one oval.

Low risk, we have adapted

1–10

High risk, we have not adapted

6.

Coastal flooding

Mark only one oval.

Low risk, we have adapted

1–10

High risk, we have not adapted

7.

Storms

Mark only one oval.

Low risk, we have adapted

1–10

High risk, we have not adapted

8.

Droughts and heatwaves

Mark only one oval.

Low risk, we have adapted

1–10

High risk, we have not adapted

9.

If you have any additional thoughts to qualify your responses to the questions above, please note them here.

Perceptions of principal emergency response organisation's ability to cope with extreme weather-related disasters

The principal response agencies (An Garda Síochána, HSE, Fire Services and Local Authorities) lead response activity and must adjust their capacity over time to respond effectively to the more frequent and intense weather related disaster events (floods, storms, drought/heatwave) projected in future. We are seeking your general perceptions of response capacity rather than thinking about capacity to respond to a specific hazard type.

10.

How well do you think principal response agencies in your area have responded to weather-related disasters over the past five years?

Mark only one oval.

Extremely ineffectively

1–10

Extremely effectively

11.

If you have any additional thoughts to qualify your responses to the questions above, please note them here.

Pathways for adaptation

Has your organisation integrated climate change adaptation into its culture, practice and way of working for the following?

12.

Has your organisation established knowledge generation, sharing and application processes for climate change adaptation in your area?

Mark only one oval.

No, not at all.

1–10

Yes, a robust and comprehensive set of processes are established.

13.

Has your organisation identified and established the human resource capacities for climate change adaptation in your area?

Mark only one oval.

No, not at all.

1–10

Yes, we have a clear understanding of what capacities are needed and are filling all the gaps, if there are any.

14.

Has your organisation institutionalised formal internal and external coordination processes including all relevant stakeholders for climate change adaptation in your area?

Mark only one oval.

No, not at all.

1–10

Yes, we have established comprehensive and robust formal coordination mechanisms involving the most relevant internal and external stakeholders.

15.

Has your organisation established robust, effective means of communication to engage all the most relevant internal and external stakeholders for climate change adaptation in your area?

Mark only one oval.

No, not at all.

1–10

Yes, we have established robust and varied communications channels to all of the most relevant stakeholders.

16.

Has your organisation effectively identified and addressed the major financing issues related to climate change adaptation in your area?

Mark only one oval.

No, not at all.

1–10

Yes, we have a clear and comprehensive financing strategy to cover all of our adaptation plans over time.

17.

If you have any additional thoughts to qualify your responses to the questions above, please note them here.

AN GHNÍOMHAIREACHT UM CHAOMHNÚ COMHSHAOIL
Tá an Ghníomhaireacht um Chaomhnú Comhshaoil (GCC) freagrach as an gcomhshaol a chaomhnú agus a fheabhsú mar shócmhainn luachmhar do mhuintir na hÉireann. Táimid tiomanta do dhaoine agus don chomhshaol a chosaint ó éifeachtaí díobhálacha na radaíochta agus an truaillithe.

Is féidir obair na Gníomhaireachta a roinnt ina trí phríomhréimse:

Rialú: *Déanaimid córais éifeachtacha rialaithe agus comhlíonta comhshaoil a chur i bhfeidhm chun torthaí maithe comhshaoil a sholáthar agus chun díriú orthu siúd nach gcloíonn leis na córais sin.*

Eolas: *Soláthraímid sonraí, faisnéis agus measúnú comhshaoil atá ar ardchaighdeán, spriocdhírithe agus tráthúil chun bonn eolais a chur faoin gcinnteoireacht ar gach leibhéal.*

Tacaíocht: *Bímid ag saothrú i gcomhar le grúpaí eile chun tacú le comhshaol atá glan, táirgiúil agus cosanta go maith, agus le hiompar a chuirfidh le comhshaol inbhuanaithe.*

Ár bhFreagrachtaí

Ceadúnú
Déanaimid na gníomhaíochtaí seo a leanas a rialú ionas nach ndéanann siad dochar do shláinte an phobail ná don chomhshaol:
- saoráidí dramhaíola *(m.sh. láithreáin líonta talún, loisceoirí, stáisiúin aistrithe dramhaíola)*;
- gníomhaíochtaí tionsclaíocha ar scála mór *(m.sh. déantúsaíocht cógaisíochta, déantúsaíocht stroighne, stáisiúin chumhachta)*;
- an diantalmhaíocht *(m.sh. muca, éanlaith)*;
- úsáid shrianta agus scaoileadh rialaithe Orgánach Géinmhodhnaithe *(OGM)*;
- foinsí radaíochta ianúcháin *(m.sh. trealamh x-gha agus radaiteiripe, foinsí tionsclaíocha)*;
- áiseanna móra stórála peitril;
- scardadh dramhuisce;
- gníomhaíochtaí dumpála ar farraige.

