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5

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

Peter Medway, Stephen Flood, Dug Cubie, and Martin Le Tissier

Introduction

Globally, and in Ireland, there are clear policy drivers that recommend the integration of climate change adaptation and disaster risk reduction. The European Environment Agency has stated that 'the impacts of weather- and climate-related hazards on the economy, human health and ecosystems are amplified by socio-economic changes and environmental

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changes. Efforts to reduce disaster risk and at the same time adapt to a changing climate have become a global and European priority' (European Environment Agency, 2017). The EU's new Strategy on Adaptation to Climate Change (European Commission, 2021) highlights both how the importance of adaptation is increasingly recognised globally and the lack of preparedness for it. The strategy highlights that climate adaptation action must better leverage synergies with actions for disaster risk prevention and reduction through better coherence in practices, standards, guidance, targets, resources and knowledge, and closer coordination at the national level, at the EU level and, internationally, under the Sendai Framework for Disaster Risk Reduction (UNISDR, 2015). Ireland's National Adaptation Framework (NAF), published in 2018, notes 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). Ireland's recently published Strategic Emergency Management (SEM) Guideline 4 on Climate Change Adaptation (Office of Emergency Planning, 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 disaster risk reduction) 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. It must be noted that Ireland's progress towards integration of climate change adaptation and disaster risk reduction is still at an early stage. The draft fiche for Ireland in the European Commission's Directorate General for Climate Action 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). The

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question, therefore, is not: should climate change adaptation and disaster risk reduction be better integrated; but how should it be done in Ireland?

Methodology

The research was implemented primarily as a desk study but also sought to engage directly with practitioners to understand the actual and potential role played, both in climate change adaptation and emergency planning and response, by individuals and organisations outside of government systems.[1]

The research hypothesis assumes that: 'The State has primary responsibility to prevent and reduce disaster risk, including that which is exacerbated or caused by climate change.' It also has a corresponding responsibility to manage the residual disaster risk which cannot be prevented or reduced through feasible, affordable actions (Fig. 5.1).



Fig. 5.1 Disaster risk management responsibilities

[1] This chapter provides a high-level summary of the research report: Peter Medway, Dug Cubie, and Martin Le Tissier, *Enhancing Integration of Disaster Risk and Climate Change Adaptation into Irish Emergency Planning* (2020). A literature review was also published as an initial output of the research project: Shannon Greene, Peter Medway, Dug Cubie & Martin Le Tissier, *Literature Review on Enhancing Integration of Disaster Risk and Climate Change Adaptation in Irish Emergency Planning* (July 2020).



Fig. 5.2 SHIELD Model for integration of climate change adaptation and disaster risk reduction. The SHIELD pathways are relevant to all the critical responsibilities of disaster risk management, illustrated at the centre of the diagram

The EU-funded Horizon 2020 ESPREssO Project Enhancing Risk Management Capabilities Guidelines (ERCG) (Lauta et al., 2018) proposes the SHIELD Model as a set of general recommendations for how to optimise risk management capabilities through disaster risk governance (Fig. 5.2). The pathways to integration proposed by the SHIELD Model do not necessarily include every way to enhance or achieve integration, but they summarise the most important areas for action that will contribute to a robust and effective risk governance mechanism. The research also draws on Cubie and Natoli's 'hourglass' model, as presented in Chap. 3 of this volume, on the relationship between the different frameworks for sustainable development, CCA and DRR, namely:

systemic coherence at the international level; vertical alignment between the international, regional and national levels; and horizontal integration of international norms at the domestic level (Cubie & Natoli, 2021). By drawing from examples of European and international good practice, the research aims to highlight their potential applicability in the Irish context, as well as the lessons which can be learned for other countries from the development of integrated approaches in Ireland.

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

Ireland has made progress on the production of policies and plans for emergencies and for climate change adaptation over the past 15 years, and herein lies one of the main challenges to integration. Policies and plans have been developed in an iterative but narrowly focused way, dealing with one issue at a time rather than attempting a holistic and integrated approach across climate and disaster domains. The consequence 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. Coordination opportunities can be missed if the timing of publication of potentially interlinking plans and policies is not well aligned. The Major Emergency Management Framework from 2006 (National Directorate of Fire and Emergency Management, 2006) is an example of this.

