

National monitoring, reporting and evaluation of climate change adaptation in Europe

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Acronyms and abbreviations

AFK	States Standing Committee for Adaptation to the Consequences of Climate Change (Germany)	DAS	German Strategy for Adaptation to Climate Change
ARE	Federal Office for Spatial Development (Switzerland)	Defra	Department for Environment, Food and Rural Affairs (England)
ARP	Adaptation Reporting Power (UK)	DETEC	Federal Department of the Environment, Transport, Energy and Communications (Switzerland)
ASC	Adaptation Sub-Committee (UK)	EAA	Environment Agency Austria (UBA-Vienna)
BMLFUW	Federal Ministry of Agriculture, Forestry, Environment and Water Management (Austria)	EC-DG CLIMA	European Commission Directorate-General for Climate Action
BMUB	Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (Germany)	EEA	European Environment Agency
CABAO	National Working Group Adaptation (Belgium)	Eionet	European Environment Information and Observation Network
CCC	Committee on Climate Change (UK)	FFA	Federal Finance Administration (Switzerland)
CCPCC	Coordination Commission of Climate Change Policies (Spain)	FOAG	Federal Office for Agriculture (Switzerland)
CCRA	Climate Change Risk Assessment	FOCP	Federal Office for Civil Protection (Switzerland)
CGEDD	General Council of the Environment and Sustainable Development (France)	FOEN	Federal Office for the Environment (Switzerland)
CIF	Climate Investment Funds	FOPH	Federal Office for Public Health (Switzerland)
Climate-ADAPT	European Climate Adaptation Platform	FVO	Federal Veterinary Office (Switzerland)
CMCC	Centro Euro-Mediterraneo sui Cambiamenti Climatici (Euro-Mediterranean Center on Climate Change)	GTIA	Working Group on Impacts and Adaptation (Spain)
CNC	National Climate Council (Spain)	IMA	Federal Inter-ministerial Working Group on Adaptation Strategy (Germany)
CNTE	National Council for Ecological Transition (France)		

IPCC	Intergovernmental Panel on Climate Change	OECC	Spanish Climate Change Office
IRCEL - CELINE	Belgian Interregional Environment Agency	ONERC	National Observatory on the Effects of Global Warming (France)
ISP	Scientific Institute of Public Health (Belgium)	PBL	Environmental Assessment Agency (Netherlands)
MMR	Monitoring Mechanism Regulation	PNACC	Plan Nacional de Adaptación al Cambio Climático (National Climate Change Adaptation Plan; Spain)
MRE	monitoring, reporting and evaluation	RMI	Royal Meteorology Institute (Belgium)
MZP SR	Working Group on Adaptation (Slovakia)	SECO	State Secretariat for Economic Affairs (Switzerland)
NAP	national adaptation plan/programme	SFOE	Swiss Federal Office of Energy
NAS	national adaptation strategy	SYKE	Suomen ympäristökeskus (Finnish Environment Institute)
NCC	National Climate Commission (Belgium)	UBA	Federal Environment Agency (Germany)
NCP	National Contact Points (European Commission — DG Climate Action)	UKCIP	UK Climate Impacts Programme
NFP	National Focal Points (EEA)	UNFCCC	United Nations Framework Convention on Climate Change
NGO	non-governmental organisation	UNISDR	United Nations Office for Disaster Risk Reduction
NRCs	National Reference Centres (EEA)		

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Executive summary

This report provides new insights into adaptation monitoring, reporting and evaluation (MRE) systems at the national level in Europe and constitutes the first attempt to consolidate emerging information across European countries. It aims to offer reliable and targeted information to support the effective and efficient implementation of climate adaptation policies and actions at the national level in Europe.

The intended users are policymakers and experts coordinating, developing, implementing, monitoring or evaluating adaptation across or within particular sectors. It is also of relevance to practitioners such as public authorities and businesses, including utility providers for various sectors such as water, energy, and transport.

The Expert Workshop on 'Monitoring, reporting and evaluation of climate change adaptation at national level' (held by the European Environment Agency (EEA) on 24–25 March 2015) was a key source of information from which the findings in this report were elaborated. Experts from the European countries that have a system for MRE of adaptation in place, or are currently developing one at national level, were invited to the workshop. This report has also benefited from the excellent cooperation with and contribution from the EEA's member countries, particularly in connection with country examples. However, it should be noted that this report seeks to consolidate the emerging information available across European countries and not to collect the countries own official positions on MRE of adaptation.

Collecting and analysing information on adaptation policy processes in European countries is essential in order to evaluate the extent to which actions are effective, efficient and equitable. It allows to better understand which adaptation actions work, in which contexts, and why, and to share experiences of countries from a dynamic field of practice. However, measuring progress in adaptation is challenging for several reasons: adaptation is context specific and cross-cutting all sectors, is characterised by long

time-frames and uncertainty, does not have common or aggregated metrics and is commonly integrated into other sectoral policies rather than being a stand-alone activity. Therefore, adaptation policy targets at European, national, regional or local levels cannot usually be monitored with a single or limited numbers of indicators or sources of information like in other policy domains such as climate change mitigation. Finally, monitoring is usually undertaken on an on-going basis while reporting and evaluation activities are typically only conducted at specific, usually strategic, points in time.

Overall key messages

- An increasing number of European countries are now taking action on MRE of adaptation at the national level. So far, 14 countries have systems for monitoring, reporting and/or evaluation of adaptation in place or under development (see Figure ES1).
- Across European countries progress on adaptation strategies and plans varies considerably and the same is true for MRE of adaptation. Despite these differences, early insights from this dynamic field of practice can be valuable to countries with established approaches as well as those just beginning to consider MRE of adaptation. These experiences contribute to an essential information base for countries to learn from.
- Most countries have focused so far on monitoring and reporting activities. The evaluation of adaptation policies is at an early stage often because the implementation of adaptation has only just begun.
- Literature on MRE of adaptation highlights that it can serve multiple purposes including improving our understanding of policy effectiveness and efficiency, providing accountability, and enhancing learning in order to improve policy and practice.

Thematic key messages

Drivers and purposes

- In most countries, the momentum for initiating monitoring, reporting or evaluation of adaptation was provided by national adaptation strategies and plans, along with European policies and international processes.
- The main purposes of national MRE systems include tracking and reporting the progress and effectiveness of adaptation policy implementation; enhancing the knowledge base; accountability; and learning to improve adaptation policies, policymaking and practices.
- Most countries have so far concentrated their efforts on adaptation monitoring and reporting activities.
- The development of specific evaluation activities is still at an early stage, even in countries that have a relatively greater experience in implementing adaptation policies.

Governance and participation

- Overall responsibility for MRE of adaptation often lies with ministries or government agencies coordinating adaptation policy.
- Horizontal and vertical coordination of MRE activities is often organised through committees involving multiple administrative levels and sectors.
- In some countries, the requirement for monitoring, reporting and/or evaluation is formalised in legislation, while in other cases it is voluntary.
- Understanding progress of adaptation policies and actions benefits from the engagement of a broad range of stakeholders.
- In many countries, it is a challenge to involve the municipal level in MRE of national adaptation policies.

Methodological approaches

- National-level MRE systems benefit from being flexible and pragmatic, using methods that are appropriate to the national context (including needs, priorities, resources and data availability).
- A mixed-methods approach to MRE, which combines multiple sources of information, provides a strong

basis for assessing adaptation progress and performance.