Forfheidhmiú Náisiúnta i leith Cúrsaí Comhshaoil
- Clár náisiúnta iniúchtaí agus cigireachtaí a dhéanamh gach bliain ar shaoráidí a bhfuil ceadúnas ón nGníomhaireacht acu.
- Maoirseacht a dhéanamh ar fhreagrachtaí cosanta comhshaoil na n-údarás áitiúil.
- Caighdeán an uisce óil, arna sholáthar ag soláthraithe uisce phoiblí, a mhaoirsiú.
- Obair le húdaráis áitiúla agus le gníomhaireachtaí eile chun dul i ngleic le coireanna comhshaoil trí chomhordú a dhéanamh ar líonra forfheidhmiúcháin náisiúnta, trí dhíriú ar chiontóirí, agus trí mhaoirsiú a dhéanamh ar leasúchán.
- Cur i bhfeidhm rialachán ar nós na Rialachán um Dhramhthrealamh Leictreach agus Leictreonach (DTLL), um Shrian ar Shubstaintí Guaiseacha agus na Rialachán um rialú ar shubstaintí a ídíonn an ciseal ózóin.
- An dlí a chur orthu siúd a bhriseann dlí an chomhshaoil agus a dhéanann dochar don chomhshaol.

Bainistíocht Uisce
- Monatóireacht agus tuairisciú a dhéanamh ar cháilíocht aibhneacha, lochanna, uiscí idirchriosacha agus cósta na hÉireann, agus screamhuiscí; leibhéil uisce agus sruthanna aibhneacha a thomhas.
- Comhordú náisiúnta agus maoirsiú a dhéanamh ar an gCreat-Treoir Uisce.
- Monatóireacht agus tuairisciú a dhéanamh ar Cháilíocht an Uisce Snámha.

Monatóireacht, Anailís agus Tuairisciú ar an gComhshaol
- Monatóireacht a dhéanamh ar cháilíocht an aeir agus Treoir an AE maidir le hAer Glan don Eoraip (CAFÉ) a chur chun feidhme.
- Tuairisciú neamhspleách le cabhrú le cinnteoireacht an rialtais náisiúnta agus na n-údarás áitiúil *(m.sh. tuairisciú tréimhsiúil ar staid Chomhshaol na hÉireann agus Tuarascálacha ar Tháscairí)*.

Rialú Astaíochtaí na nGás Ceaptha Teasa in Éirinn
- Fardail agus réamh-mheastacháin na hÉireann maidir le gáis cheaptha teasa a ullmhú.
- An Treoir maidir le Trádáil Astaíochtaí a chur chun feidhme i gcomhair breis agus 100 de na táirgeoirí dé-ocsaíde carbóin is mó in Éirinn.

Taighde agus Forbairt Comhshaoil
- Taighde comhshaoil a chistiú chun brúnna a shainaithint, bonn eolais a chur faoi bheartais, agus réitigh a sholáthar i réimsí na haeráide, an uisce agus na hinbhuanaitheachta.

Measúnacht Straitéiseach Timpeallachta
- Measúnacht a dhéanamh ar thionchar pleananna agus clár beartaithe ar an gcomhshaol in Éirinn *(m.sh. mórphleananna forbartha)*.

Cosaint Raideolaíoch
- Monatóireacht a dhéanamh ar leibhéil radaíochta, measúnacht a dhéanamh ar nochtadh mhuintir na hÉireann don radaíocht ianúcháin.
- 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 cosanta ar an radaíocht a sholáthar, nó maoirsiú a dhéanamh ar sholáthar na seirbhísí sin.

Treoir, Faisnéis Inrochtana agus Oideachas
- Comhairle agus treoir a chur ar fáil d'earnáil na tionsclaíochta agus don phobal maidir le hábhair a bhaineann le caomhnú an chomhshaoil agus leis an gcosaint raideolaíoch.
- Faisnéis thráthúil ar an gcomhshaol ar a bhfuil fáil éasca a chur ar fáil chun rannpháirtíocht an phobail a spreagadh sa chinnteoireacht i ndáil leis an gcomhshaol *(m.sh. Timpeall an Tí, léarscáileanna radóin)*.
- Comhairle a chur ar fáil don Rialtas maidir le hábhair a bhaineann leis an tsábháilteacht raideolaíoch agus le cúrsaí práinnfhreagartha.
- Plean Náisiúnta Bainistíochta Dramhaíola Guaisí a fhorbairt chun dramhaíl ghuaiseach a chosc agus a bhainistiú.