The Strategic Emergency Management National Structures and Framework document itself makes very little mention of climate change or its effect on disaster risk. The approval of SEM Guideline 4 on climate change adaptation in December 2020 is a significant step forward, providing an introductory summary in the context of emergency planning. The guideline does not, though, provide any detailed guidance on how to integrate adaptation and risk reduction despite reiterating the need to achieve integration. Detailed guidance has been explicitly left for future iterations and further research. Conversely, the Climate Action Plan's

principal focus is on mitigation of greenhouse gas emissions, with only three of 183 actions focusing on adaptation (including the preparation of sectoral and local adaptation strategies), while connections to disaster risk reduction or management are largely absent. Adaptation is expected to be more prominent in the next iteration of the Climate Action Plan to be published in 2021.

Alignment with Global and Regional Drivers of Integration

Building on the foundational Climate Action and Low Carbon Development Act 2015 and the National Adaptation Framework 2018, 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.' The plan describes the cross-departmental ambition to achieving climate resilience and reiterates its commitment to ensuring the permanent provision of accurate and authoritative information and expertise through Climate Ireland (https://www.climateireland.ie). By the end of 2021, the country's first set of sectoral and local authority adaptation strategies will have been completed. These policies, plans and operational actions represent real, measurable and relatively immediate action for climate change adaptation. As work is in progress, real-time learning and problem-solving is inevitably required to resolve emerging challenges of integration.

Ireland's policy and planning frameworks for emergency planning and climate change adaptation are broadly coherent with global policy and planning frameworks. The climate change instruments in Ireland are aligned with the Paris Agreement to the UN Framework Convention on Climate Change and with the UN Sustainable Development Goals (SDGs), and so include a clear shared logic and regulatory effect. However, implementation may be lagging behind in climate action, with the Sustainable Development Report for 2020 noting that significant

challenges to achievement of the goals remain (Sachs, 2020). The Strategic Emergency Management National Structures and Frameworks describes Ireland's participation in various international areas for emergency management processes, mentioning the United Nations (UN), the European Union (EU), the Organisation for Economic Cooperation and Development (OECD), and the NATO Partnership for Peace (PfP). For example, the SEM Guideline 4 on Climate Change Adaptation is both coherent with global drivers and is well aligned with regional policy and guidance, sharing definitions and categorisation of actions, such as using the 'soft', 'green' and 'grey' categories of adaptation actions as described in the European Environment Agency's report on adaptation in Europe (European Environment Agency (EEA), 2013), among others.

The absence of references to the UN Sendai Framework for Disaster Risk Reduction (UNISDR, 2015) is notable in Irish policy and planning documents. This is despite Ireland's engagement in the negotiation of the framework and on-going promotion of it at the international level via Irish Aid's policies and programmes. Moreover, the concept of DRR as defined in the Sendai Framework goes beyond the definition of mitigation in the SEM National Structures and Framework as it includes reference to the desired outcomes from DRR, namely the need to manage residual, in addition to preventing new and reducing existing, risk (Table 5.1). It also specifically reminds us of the importance of targeting the different components of risk: exposure to the risk, the relative strength and likelihood of the hazard, and the vulnerability of people and assets exposed to the risk. DRR is explicitly connected to wider efforts to strengthen resilience and to achieve sustainable development.

Table 5.1 Comparison of definitions of DRR and mitigation

UNDRR/IPCC	SEM Framework, DoD
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 achieving sustainable development	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

The broader and better integrated definition of DRR provides important direction towards a more holistic treatment of risk in Ireland, which is helpful for breaking down institutional, technical and thematic silos, even if some of these connections may be implicit in the SEM's definition of mitigation.

It is well established that an individual's vulnerability is affected by socio-economic characteristics such as age, income, gender, housing and health status, among others. Those with low socio-economic characteristics and an associated low adaptive capacity are likely to be less resilient to the impacts of a disaster and to be more profoundly impacted by its negative effects. Analysis 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 (Climate Ireland, 2020). To date, risk assessment in Ireland has primarily focused on the expected economic cost of disasters as the main driver for identifying relative merits of risk reduction projects, without considering a wider set of socio-economic drivers of vulnerability. Often, risk reduction projects target areas of relatively lower social vulnerability, potentially with a greater value of exposed assets, even though the residents of those areas of higher social vulnerability will benefit less and be disproportionately affected. To achieve equitable resilience and a just transition to a low-carbon, well-adapted society, considering integration of vulnerability indices is merited.