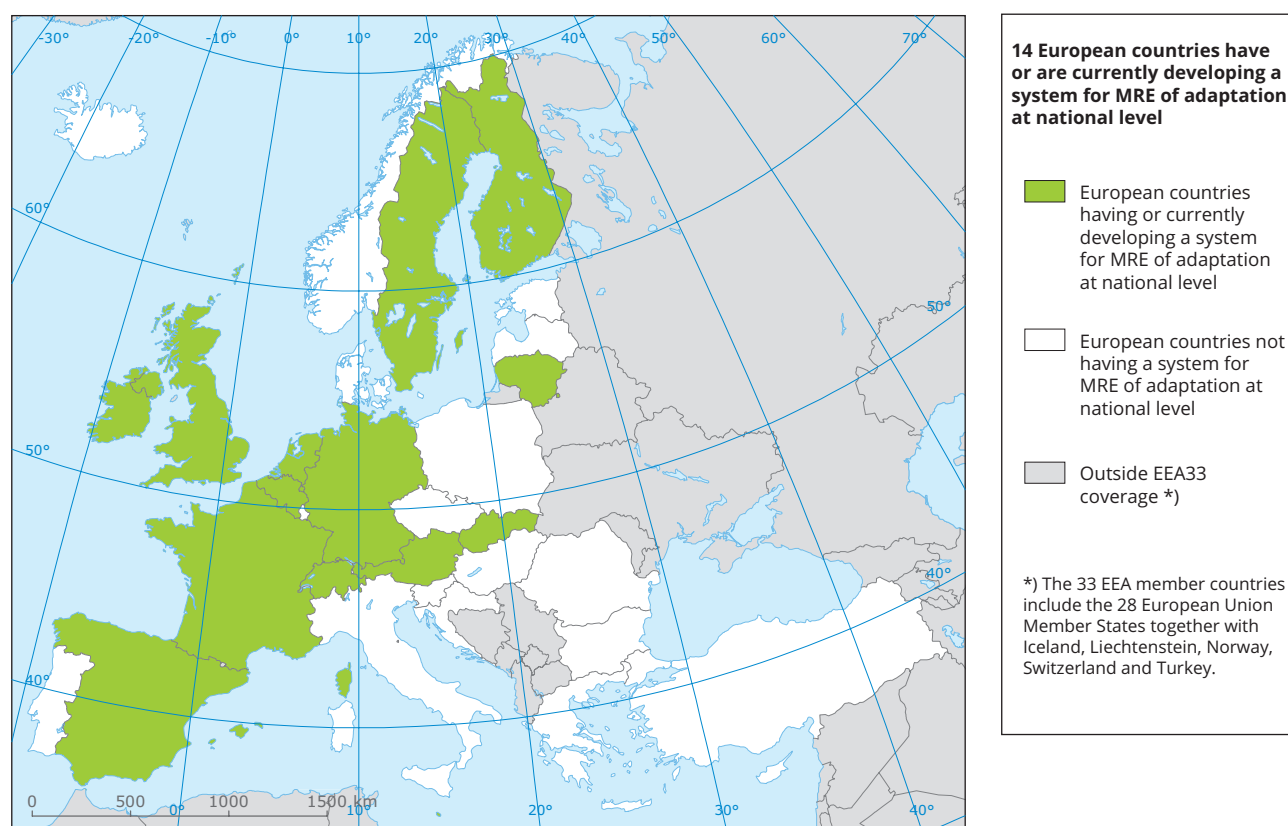
- Qualitative methods complement quantitative approaches and reveal critical contextual information that can help to explain the narrative behind the numbers.
- Indicators play a key role in national MRE systems. In a number of countries, they have been created through an iterative and interactive process involving experts and other stakeholders.
- It is not necessarily the value of an individual indicator that needs to be considered, but whether or not the set of indicators provides a coherent and robust picture of adaptation progress.

Informing adaptation policy and practice

- Experience of applying monitoring and evaluation results to improve adaptation policy and practice is limited, as only a few countries have MRE systems in place, and these have only been established recently.
- Some evidence is available that monitoring and evaluation results inform the revisions of adaptation strategies and plans. However, little is known about the influence of these results on adaptation practice.
- Countries have started to use various methods to communicate monitoring and evaluation results. Communicating results to the intended target groups is largely focused on published reports.
- Sharing experiences and learning about the use of monitoring and evaluation results will further improve adaptation policy and practice.

Beyond these findings, this report briefly reviews a number of issues that will shape the future of MRE of adaptation at national levels across Europe. Specific and dedicated attention is needed to strengthen the knowledge base about MRE in European countries and to foster learning from the evaluation of adaptation policies. In addition, there is a need to further coordinate the development of adaptation policies and MRE systems, and to better understand how MRE results can or do influence policymaking. Finally, there is a need to better use the variety of existing data sources to help develop adaptation indicators and evaluate policies, and to develop and update MRE of adaptation policy and practice to take into account risks, vulnerability and resilience.

Figure ES1 14 European countries have or are currently developing a system for monitoring, reporting and/or evaluation of adaptation at national level (as of mid-October 2015) (*)



Note: (*) This map is derived from a combination of verified output of EEA's 2014 self-assessment survey (i.e. countries assessing themselves on the basis of a questionnaire; EEA, 2014) and update by member countries as of mid-October 2015. This map shows in green the following countries: Austria, Belgium, Finland, France, Germany, Ireland, Lithuania, Malta, the Netherlands, Slovakia, Spain, Sweden, Switzerland, and the United Kingdom.

Objectives and intended users

The objective of this report is to provide new insights into adaptation monitoring, reporting and evaluation (MRE) systems at national level in Europe, and it is the first attempt to consolidate emerging information across European countries. It aims to offer reliable and targeted information to support the effective and efficient implementation of climate adaptation policies and actions at national level in Europe. This report provides readers with:

- a grounding in the latest literature on MRE of adaptation at national and other relevant levels;
- insights into key aspects of MRE of adaptation, drawn from experiences in European countries that have established, or begun to develop, MRE systems at national level;
- reflections on MRE of adaptation in practice, including national-level case studies;
- thoughts and ideas on some of the future issues for those working on MRE of adaptation at national level, based on the experiences of experts.

European countries are eager to learn from each other about adaptation MRE systems at national level and how MRE activities can inform policymaking. The European Environment Agency (EEA) uses this opportunity to facilitate such learning and further strengthen the knowledge base by sharing experiences, lessons learned and good practice in MRE of adaptation at national level. By advancing

the knowledge base for monitoring and evaluating progress, effectiveness and efficiency of adaptation policies and practices, this report intends to inform decisionmaking processes across Europe and to contribute to discussions on systemic change towards a more resilient Europe ^(1,2).

This report will primarily inform and support the work of policymakers, experts and practitioners who are coordinating, developing, implementing, monitoring or evaluating adaptation policies across or within particular sectors. It is particularly relevant to national, regional and local authorities, and can also be of interest to businesses involved in monitoring, reporting and evaluating adaptation actions, including utility providers for various sectors such as water, energy and transport. The findings from this report will also contribute to the growing body of knowledge on MRE of adaptation and may be of interest to those working on climate adaptation and policy evaluation both within and outside Europe.

This report complements the information on MRE of adaptation activities in European countries available on the European Climate Adaptation Platform (Climate-ADAPT ⁽³⁾), on websites available at national level ⁽⁴⁾ and in the Monitoring Mechanism Regulation (MMR) reports submitted under Article 15 by all 28 European Member States in 2015 to the European Commission (EU, 2013) ⁽⁵⁾. It builds upon previous EEA reports on climate change adaptation at European and national levels published in 2013 and 2014, which specifically identified MRE as an emerging priority area of work for most countries planning and

(¹) There are several key goals of the EEA's Multiannual Work Programme 2014–2018: (1) to be the prime source of knowledge at European level informing the implementation of European and national environment and climate policies; (2) to be a leading knowledge centre on the knowledge needed to support long-term transition challenges and objectives; and (3) to be the lead organisation at European level facilitating knowledge sharing and capacity-building in the field of environment and climate change.

(²) The EU 7th Environment Action Programme's 2050 vision — 'to live well within the planet's ecological limits' — can be accessed at <http://ec.europa.eu/environment/newprg/index.htm>.

(³) See, in particular, <http://climate-adapt.eea.europa.eu/countries>.

(⁴) See, in particular, the 2015 EEA Technical Report 'Overview of climate change adaptation platforms in Europe' (<http://www.eea.europa.eu/publications/overview-of-climate-change-adaptation>).

(⁵) MMR reports submitted by European Member States are available on EEA's ReportNet at: http://cdr.eionet.europa.eu/ReportEngine/searchdataflow?dataflow_uris=http%3A%2F%2Frod.eionet.europa.eu%2Fobligations%2F703&years%3Aint%3Aignore_empty=&partofyear=&reportingdate_start%3Adate%3Aignore_empty=&reportingdate_end%3Adate%3Aignore_empty=&country=&release_status=released&sort_on=reportingdate&sort_order=reverse.

implementing adaptation policies ⁽⁶⁾. The present report is also a key element in the implementation of EEA's multiannual work programme (2014–2018) ⁽⁷⁾ and its road map for adaptation (EEA, 2013). In this context, it is part of a series of three EEA assessment reports, with two upcoming reports addressing climate change impacts and vulnerability as well as adaptation practices at urban level across Europe.