Múscailt Feasachta agus Athrú Iompraíochta
- Feasacht chomhshaoil níos fearr a ghiniúint agus dul i bhfeidhm ar athrú iompraíochta dearfach trí thacú le gnóthais, le pobail agus le teaghlaigh a bheith níos éifeachtúla ar acmhainní.
- Tástáil le haghaidh radóin a chur chun cinn i dtithe agus in ionaid oibre, agus gníomhartha leasúcháin a spreagadh nuair is gá.

Bainistíocht agus struchtúr na Gníomhaireachta um Chaomhnú Comhshaoil
Tá an ghníomhaíocht á bainistiú ag Bord lánaimseartha, ar a bhfuil Ard-Stiúrthóir agus cúigear Stiúrthóirí. Déantar an obair ar fud cúig cinn d'Oifigí:
- An Oifig um Inmharthanacht Comhshaoil
- An Oifig Forfheidhmithe i leith cúrsaí Comhshaoil
- An Oifig um Fianaise is Measúnú
- Oifig um Chosaint Radaíochta agus Monatóireachta Comhshaoil
- An Oifig Cumarsáide agus Seirbhísí Corparáideacha

Tá Coiste Comhairleach ag an nGníomhaireacht le cabhrú léi. Tá dáréag comhaltaí air 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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Enhancing Integration of Disaster Risk and Climate Change Adaptation into Irish Emergency Planning

Authors: Peter Medway, Dug Cubie and Martin Le Tissier

Identifying Pressures

Climate research tells us that extreme weather events will become more frequent and severe. Climate change adaptation (CCA) focuses on the probable chronic long-term impacts likely to occur across multiple sectors. In contrast, emergency planning and disaster risk reduction (DRR) primarily aims to address acute short-term impacts. The challenge many countries face is to balance the immediate risks of extreme weather and climate events with planning for how these threats will evolve and alter future vulnerabilities of communities and/or environments. In Ireland, there is a portfolio of policies, plans, strategies and reports that address the consequences of climate change and emergency planning. However, emergency management and CCA are currently two discrete systems for governance, management and coordination at the national level. There is no nationally shared understanding of what constitutes "risk" and "resilience" to short-, medium- and long-term change, and how best to develop an integrated and holistic approach to both the long-term CCA needs and the more immediate emergency risk management needs.

Informing Policy

More coherent policies and practices for CCA, DRR and disaster risk management (DRM) ensure that responses do not conflict with one another (maladaptation). They also ensure that preserving the opportunities of the current generation does not compromise the opportunities of future generations. This desk study shows that emergency response planning is different from developing a long-term risk management policy that acknowledges Ireland's increasing vulnerability to the climate crisis. Building on the existing Strategic Emergency Management and Major Emergency Management Frameworks, the report argues that a key objective for both short-term emergency planning and long-term CCA is to reduce vulnerability and increase the resilience of individuals, communities and national structures. Drawing on examples of European good practice, the report highlights that preventing new risk, and reducing the level of existing risk, will in turn reduce the remaining residual risk left to be managed.

Developing Solutions

The project identifies how existing approaches to DRR, DRM and CCA in Ireland are juxtaposed and concludes that identifying ways to promote coordination and align incentives, priorities and planning processes will facilitate a more holistic and comprehensive approach to DRM at all levels of government. In particular, the report argues that to achieve effective integration of the different frameworks all future policies and plans should consider the following six pathways, first identified by the Horizon 2020 ESPREssO project: sharing knowledge; harmonising capacity; institutionalising coordination; engaging stakeholders; leveraging investment; and developing communications.

The project findings were validated and revised by engagement with local communities, key stakeholders and sectors most likely to be affected by the existing and increasing risks of climate change. The report provides a high-level roadmap of guiding principles and a series of priority actions that the government and other stakeholders may wish to consider for achieving greater coherence and integration between the emergency management and climate adaptation frameworks in Ireland.

EPA Research: McCumiskey House, Richiew, Clonskeagh, Dublin 14.

Phone: 01 268 0100
Twitter: @EPAResearchNews
Email: research@epa.ie

www.epa.ie

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