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

The planning guidelines set out by government for the design of sectoral and local authority adaptation strategies required the development of a common framework with six steps (Fig. 5.3). These steps were intended to standardise the planning approach taken, provide a rigorous process to identify and prioritise vulnerabilities, and ensure robust implementation, monitoring and learning measures in the strategies.

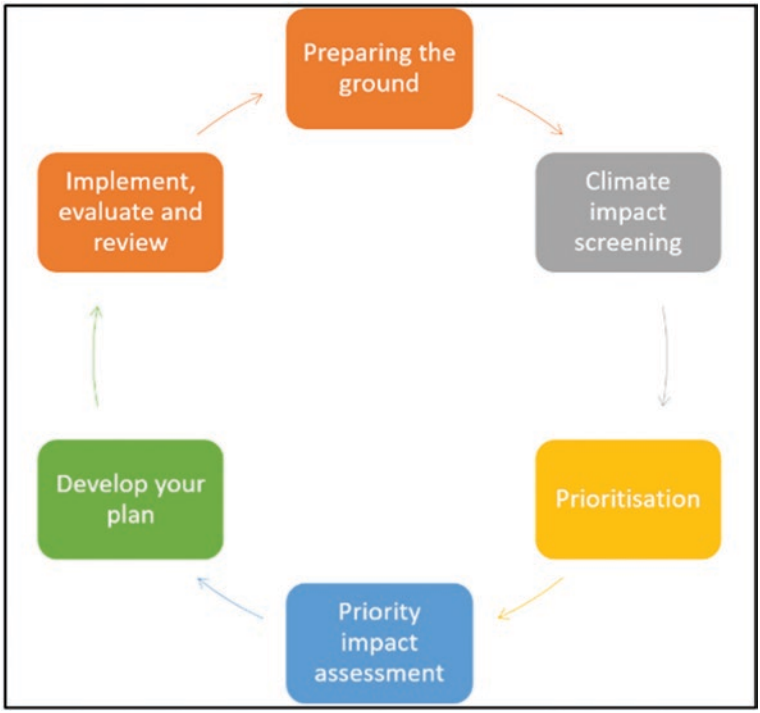


Fig. 5.3 Sectoral and local authority adaptation planning process

However, there are some variations of approach and, consequently, proposed actions taken across the different adaptation strategies. This mostly reflects the different sectoral and local authority assessments and understandings of vulnerability, as well as its prioritisation and treatment. There are also a range of approaches to integration with emergency planning and interaction in the three principal response agencies (An Garda Síochána, Health Services Executive and local authorities). 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 prevention and reduction of new and existing risk, and those responsible for response to residual risk and planning recovery from events to reduce future risk, are usually not articulated in detail and, in some cases, are entirely absent.

Sector Adaptation Planning

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 interruption to the regulator, ComReg. Operators are required not only to repair infrastructure as needed, but '*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 climate change adaptation and disaster risk reduction 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 beginning to work in a coordinated fashion under the Critical Infrastructure Working Group, including, among others, the communications and energy sectors, local governments, Irish Water, Climate Ireland and CAROs (Climate Action Regional Offices). The working group is creating a comprehensive inventory of critical infrastructure but faces challenges in reconciling the differing definitions of criticality across different sectors. Mapping the cascade of risks that cross the intersection of different critical infrastructure systems (e.g. flood risk that threatens critical access roads for an electricity sub-station, hospital or fibre-optic cable) is still outstanding. A mechanism to manage the cascading risk across institutional boundaries is also to be established to facilitate the financing and delivery of needed measures to prevent, reduce and manage residual risks at each intersection.