The EEA believes that the information and country experiences presented in this report can make a valuable, timely and relevant contribution to support forthcoming exercises linked to MRE. The EU Adaptation Strategy ⁽⁸⁾ proposes that the status and progress of adaptation in the EU be monitored and evaluated based on the following: (1) reports of Member States (e.g. the MMR reports to the European Commission in 2015 and the sixth national communications to the United Nations Framework

Convention on Climate Change (UNFCCC)); (2) an adaptation preparedness scoreboard, including indicators for measuring Member States' level of readiness; and (3) other sources of information, such as this report or other country surveys. In 2017, the European Commission will report to the European Parliament and the Council on the state of implementation of the EU Adaptation Strategy, and propose its review, if needed.

In addition, the experiences shared in this report may support Member States with the development of their seventh national communication under the UNFCCC, due in 2018, the next reporting on national adaptation policies under the EU MMR, due in 2018, or discussions and reporting (e.g. on indicators) in connection with the United Nations Sustainable Development Goals indicators and the United Nations Office for Disaster Risk Reduction (UNISDR) Sendai Framework.

⁽⁶⁾ See the 2014 EEA report 'National adaptation policy processes in European countries — 2014' (<http://www.eea.europa.eu/publications/national-adaptation-policy-processes>) and the 2013 EEA report 'Adaptation in Europe — addressing risks and opportunities from climate change in the context of socio-economic developments' (<http://www.eea.europa.eu/publications/adaptation-in-europe>).

⁽⁷⁾ See <http://www.eea.europa.eu/publications/multiannual-work-programme-2014-2018>.

⁽⁸⁾ In 2013, the European Commission adopted the communication 'An EU Strategy on adaptation to climate change' (European Commission, 2013a) (also commonly known as the EU Adaptation Strategy), which includes several elements to support Member States in adaptation (i.e. providing guidance and funding, promoting knowledge generation and information sharing, and enhancing resilience of key vulnerable sectors through mainstreaming). In addition, the EU has agreed that at least 20 % of its budget for the 2014–2020 period should be spent on climate change-related actions, including mitigation and adaptation (and 35 % of its Horizon 2020 programme funding should be spent on research and innovation).

Scope, rationale and outline of the report

Scope of the report

This report provides new insights into systems for MRE of adaptation currently being implemented or developed at national level in Europe.

Deciding what a MRE system for adaptation aims to accomplish (i.e. its purposes) has an impact on the way this can be achieved (i.e. the methods), the actors who are involved in the process (i.e. governance and participation) and the extent to which the results of monitoring and evaluation activities are used in policymaking (i.e. informing adaptation policies and practices). Therefore, this report addresses the following thematic topics, which are of direct relevance to policymakers involved in developing or implementing MRE systems:

- Drivers and purposes — what motivates action on MRE of adaptation and what do countries hope to achieve?
- Governance and participation — how is MRE of adaptation organised and coordinated?
- Methodological approaches — what methods are being used?
- Informing adaptation policy and practice — how are the results being applied and communicated?

Given the emergent nature of MRE of adaptation in many European countries and the limited information sources available, this report does not provide an inventory or comprehensive review of MRE of adaptation at national level. Instead, it focuses on reflecting upon practical insights from selected European countries. It highlights valuable experiences and lessons learned and provides analysis for countries looking to improve existing MRE approaches, as well as those at an early stage in their adaptation MRE development. Examples from European countries' activities on MRE of adaptation are included as dedicated boxes and support the overall findings of the report. In line with the objectives of this report, country examples illustrate the experiences gained from developing

and implementing MRE systems at national level, rather than providing a full profile of progress in the country.

Why this report was developed

MRE is becoming an increasingly important theme as countries across Europe develop and implement adaptation policies. The significance of MRE for adaptation is evident in emerging national-level MRE systems and in European policy.

The results of the self-assessment survey (in which countries assessed themselves using a questionnaire) coordinated by the EEA in 2013/2014 provided an insight into how far European countries are in developing and implementing MRE systems for adaptation at national level (EEA, 2014). Specifically, it showed that progress on MRE in European countries was variable, with 8 countries implementing a monitoring, reporting or evaluation system (Austria, Finland, France, Germany, Lithuania, Spain, Switzerland and the United Kingdom), 6 additional countries working on MRE systems and 11 planning to do so in the future. It was found that 10 of 22 countries are implementing or developing indicators on climate impacts, risks and adaptation. However, the self-assessment survey provided limited insights into exactly what each country is doing to progress MRE and address the related challenges.

Discussions with member countries highlight the dynamic situation regarding national MRE systems and that, since 2014, many countries have made further progress, while others have recognised the significance of MRE and have therefore taken the first steps in this field. In addition, countries indicate their keen interest in learning. This reinforces the need for, and the importance of timeliness of, the present EEA report.

The need for effective MRE of adaptation is also driven by European policy. MRE is a key element of the EU Adaptation Strategy (EC, 2013a) and is included in the guidelines for formulating adaptation strategies at national level (EC, 2013b).

How this report was developed

The EEA held an Expert Workshop on 'Monitoring, reporting and evaluation of climate change adaptation at national level' on 24–25 March 2015 at the EEA (referred to elsewhere in this report as the 'Expert Workshop'). This workshop was a key source of information from which the findings in this report were elaborated (9). Experts from the European countries that have a system for MRE of adaptation in place, or that are currently developing one at national level, were invited to the workshop (one expert per country) and supported its preparation by answering, on a voluntary basis, a questionnaire comprising seven questions relating to key aspects of MRE systems (¹⁰). The Expert Workshop was designed in line with the four thematic topics mentioned above so that the outputs generated would directly support the report.

In addition, this report benefited from, and builds upon, the following sources of information:

- Reports submitted under Article 15 of the MMR by all 28 European Member States in 2015 to the European Commission.
- Direct contacts with country authorities responsible for coordinating adaptation activities (EEA's National Focal Points (NFPs)/National Reference Centres (NRCs) for climate change impacts, vulnerability and adaptation, and the European Commission Directorate-General for Climate Action (DG CLIMA)'s National Contact Points (NCPs) for adaptation), particularly in connection with developing the country examples. Following EEA procedures, the draft of this report was made available to EEA member countries for comments through the European Environment Information and Observation Network (Eionet) consultation in September 2015. In this context, the EEA would like to acknowledge the willingness to share information and the intense interest in learning from each other demonstrated by member countries. The number of country examples included in the report reflects specifically this interest, as background information was primarily

provided by country representatives and experts. However, it should be noted that this report did seek to consolidate the emerging information available across European countries and not to collect country official positions on MRE of adaptation.

- The information available on Climate-ADAPT's country pages (updated with the MMR reports of the European Member States in autumn 2015), on national websites and in national documents.
- The literature and knowledge base available on MRE of adaptation and the review work recently undertaken on selected numbers of both developing and developed countries (e.g. Spearman and McGray, 2011; Hammill et al., 2014; Dinshaw et al., 2014; OECD, 2015).

Outline of this report

Chapter 1 frames the issue of MRE of adaptation within the context of policymaking, and provides an overview of the rationales for MRE of public interventions on adaptation. In doing so, it reflects on the latest literature in this emerging field.

Chapter 2 presents insights into key aspects of MRE of adaptation at national level, drawn from experiences in European countries that have established, or begun to develop, approaches to MRE at national level. These are organised under four key topics in Sections 2.1 to 2.4: drivers and purposes; governance and participation; methodological approaches; and informing adaptation policy and practice. These thematic topics feature case studies and examples from across Europe and can be read independently, depending on the reader's main interests. Findings for each thematic topic are summarised in the 'Key messages' boxes.

Chapter 3 highlights issues that are likely to shape the future of MRE of adaptation in Europe. It builds on previous chapters and also reflects on gaps in our understanding of how MRE of adaptation proceeds and how it could be supported further.

(9) Information about the Expert Workshop, including the list of participants and the agenda, is available at: <http://forum.eionet.europa.eu/nrc-climate-change-adaptation/library/workshops-meetings/expert-workshop-monitoring-reporting-and-evaluation-mre-climate-change>.