Adaptation strategies for non-critical infrastructure sectors, including those for biodiversity, built and archaeological heritage, agriculture,

forests and seafood, also address links to emergency planning. However, there is considerable variation in how and the extent to which this is carried out. The agriculture, forests 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 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. For example, 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 on flood risk management, using flood maps and projections for decision-making. It 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, 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, 2019). The sector bears no lead responsibility for emergency management or disaster risk reduction but is playing a positive role in promoting nature-based solutions to a range of hazards.

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. Effective action by local authorities is vital for the prevention, reduction and response to

disaster risk, and in climate change adaptation. Moreover, local authorities have a culture and tradition of finding ways to work in a holistic, integrated manner given their broad range of responsibilities. 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 workings of national government departments and agencies meet and where problems of policy coherence, or a lack thereof, manifest. The formation of cross-sectoral Climate Action Teams for the formulation of local authority adaptation plans may be an effective model for more integrated working to ensure sustained coordination of implementation measures, and could be extended to address risk reduction from extreme events/disasters.

Local authority roles, responsibilities and planned actions are enshrined in several interconnected commitments, strategies and plans. In 2019, local authorities signed the Climate Action Charter with the Minister for DCCAE (Department of Communications, Climate Action and Environment, 2019a) as part of the National Climate Action Plan. The charter commits local authorities to 23 wide-ranging actions. This includes 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 Managers Association (CCMA) report entitled 'Delivering Effective Climate Action 2030' (City and County Managers Association, 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.'

Many examples of local authorities taking integrated action on adaptation and disaster risk reduction exist. Cork County Council has mitigated the risk of coastal erosion and flooding to the R604 roadway at Garrettstown 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 (CAROs, 2021b). The CCMA strategic goals for climate action place a strong emphasis on working with communities and building local resilience. In Mayo, a community-based

Flood Action Committee was established in Crossmolina as a partnership between residents, traders and the County Council for the dissemination of flood early warning systems and placing of sandbags and other defences. The partnership was instigated by the community which has 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 Association (LGMA) 'Profile of Local Government Climate Actions in Ireland' (Clarke & O'Donoghue-Hynes, 2020). The LGMA also notes the drive for more green infrastructure options working with nature, in combination with traditional 'grey' adaptation approaches.

Research Outcomes

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

Feedback from perception surveys and focus group discussions, conducted with multidisciplinary experts from councils and other institutions from County Mayo, Cork City and the Dublin region, provided a glimpse of progress as well as areas where further work may be needed to achieve integration of climate change adaptation 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 responses provided by participants clearly suggested that while much progress had been made over recent years, there was 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, responses covered a wide range. For instance, river flooding was considered a slightly higher risk that is less well adapted to than others, such as surface water flooding, droughts and heatwaves, and storms. The differences in perception of severity between hazard types was not so great as to offer a meaningful sense that one represented an overwhelming

priority, such that an all-hazard approach continues to be merited. Overall, respondents agreed that emergency services had done a rather good job in response to the various extreme weather events experienced in Ireland. Many focus group participants remarked upon the effective ways that emergency services reviewed responses and learned from them to improve future outcomes. Respondents were mostly positive about the work their organisations had done towards the integration of climate change adaptation and disaster risk around the five pathways included in the survey.[2] Feedback in the focus group discussions was realistic, though about the need for further progress. Their perceptions suggested that the most progress had been made on communications and stakeholder engagement, knowledge management and coordination. More work was needed on capacity building and, in particular, financing for personnel and training, infrastructure (e.g. flood defences) and equipment (e.g. fire response vehicles). The generally very positive perception of the emergency services' incident 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 climate change adaptation and disaster risk reduction, the possibility of overwhelming response capacity is real.

Practitioner Perceptions of the Six Pathways to Integrated Climate Change Adaptation and Disaster Risk Reduction

The current situation regarding the integration of climate change adaptation and disaster risk reduction in Ireland in the context of the six SHIELD pathways (Fig. 5.2), and some of the main challenges identified by the participants, is summarised below.

[2]To reduce the time it took for respondents to complete the survey the team condensed the six pathways of the SHIELD model to five, amalgamating communication and stakeholder engagement.

Sharing Knowledge

The ESPREssO Guidelines identify four key issues, all of which were variously identified in Ireland. The key issues are: the lack of awareness of the need to share knowledge; the risk of information overload; data and information as value; and knowledge silos. Noting these challenges, we must also consider who shares what knowledge 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 established under the Environmental Protection Agency (EPA) as the permanent curated repository of information that connects policymakers and practitioners at different levels with the science of climate change, provides support for hazard and risk analysis, policy-making and planning, and undergoes constant improvement based on government and user requirements.

The four CAROs also play an important role in sharing knowledge which includes liaising with third-level research establishments, the EPA-led Climate Research Group and overseas institutions, predominantly in the UK and Europe. Combined with the practical support to local authorities for the implementation of adaptation strategies as well as engagement with the departments and agencies delivering sectoral adaptation, the CARO role extends to supporting the application of shared knowledge. Research participants remarked upon the low level of awareness of climate change adaptation across all practitioner groups within local authorities as a constraint in the design of adaptation strategies. Climate Ireland provides training and technical assistance to local authorities and others through networks such as the Local Government Managers Association and the City and County Managers Association. The training plan to raise awareness of 2900 local authority staff on climate change adaptation is being rolled out in 2021 alongside an introductory course for local authority senior management.

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 tasks.

Participants in both 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 noted the rapid growth of policy commitments and plans on climate actions of all kinds (such as the Climate Action Charter for Local Authorities) and a growth of governance tasks including reporting and planning, but also a lack of significant additional capacity to deliver these new responsibilities. Some additional capacity is provided to local authorities by CAROs who themselves, 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 in 2021. Numerous contributions also noted that local authority personnel have, in many cases, taken on climate change adaptation related tasks as part of their regular role without a background in climate services, education or training, with staff inevitably facing a steep learning curve. Those with technical backgrounds, such as engineering, reported being better prepared for such additional responsibilities.

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 disaster risk it is important to go beyond effective operational coordination of responses by making

connections between all steps of the disaster management cycle as reflected in Ireland's SEM framework.

Research participants referenced the positive impact of informal coordination and information-sharing networks using social media 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 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 Teams and Flood Assessment Teams as examples of multidisciplinary coordinated actions to address disaster risk.

Several additional challenges were also identified. These included the increased complexity of coordinating across organisations and the need to understand 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 for early warning. Finally, the establishment of 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.

Engaging Stakeholders

Climate change adaptation and disaster risk reduction for resilience 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.' Government alone cannot deliver the changes needed to achieve a sufficient level of resilience.

The ESPREssO Guidelines articulate a clear call for stakeholder inclusion, reflecting the Sendai Framework among other international agreements. The guidelines note that engaging stakeholders in the complex

agendas of Disaster Risk Reduction and Climate Change Adaptation is not easy given the range of different issues, agendas and interests of relevance. They identify some common challenges to overcome, including how to identify and engage with the right stakeholders in different aspects of the process, and determine the right way to engage them.

Focus group responses suggest that participants are confident that local authorities are 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 where risk reduction co-benefits are built into collaborations, such as where public green spaces serve a flood attenuation purpose. 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, such as with the challenges arising from competing interests and the readiness of existing collaborators, like the established voluntary emergency services, to adapt and take on new tasks related to disaster risk reduction and climate change adaptation.

Noting the challenge of understanding and creating awareness of adaptation and its application, 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 adaptation and disaster risk reduction, as well as the organising principle for stakeholder engagement. The SEM National Structures and Framework guideline on climate change adaptation, 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-society collective effort in building resilience to extreme weather events government, should have a clear understanding of stakeholder awareness, their information needs and how best to engage them.

Leveraging Investment and Financing

The ESPREssO guidelines highlight the critical insight that investment in disaster risk reduction reduces the cost of response and recovery in the long-term. However, governments are challenged by having to prioritise an investment that will not deliver immediately visible benefits.

Focus group participant responses suggest that the question of financing adaptation and disaster risk reduction is where the 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 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. A review of current local authority adaptation plans shows that many of the actions proposed are not included within 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 disaster risk reduction was largely adequate. Given the increasingly lengthy list of tasks and investments that sectors and local authorities are expected to make for adaptation and disaster risk reduction, an appraisal of funding mechanisms and the quantum of funds available to them is merited.