(10) Namely Austria, Belgium, Finland, France, Germany, Lithuania, Malta, the Netherlands, Norway, Slovakia, Spain, Switzerland and the United Kingdom. See also Section 2.8 'Key topic 8: Monitoring, reporting and evaluation' of the 2014 EEA report 'National adaptation policy processes in European countries — 2014' (<http://www.eea.europa.eu/publications/national-adaptation-policy-processes>). The pre-workshop questionnaire can be accessed at: <http://forum.eionet.europa.eu/nrc-climate-change-adaptation/library/workshops-meetings/eea-expert-workshop-monitoring-reporting-and-evaluation-mre-climate-change>.

1 Setting the scene

Key messages

- MRE of adaptation is increasingly recognised as a key aspect of adaptation policymaking and this is reflected in the growing number of MRE systems being designed and implemented at national level in Europe.
- Literature on MRE of adaptation highlights that it can serve multiple purposes, including improving our understanding of policy effectiveness and efficiency, providing accountability, and enhancing learning in order to improve policy and practice.
- When focused on learning (what works, in which contexts and why?), MRE presents a valuable opportunity to improve our understanding of how societies can best adapt to climate change.
- The challenges associated with MRE of adaptation are not necessarily unique to this policy area, but do present a distinct combination of issues that have required re-examination of MRE framings and methods.

The objective of this chapter is to provide an introduction to the growing body of literature on MRE of adaptation and what it means at national level. This grounding provides valuable context for the practical examples and experiences set out later in the report. The chapter is structured based on four themes:

- What MRE of adaptation means.
- Why MRE is a critical part of the adaptation process.
- MRE of adaptation at national and other levels.
- The challenges of MRE of adaptation.

In the last 5 years, interest in MRE of adaptation has grown rapidly, including at national level. This reflects the increasing number of countries that are developing adaptation plans, policies and strategies and have begun to implement adaptation actions. Consequently, the demand to understand if adaptation policies and actions work (or not), in which contexts they work and why has grown. This proliferation of national adaptation plans has, until recently, not been matched by proportional efforts to track effectiveness, efficiency and value for money of adaptation or to learn from emerging practice. This is perhaps not surprising given that the implementation of adaptation as part of a coordinated plan has

occurred only relatively recently in most European countries, leaving a void in this increasingly important area of adaptation practice.

1.1 What MRE of adaptation means

Much of the literature on MRE of adaptation refers to 'monitoring and evaluation'. Box 1.1 below explores these two terms and explains the addition of 'reporting' into the term MRE used throughout this report. MRE can occur at a range of scales, from individual projects in a specific locality to large programmes, policies and funding mechanisms spanning international boundaries. The focus of this report is specifically on national level.

As can be seen in later chapters, 'national level' can be interpreted in different ways. For some countries, it may specifically relate to a process of assessing and tracking the implementation of the national adaptation strategy or plan (NAS/NAP) and its associated actions, while other countries may take a broader view using MRE to understand changing vulnerability and risk levels across the country, albeit often against the backdrop of the NAS/NAP. National-level MRE can involve consolidating and distilling information from other levels of governance in order to gain an understanding of adaptation progress. Chapter 2 considers these differing framings of 'national level'

Box 1.1 What do we mean by MRE?

Monitoring, reporting and evaluation are distinct yet closely linked processes. For the purposes of this report, we use the term 'MRE' when referring to systems and approaches designed to monitor, report and evaluate adaptation progress at national level. However, where appropriate, we also refer to 'monitoring', 'reporting' and 'evaluation' in combination, or as individual terms, as they are distinct processes.

Monitoring refers to a continuous process of examining progress made in planning and implementing climate adaptation. This might also include examining the context and environment within which adaptation occurs or drivers which shape resilience and vulnerability. The objective of monitoring can be described as being 'to keep track of progress made in implementing an adaptation intervention by using systematic collection of data on specified indicators and reviewing the measure in relation to its objectives and inputs, including financial resources' (EEA, 2014).

Reporting is the process by which monitoring and/or evaluation information is formally communicated, often across governance scales. It can enable the assessment of adaptation performance, and facilitate learning, on different scales, for example by providing an overview of progress across the EU. Reporting on adaptation can be voluntary or a legal requirement, depending on the governance context or the reporting mechanism used.

Evaluation refers to a systematic and objective assessment of the effectiveness of climate adaptation plans, policies and actions, often framed in terms of the impact of reducing vulnerability and increasing resilience. Evaluations usually draw upon a range of quantitative and qualitative data, including those gathered through monitoring processes. Evaluations are undertaken at a defined point in the project or policy cycle. *Ex ante* and mid-term evaluations focus on ways of improving a project or programme while it is still happening. An *ex post* evaluation seeks to judge the overall effectiveness of an intervention, usually after a project or programme has been completed (EEA, 2014).

in more detail, as these can influence the methods applied, and the governance and structure of MRE systems, including who is responsible and which stakeholders are engaged.

protocols driven by *accountability* may not be conducive to creating a *learning* environment. In Section 2.1, we explore the drivers and purposes specifically for national-level MRE of adaptation in European countries in greater detail.

1.2 Why MRE is a critical part of the adaptation process

1.2.1 The purposes and applications of MRE

A number of common purposes and applications can be identified that appear to have catalysed efforts to develop MRE of adaptation at a range of scales. The most significant of these purposes are examined below. These illustrate the value of MRE in improving adaptation performance and emphasise the critical role it can play in improving adaptation policy and practice. It is important to note that there can be tensions between these purposes. For example, standards or

Effectiveness and efficiency: MRE can play an important role in helping to understand whether or not a policy or set of interventions has been effective in achieving its objectives (e.g. avoiding loss of life or increasing resilience) and whether or not these objectives have been achieved efficiently (e.g. was the most appropriate means of achieving that objective chosen and how could it be improved in the future?). The latter may include weighing up the costs and benefits (including value for money), the risks involved and the timeliness of actions.

Accountability: Adaptation is often undertaken in the context of European, national and sub-national policies and with the support of European or national government funding. This means there is a close relationship between national-level MRE and accountability, be that accountable to funders, governments or the tax-paying public. This can lead to a particular focus on ensuring that policy commitments, expectations, expenditure targets and standards are met (Spearman and McGray, 2011). To support this objective, formal monitoring and reporting requirements are often put in place. Accountability

“Monitoring and evaluation play a central role in identifying how best to reduce vulnerability and build resilience to climate change”

(Bours et al., 2014a)

may also overlap with effectiveness and efficiency considerations, for example when considering value for money of an investment.

Assessing outcomes: Outcomes describe the intended changes in conditions that result from the interventions of a policy or programme. These are often realised in the medium or longer term. For example, an outcome could be a reduction in the number of homes affected by flood events, which, in turn, could be considered an aspect of reduced vulnerability. Assessing outcomes can be challenging in the context of climate adaptation; long timescales, uncertainty and establishing the counterfactual (including measuring avoided adverse outcomes) are all methodological challenges. Nevertheless, MRE systems are expected to at least determine the progress that has been made towards outcomes, such as increased resilience and reduced vulnerability to climate change. Often measuring processes and outputs are viewed as useful stepping stones to reaching an understanding of outcomes (see Section 2.3 for further information).

“A critical assessment of what we want to learn and why is required before we can consider 'how?'”

(Fisher et al., 2015)

Learning: There is a growing emphasis on ensuring that learning is placed at the heart of MRE. Climate adaptation is still a relatively new field and, while many European countries have undertaken some form of adaptation planning, only a modest number have begun implementation (EEA, 2014). Consequently, knowledge and experience of how best to adapt to future climate change, how vulnerability can be most effectively reduced and resilience enhanced, and what the characteristics of a well-adapting society might be, are still under-developed. Learning what works well (or not), in which circumstances and for what reasons is critical (Pringle, 2011). Countries need to make full use of the knowledge that can be gained through MRE, especially given the scale of the likely impacts and, consequently, the level of adaptation investments required. MRE has the potential to be a key means of enhancing our learning and informing more effective adaptation policy and practice.

Equity: The impacts of climate change on people will be unevenly distributed, both spatially and temporally, and will affect different communities in different ways, often due to differences in vulnerability. As a result, equity

and justice are important factors (Pringle, 2011) and raise questions during the adaptation planning process such as 'whose voice should be heard?' and 'how are the needs of socially vulnerable groups being addressed?'.

Transparency: Linked closely to accountability and equity is the purpose of transparency. MRE can help to ensure transparency regarding the allocation, use and results (OECD, 2015) achieved through adaptation policies.