Ireland's commitment to 'green budgeting' suggests that a 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 disaster risk reduction is needed. This helps to sustain the commitment to long-term change beyond the typically short-term planning horizons of elected representatives, 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 agreed responsibilities. This is consistent with the OECD Green Budgeting Framework's Building Block 1 for a Strong Strategic Framework where government's strategic priorities and objectives relating to the environment and climate are clearly set out so as 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, 2020). '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 facilitate funding for important projects that may be less visible or politically appealing.

A significant challenge to overcome is the improvement of cost-benefit analysis for adaptation and disaster risk reduction 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 funds 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 disaster risk reduction outcomes) in sectors with active adaptation plans and local authorities, and tagging disaster risk reduction 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 sub-head level, would enable local authorities and other sectoral institutions to more easily track the cost of managing climate change-related risks and to eliminate duplication in current funding. Local authorities are already developing approaches to improve financial analysis and management for disasters that may be suitable for scale-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 (CAROs, 2021a).

Developing Communication

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 respondents 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 like Ireland, a failure to communicate effectively about climate change adaptation and disaster risk reduction, and the actions that citizens and other stakeholder groups should take, will completely undermine the ability of a country to manage its risk.

Several participants noted the effectiveness of communications in managing the Covid crisis and suggested that lessons, such as the importance of using clear, concise language and focusing on personal behaviour, may be helpful in the further development of communications for climate change adaptation and disaster risk reduction. While many of the tasks for adaptation and disaster risk reduction are devolved to the local authority level for implementation, there is a strong case for a long-term, national-level, general communication campaign to change the low level of risk awareness among the general public. Such a campaign may bring together the various existing initiatives, such the 'winter ready' and 'summer ready' campaigns, while creating new content and means of engagement through social media. As a long-term initiative, a campaign 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.

Conclusions

Policies, plans, institutions and processes to adapt to climate change and to reduce disaster risk in Ireland are becoming well established. The objective to integrate actions for climate change adaptation and disaster risk

reduction is clearly articulated in policy, although the practical arrangements for who, 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. By increasing the ability of Irish systems to reduce, avoid or transfer new and existing risk the result should be to reduce the impact of unmitigated residual risk.

Based on the research undertaken, and in conjunction with a detailed series of recommended actions for different stakeholders, we identified six overarching conclusions for the integration of climate change adaptation and disaster risk reduction in Irish emergency planning. They are:

1. The 5-stage model for emergency planning in the MEM and SEM frameworks implies seamless integration of the main stages. In reality, the integration of mitigation and recovery (the areas of greatest relevance for the integration of climate change adaptation are not as well integrated into the emergency planning system as they could be. The focus of both the MEM and the SEM is, in practice, primarily on response.
2. Applying the three objectives of disaster risk management – prevention of new risk, reduction of existing risk and management of residual risk – alongside the 5-stage model may facilitate clarity of role and purpose for lead government departments and their support organisations under the SEM in areas where integration with climate change adaptation is helpful.
3. The main adaptation challenge for principal response agencies, then, is to ensure that their capacity is at least equal to the changing levels of climate change-influenced hazards, community exposure and vulnerability. Sectoral agencies and local authorities must integrate adaptation in multiple ways throughout their service provision and infrastructure operation and maintenance responsibilities.
4. There are currently two discrete systems for the governance, management and coordination of climate change adaptation and disaster risk reduction at the national level. Identifying ways to coordinate expectations for integration and align incentives, priorities and planning processes will facilitate further integration at all levels of government.



Fig. 5.4 Pathways to integration

5. Sequencing policy-making, planning and research so that initiatives at different levels of government are coherent, mutually reinforcing and, consequently, easier to implement and more impactful.
6. To achieve 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 will help to clarify the who, what, when and how questions that institutions are currently addressing iteratively and in a way that is consistent with the existing model for disaster risk management in Ireland, as described in the MEM Framework and SEM National Structures and Framework.

Our research finds that if attention is paid to each of the six pathways in future policies, plans and their implementation, Ireland will more readily achieve the benefits of integrated climate change adaptation and disaster risk reduction, resulting in more resilient communities. This is summarised in Fig. 5.4, above.

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