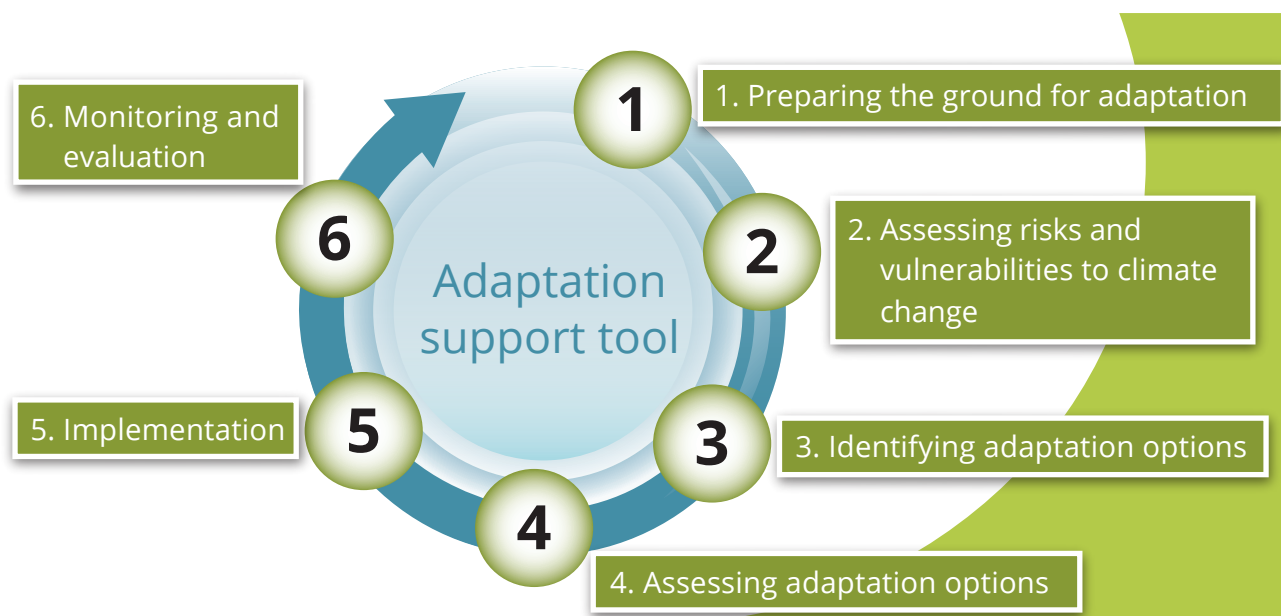
1.2.2 Role of MRE in the adaptation policy cycle

The policy cycle is commonly used to conceptualise, and then manage, policies and associated projects and programmes. If implemented effectively, learning is a central concept whereby adjustments can be made during the cycle in response to events and past experiences can be taken into account to inform future planning (Biggs and Smith, 2003). Monitoring and evaluation play a key role in providing the evidence for this cyclical learning process and are familiar to policymakers and project managers the world over. However, the realities of implementation have led to numerous criticisms of the policy cycle in relation to MRE, with examples of expensive and seemingly comprehensive monitoring systems failing to take account of and learn from past experiences, and evaluation findings not being used effectively to inform future management or planning. Given the complexity of climate change, the challenge for those working on climate adaptation is even greater.

The process of adaptation has also been conceptualised as a cycle. The adaptation risk, uncertainty and decisionmaking framework (Willows et al., 2003) was one of the first publications to characterise adaptation as a cyclical, iterative process. Within this cycle, 'monitor, evaluate and review' is identified as a critical step, enabling new information and lessons learned to shape future decisions. The concept of the adaptation cycle has been adapted to a range of support tools and frameworks, which are now applied in a number of European countries (the United Kingdom (UKCIP, 2005); Slovenia (Cegnar, 2011); Germany (the German

“Given the complexity and long-term nature of climate change, it is essential that adaptation be designed as a continuous and flexible process and subjected to periodic review”

(UNFCCC, 2010)

Figure 1.1 The European Adaptation Support Tool ⁽¹¹⁾

Adaptation Support Tool ⁽¹²⁾; the Netherlands) and beyond. Most notably, this approach informed the development of the European Adaptation Support Tool (Figure 1.1) and the European Commission's Guidance for National Adaptation Strategies (EC, 2013b).

While these cyclical adaptation frameworks clearly acknowledge the role of MRE, until relatively recently few considered the challenges associated with MRE of adaptation, and even fewer provided guidance on this subject. This partly stems from the positioning of MRE as a later step within both the adaptation and the policy cycle; efforts previously tended to focus on planning, risk and vulnerability assessment and identifying options. This meant that adaptation plans and frameworks expected iterative learning to occur while taking few or no steps to support this. As countries are now reaching implementation, their appetite for considering the challenges and methods associated with MRE has increased. With this has come a realisation that conventional MRE practice will not automatically provide the insights and understanding we require.

1.3 MRE of adaptation at national and other levels

It is useful to understand how the characteristics of national-level MRE systems compare with MRE

of adaptation at other scales, as this can help practitioners to draw upon existing practice where appropriate. Such comparisons and sharing of knowledge can be mutually reinforcing; for example, improved MRE at project and programme level can help inform the national level and vice versa. As yet, there is no evidence of efforts to methodologically link national-level MRE systems to MRE of adaptation at other scales in Europe, perhaps because these systems were developed at different times and in response to different drivers.

To date, the most common scale at which adaptation progress and performance has been assessed is project or programme level. Monitoring and evaluation are well-established elements of project management practice and are usually expected and necessary elements of any project or programme, irrespective of field or sector. Project and programme evaluations usually reflect a defined and bounded set of project objectives and outputs. As a result, if the project is well designed, it is relatively easy to determine what is within the scope of MRE activities; but challenges can still remain, including long timescales, uncertainties, shifting baselines and attribution (see Box 1.2).

Portfolio level is another scale at which MRE of adaptation has been considered within the growing body of guidance and frameworks. This refers

⁽¹¹⁾ <http://climate-adapt.eea.europa.eu/adaptation-support-tool>.

⁽¹²⁾ <http://www.umweltbundesamt.de/themen/klima-energie/klimafolgen-anpassung/werkzeuge-der-anpassung/klimalotse>.

to a portfolio of projects often determined by organisational or funding boundaries rather than geography, for example Climate Investment Funds (CIF)-funded activities or the 'adaptation portfolio' of an international non-governmental organisation (NGO). In such cases, MRE systems can help to synthesise findings from across a range of adaptation activities, sometimes implemented by different agencies in very different socio-cultural contexts. However, establishing appropriate methods such as indicators can be difficult; the number and type of indicators that are applicable across a portfolio of activities is often limited, meaning that the level of detail they can provide may be compromised.

At national level, there are usually defined geographical boundaries, but establishing a clear picture of adaptation progress and performance can still be difficult. MRE at national level involves gathering data across a range of sectors and spatial levels and requires an understanding of the complex web of decisions and policies that can act to enable or block effective adaptation. It also must account for adaptation efforts implemented by a range of agencies and organisations and for both planned and, where possible, autonomous adaptation. As is illustrated later in this report, countries have employed a number of approaches to more clearly define the scope and nature of their MRE systems of adaptation. These include applying climate change resilience as an overarching objective (therefore, understanding changing resilience, vulnerability and risk become key 'measurables') or using NAPs as the frame for national-level MRE. The latter raises interesting issues concerning scope and coverage; should MRE systems focus only on measuring the specific objectives and actions within a NAP or should they also account for indirect (social, economic and environmental) drivers of changing resilience and vulnerability? As national-level MRE systems develop, further consideration will need to be given to if, and how, the outputs should link to international monitoring efforts (e.g. via European or UNFCCC reporting processes). Chapter 2 explores how European countries have defined the scope of national-level adaptation MRE systems and frameworks.

1.4 The challenges of MRE of adaptation

Rather than disheartening practitioners, an appreciation of the challenges of MRE of adaptation can support the development of effective and ambitious

“The monitoring and evaluation of adaptation interventions is beset with methodological challenges given the uncertain, non-linear and long-term nature of climate change. These challenges are not unique to adaptation, although they differ from those faced by mitigation”

(Dinshaw et al., 2014)

MRE systems. If carefully planned, MRE presents a valuable opportunity to improve our understanding of how societies can best adapt to climate change and improve adaptation practice.

The consequences of climate change, and therefore the adaptation steps that might be chosen, are shaped by a web of bio-physical, social and economic interactions (Brown et al., 2011). These interactions occur at multiple scales; thus, decisions taken at one level can reverberate throughout the system (Preston and Stafford-Smith, 2009). This complexity can make it difficult to understand the impact of adaptation policies on the resilience and adaptive capacity of a country. Factors such as long timescales, uncertainty, shifting baselines and contexts, and divergent values, perceptions and goals (Bours et al., 2015) present a distinct set of challenges to those seeking to undertake MRE of adaptation at national level. Many key aspects of MRE, such as what successful adaptation is or which indicators to select, are often shaped by the values and priorities of individuals and organisations. This can make the process of MRE contested and highly political. Such challenges are not necessarily unique to climate adaptation, but do present an assortment of issues that have required re-examination of conventional MRE methods, approaches and framings. This has resulted in a growing body of literature to support MRE practitioners and policymakers to employ effective approaches to MRE of adaptation (Villanueva, 2011; Lamhauge et al., 2012; Bours et al., 2014a).

The literature on MRE of adaptation highlights a number of interlinked challenges that are pertinent to those designing or implementing MRE at national level (see Box 1.2). The precise nature of these challenges is context specific and can also vary depending on whether one is considering monitoring, reporting or evaluation as individual issues or in combination.

Box 1.2 Challenges of MRE of adaptation

Uncertainty: There are inevitable uncertainties surrounding adaptation. These are often described in terms of our understanding of the climate system. However, uncertainties also relate to the social, economic and environmental drivers that influence the extent and nature of climate impacts, where they are experienced and who they affect (see Wilby and Dessai, 2010). Given the dynamic and uncertain nature of these factors, it can often be difficult to evaluate the appropriateness of adaptation policies and actions. Section 2.3 of this report examines the methods currently being used at national level to undertake MRE in the context of uncertainty.

Long timeframes: Climate change is a long-term process that stretches beyond the span of programme and policy management cycles. Consequently, we may not truly understand if our adaptation decisions were optimal or appropriate for many years. As societal values and our understanding of bio-physical and social conditions change, what may appear to be a sound adaptation decision today may not in the future. For example, will a major long-term investment in climate-resilient coastal resorts still be relevant if our choice of holiday destinations changes?

Establishing baselines: The combination of long timescales, uncertainty and a complex array of climate and non-climate drivers creates a dynamic context within which adaptation occurs. This means that the specific points of reference against which adaptation progress might ideally be measured change over time (also called the 'shifting baseline' problem). For example, adaptation of the agricultural sector may be based on assumptions regarding crop yields that prove to be inaccurate in a changing climate or based on current demographic data that may change significantly. Thus, the appropriateness of adaptation actions cannot be measured against the previous point of reference.

Attribution: Attribution refers to the process of attributing outcomes to specific policy actions (or answering the question 'what difference did the intervention make?'). Attribution can be challenging, as adaptation is characterised by long timescales and uncertainty and is often delivered using policies that have broader objectives. However, where policy objectives are clear, attribution is feasible. The evaluation of the national heat waves management plan in Belgium provides one such example (see Box 2.16 in Section 2.4).

A lack of a universal objective: Climate mitigation MRE is characterised by a strong focus on tracking changes in greenhouse gas emissions or in avoided emissions through the protection of carbon sinks. This interchangeable and quantifiable unit of carbon dioxide equivalent emissions provides common ground for MRE. In contrast, adaptation lacks a transparent and universal objective or indicator; what exactly we should be monitoring and evaluating is therefore more varied, diffuse and subjective. Section 2.3 of this report examines how a combination of methods can be used to help generate a clearer picture of adaptation progress and performance.

Diversity of key concepts and definitions: Adaptation can refer to (1) actions taken to adapt, (2) the process by which adaptation is enabled or (3) the outcome of a process that leads to a reduction in risk (Bours et al., 2014b). It might comprise building adaptive capacity, adaptation planning, adaptation actions or a combination of these. Sometimes it is framed in terms of increasing resilience, reducing vulnerability or altering risk levels. All of these terms can offer subtly different frames for viewing adaptation and, therefore, different references for what should be measured and understood. The need to understand the differing drivers and purposes underpinning MRE at national level, and how these can shape MRE systems, is examined in Sections 2.1 and 2.3 of this report.

Data availability: Data for adaptation indicators should be scalable and applicable in a wide range of areas to allow for comparison. However, data are not always available in the same format, on the same scale or over a coherent timescale. Adaptation monitoring also often requires using, and combining, data that are gathered for other purposes, such as land use management, housing policy or the provision of health services; this can increase the likelihood of the data not being fully available or suitable.

Resource constraints: The resources available to collect and analyse information on adaptation are often limited. As with data availability, this means that compromises must be made regarding what can and should be monitored and evaluated, who can be engaged in the process and how, and with whom and in what format the findings can be shared. It also emphasises the need to make use of existing data sources (including socio-economic data) and to ensure that reflection and learning (key aspects of evaluation) are mainstreamed into adaptation practice.

2 Approaches and experiences from across Europe

This chapter provides insights into key aspects of MRE of adaptation, drawn from experiences in European countries that have established, or begun to develop, approaches to MRE at national level. The practical application of MRE of adaptation is also considered through a selection of national-level case studies. The chapter builds upon many of the themes and challenges identified in the literature, as highlighted in Chapter 1. Findings are organised into four sections:

- drivers and purposes
- governance and participation
- methodological approaches
- informing adaptation policy and practice.

These sections follow the structure of the Expert Workshop and form a logical flow of considerations when developing MRE approaches. Deciding 'what' it is that an MRE system aims to accomplish (its purpose) will have an impact on the way MRE is coordinated and the actors who will be involved in this process (governance). These factors then shape the way that this can be achieved (methodological approach), and even the extent to which the produced information could be used to support policy and practice (application of results).

2.1 Drivers and purposes

Key messages

- In most countries, the momentum for initiating monitoring, reporting or evaluation of adaptation was provided by national adaptation strategies and plans, along with European policies and international processes.
- The main purposes of national MRE systems include tracking and reporting the progress and effectiveness of adaptation policy implementation; enhancing the knowledge base; accountability; and learning to improve adaptation policies, policymaking and practices.
- Most countries have so far concentrated their efforts on adaptation monitoring and reporting activities.
- The development of specific evaluation activities is still at an early stage, even in countries that have a relatively greater experience in implementing adaptation policies.

The purposes of national MRE systems reflect each country's specific context. The contextual factors that might influence decisions regarding the purposes that MRE systems aim to accomplish include the:

- available knowledge, such as the amount and the type of existing information and data, and whether this is sufficient and appropriate for MRE of adaptation;
- time when the country develops its national MRE system relative to its stage in the adaptation policy cycle; and
- experience of policymakers and other stakeholders in adaptation policymaking and practice.

This section presents an overview of the purposes of national MRE systems in European countries. Within this report, the term 'purpose' refers to

both the overarching aims and the more specific objectives that countries attempt to achieve through their national-level MRE activities. Furthermore, the section describes the main drivers — the 'reasons why' — of initiating the process of developing an MRE system at national level. The distinction between drivers and purposes, however, is not always clear; they can be similar or in some cases overlap. For example, as shown later in this section, while some countries discuss reporting activities in reference to the requirements associated with European policies or international processes and identify these policies and processes as key drivers underpinning their decision to develop an MRE system, other countries mention reporting requirements when describing the main purposes that they aim to achieve through their national MRE system. Moreover, although it is meaningful to look at the purposes of monitoring activities, reporting on activities and evaluation activities separately, we need to acknowledge that there is not always a clear-cut distinction between them.

2.1.1 Drivers for developing national MRE systems

National-level legal and administrative requirements

In most European countries with MRE systems in place, the prevailing NAS or NAP has provided the momentum for initiating national adaptation MRE. In some countries, this has taken a legal form (Finland (for monitoring and reporting), Lithuania, Malta and the United Kingdom). In Lithuania, for example, the MRE system is closely aligned to the NAP, with a legal requirement for all ministries whose actions are relevant to adaptation to report to the ministry of the environment and then to the parliament in regular (triennial) policy planning cycles. Existence of a statutory requirement to evaluate the NAP was a driver for the MRE activities in the United Kingdom, and responsibility for MRE of adaptation was placed with the Committee on Climate Change (CCC) and more specifically the Adaptation Sub-Committee (ASC), an independent, statutory body established under the Climate Change Act (2008).

The influence of the NAS or NAP is also observed in countries where monitoring, reporting and/or evaluation activities are not legally binding (Finland (for evaluation), France, Germany, Ireland, Spain, Switzerland). In France, the NAP (2011–2015) anticipates annual monitoring of its implementation. In Germany, the establishment of the national adaptation strategy (German Strategy for Adaptation to Climate Change; DAS) was the springboard for activities to monitor adaptation progress and heavily influenced the structure of the national monitoring system. In Spain, monitoring of adaptation is performed

as an integral part of the policy cycle. The Spanish National Climate Change Adaptation Plan (PNACC) includes a mandate that specifies the frequency of the reporting activity (every 2–3 years) and the actors who should be involved in it. Monitoring reports are structured according to the architecture of the PNACC and form the basis for following up progress in its implementation. In Switzerland, after the adoption of the action plan in 2014, the Federal Council mandated the Federal Department of the Environment, Transport, Energy and Communications (DETEC) and all the participating departments to report every second year on the implementation of adaptation and to assess the effectiveness of adaptation in 2017.

MRE is commonly recognised as an important requirement for many countries that are currently revising their NAS or NAP (e.g. the Netherlands), while, in some countries, the legal status of monitoring, reporting and/or evaluation actions is being strengthened. For example, in Belgium, monitoring of adaptation was already considered in the national adaptation strategy (2010) as an administrative good practice, but became compulsory in Flanders from a legal point of view after the approval of the Flemish Climate Plan 2013–2020 by the Flemish Government (2013).

Finally, although adaptation has been addressed largely at national level through the development of NASs and NAPs, the role of sub-national governments and the personal interest of the people involved in them can also be catalytic for national-level MRE of adaptation. In Switzerland, for example, reporting responsibilities have been allocated to cantons, and are recognised as a legal duty under the CO₂ Act, while the role of the national government is focused mostly on the coordination of adaptation activities and the development of the strategy. Furthermore, sub-national-level initiatives such as the Covenant of Mayors on Climate and Energy have the opportunity to influence MRE of adaptation at national level by raising awareness and commitment for adaptation action at the local and regional levels.

European and international reporting requirements

Meeting European and international reporting requirements is identified as another important driver for the development of MRE systems in European countries. In Finland, for example, MRE activities are viewed as a way to contribute not only towards the fulfilment of the country's reporting responsibilities under the NAP and the Climate Act (2015) but also towards the reporting requirements under the EU MMR Article 15, and the development of national communications under the UNFCCC. Similarly, the anticipated EU adaptation preparedness

scoreboard was identified as one of the triggers for the development of the Dutch MRE system.

Extreme weather events

The increased frequency and severity of extreme weather events is another reason why adaptation has become more visible in the national political agendas of most European countries (EEA, 2014). The urgency for adaptation action raises the following questions: 'who is responsible for dealing with this issue?' and 'how can countries tackle these events and their consequences?'. National MRE systems have been identified as a source of evidence for responding to such questions and for supporting relevant policy decisions. In this regard, the demand for event-related evidence to inform political decisionmaking (and, in turn, respond to public concerns) can encourage the development of MRE systems. In the United Kingdom, the need to demonstrate and understand responses to extreme events was acknowledged as an additional driver for monitoring activities.

2.1.2 Purposes of national MRE systems

Tracking and reporting adaptation policy progress and effectiveness

Most European countries with MRE systems in place or under development aim to monitor and report on the progress that has been achieved in the implementation of actions and policies included in NASs or NAPs (Austria, Belgium, France, Finland, Germany, Lithuania, the Netherlands, Spain, Switzerland and the United Kingdom). Some also refer to monitoring the effectiveness of the actions and policy implementation (France, the Netherlands, Switzerland and the United Kingdom). Tracking such trends can contribute to a better understanding of how adaptation processes evolve within a country and whether or not decisions and their implementation are leading towards the desired outcomes.

Some differences exist across European countries with regard to the type of activities used for adaptation monitoring. In some cases, simple 'checklists' are used to ensure that different institutions implement NAS/NAP actions in compliance with related agreements. It is clear, however, that many countries aim to go further. In these cases, MRE systems are designed to track changes in vulnerability and resilience over time in key sectors and locations. In the United Kingdom, for example, it is anticipated that MRE activities will provide information to evaluate whether or not the implemented adaptation actions address the climate change risks that have been identified for the country in the Climate Change Risk Assessment (CCRA). A broader purpose, such as understanding vulnerability

and climate risks in a dynamic context, demands an altogether more nuanced methodology than that of a system that aims to establish only the delivery of policy actions from a process perspective. This highlights the critical role that the 'purpose' may play when developing an MRE system and its potential influence on other aspects of the system.

Enhancing the knowledge base

Enhancing the knowledge base to support experts, intermediaries and decisionmakers in the public and private sectors was identified as another core purpose of national MRE systems in many European countries (Austria, Belgium, Germany, the Netherlands, Spain and Switzerland). References were made particularly to climate change impacts and vulnerability, which were identified as themes that could be better understood through MRE activities. For example, in Germany, the establishment of a regular monitoring mechanism is expected to deliver time series of data related to the 15 fields of action included in the NAS, contributing to the better overview of climate change impacts. Similarly, in Austria, the national MRE system is anticipated to enhance the existing knowledge base on the key trends of climate change impacts and vulnerabilities. In Belgium, MRE of adaptation is perceived as an opportunity to collate all relevant information that is currently available at different levels (local, regional, national) and sectors, and for different themes (climate change impacts, vulnerability assessments, etc.).

MRE activities are expected to help identify key challenges and opportunities (Austria, Switzerland); to highlight priority areas (Belgium), including who or what needs to adapt, where and how (the Netherlands); and to shed light on existing knowledge gaps (Austria). Such information is important for identifying the areas on which efforts should be focused to support better-informed policy decisions (Germany) (e.g. what should be done in the future or how to improve the next step of planning). It can also support better coordination of sectors that may be at different levels in terms of adaptation progress, and can be used to engage sectors that have not traditionally been involved in the adaptation policy process.

A better understanding of climate change impacts and vulnerabilities, in combination with efficient and effective ways of communicating, may also contribute to further raising awareness about climate change adaptation among the general public (Austria, France, Germany). Awareness of climate impacts and risks has already been recognised as one of the main factors that motivates adaptation action (EEA, 2014). Participants at the Expert Workshop acknowledged the significance of awareness raising and communication in improving a society's

preparedness to climate change and adaptive capacity (Finland, Switzerland). This is important because the way that people understand climate change and its impacts, and the extent to which they fully capture the urgency of adaptation, may vary to a large degree, especially when their experiences of climate change impacts are not direct, recent or frequent.

Learning for improving adaptation policies, policymaking and practices

To date, most countries have concentrated their efforts on monitoring and reporting activities. The development of evaluation activities and the definition of their clear purposes are at a relatively early stage, even in countries that have greater experience in implementing adaptation policies (e.g. Finland, Germany, the United Kingdom). This observation comes as no surprise: first, because only a few countries have implemented their adaptation policies and plans for a sufficient amount of time to allow for meaningful evaluation and, second, because discussions with experts have revealed a number of conceptual and methodological challenges that have constrained evaluation activities from being fully developed, especially when it comes to the definition and the assessment of 'effectiveness' or the 'success' of policies (for a detailed discussion of these challenges of MRE, see Chapter 1 and Section 2.3).

Nevertheless, several countries have included the assessment of the outputs and outcomes achieved by specific adaptation measures and/or their NAS or NAP overall in the list of core purposes of national MRE systems. Consultations with MRE experts highlighted that the following dimensions are being considered by countries in relation to evaluation:

- the implementation of adaptation policies and plans (Belgium, Finland, the Netherlands, Spain, Switzerland);
- the added value of adaptation policies and/or strategies (what would have happened if these measures were absent?) (France, the Netherlands, Switzerland, the United Kingdom);

- the effectiveness or efficiency of adaptation measures (the Netherlands, Slovakia, Switzerland, the United Kingdom);
- adaptation preparedness (France).

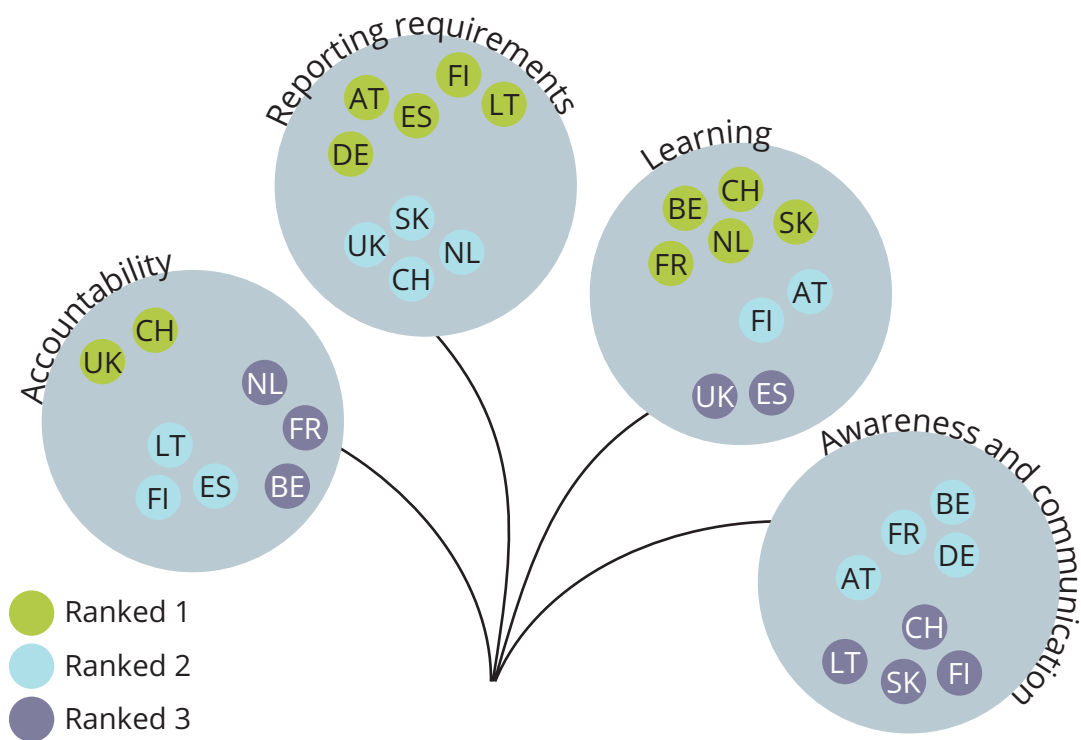
The Expert Workshop highlighted that many countries intend to use evaluation outputs in the revision of their current NASs or NAPs (Austria, France, Lithuania, Slovakia, Switzerland), and for planning their future work in the field of adaptation policy (Finland). Such statements reflect countries' intentions to apply monitoring and evaluation results in adaptation policies and practices. However, as discussed later in this chapter, such examples are still limited (see Section 2.4).

Increasing accountability

In addition to providing proof of political action, there is now an increasing need to provide evidence of policy effectiveness and to assess whether or not adaptation investments represent appropriate use of public funds. As a result, a growing number of countries identify accountability as a core purpose of monitoring and evaluation activities (Figure 2.1). Evaluation activities may provide insight on how actions have been or are being developed; assess if and to what extent the defined aims have been achieved; and support a better understanding and assessment of policy efficiency (e.g. the 'value for money' of adaptation policies). In the current period of economic austerity in Europe, when human and financial resources available for adaptation are limited and competition between the adaptation and other policy goals might increase, monitoring and evaluation may provide evidence to inform the allocation of adaptation-related resources and support the case for future adaptation funding.

The drivers that motivate action on MRE and the purposes which MRE systems are designed to achieve are both important factors that influence how MRE of adaptation is organised, who is involved in this process and the methods that are used. These issues are explored in the remainder of this chapter.

Figure 2.1 Ranking of purposes by MRE experts participating in the Expert Workshop



Note: Participants were asked to select the main purposes underpinning national MRE systems and rank them in order of importance, with 1 being the most important ⁽¹³⁾.

Country codes: AT (Austria), BE (Belgium), CH (Switzerland), DE (Germany), ES (Spain), FI (Finland), FR (France), LT (Lithuania), NL (the Netherlands), SK (Slovakia), UK (the United Kingdom).

⁽¹³⁾ Purpose categories included in this exercise were elicited from discussion with experts, but do not provide an exhaustive list.

2.2 Governance and participation

Key messages

- Overall responsibility for MRE of adaptation often lies with ministries or government agencies coordinating adaptation policy.
- Horizontal and vertical coordination of MRE activities is often organised through committees involving multiple administrative levels and sectors.
- In some countries, the requirement for monitoring, reporting and/or evaluation is formalised in legislation, while in other cases it is voluntary.
- Understanding progress of adaptation policies and actions benefits from the engagement of a broad range of stakeholders.
- In many countries, it is a challenge to involve the municipal level in MRE of national adaptation policies.

Reflecting on experiences of European countries, this section examines how monitoring and evaluation of adaptation has been organised so far. The main areas of interest in terms of governance are (1) who coordinates adaptation policies and how it relates to the responsibilities for MRE of adaptation; (2) horizontal and vertical coordination of MRE; and (3) the role of stakeholders in MRE of adaptation. In the context of this report, governance refers not only to government actions, but also to interactive processes, undertaken by a government, the private sector and/or other organisations, to discuss a collective problem and create solutions in the form of new social norms and institutions (Hufty, 2011).

2.2.1 Organisation and coordination of MRE at national level

This section looks at who coordinates adaptation to climate change, and compares this with who is responsible for developing and implementing MRE of adaptation. It considers the types of organisations that have responsibilities for these related activities and the degree of independence and interdependence that exists between these two functions.

Governance of adaptation is usually led by two types of organisation: ministries and committees (see Table 2.1). The Ministry of Environment (or the ministry within which 'environment' is a statutory

responsibility) is most commonly the ministry responsible for coordinating climate change adaptation. In many countries, committees have been formed for the governance of adaptation. In these committees, several national ministries are often represented (e.g. Germany, Switzerland) alongside other levels of government (e.g. Belgium) and/or scientists and other representatives from society.

In most European countries, the organisations responsible for coordinating MRE activities are the same organisations that have overall responsibility for the implementation of adaptation policies, namely ministries of environment and/or the committees that were established to design, implement or coordinate adaptation policies. The pre-existing organisation of the adaptation policy process therefore seems to be an important driver for the organisation of the MRE process. In some countries, the adaptation community is monitoring its own performance on an informal basis. This self-reflective process can be an adequate approach, especially in the early stages of adaptation policy when many struggle to understand what adaptation should comprise. The uptake of the results of monitoring and evaluation in the next round of adaptation policymaking can be facilitated by such an informal institutional setting (see Box 2.2 for an example from Finland). As adaptation policies mature, self-reflection might be combined with a more output- or outcome-oriented assessment by an independent organisation.

In most cases, there is limited separation between those organisations responsible for implementing adaptation policy and those responsible for MRE of adaptation (Austria, Belgium, Finland, Germany, Lithuania, the Netherlands, Slovakia, Spain and Switzerland). Notable exceptions are France, Germany and the United Kingdom. In the United Kingdom, the ASC was established (within the broader CCC) to provide advice and to report to parliament on the progress made in preparing for climate change. It is an independent body made up of experts from the fields of climate change, science and economics. In order to fulfil its statutory reporting and scrutiny role, the ASC has led the development of the United Kingdom system for MRE of adaptation (see Box 2.1). In France, an evaluation committee is planned with the mandate to report independently (evaluation is done independently, while monitoring is not independent). In Germany, the Environment Agency is responsible for monitoring and reporting but not for implementation of adaptation. Some other countries also aim to outsource part of the evaluation work to an external organisation in order to maintain independence, transparency and, consequently, credibility.

Table 2.1 Organisations involved in adaptation and in MRE of adaptation

Country	Organisation coordinating adaptation policy	Organisation(s) implementing adaptation	Organisation(s) responsible for MRE	Organisation(s) implementing MRE
Austria	Federal Ministry of Agriculture, Forestry, Environment and Water Management (BMLFUW)	Federal Ministry of Agriculture, Forestry, Environment and Water Management (BMLFUW)	Federal Ministry of Agriculture, Forestry, Environment and Water Management (BMLFUW)	Environment Agency Austria (UBA-Vienna)
Belgium	National Climate Commission (NCC)	National Working Group Adaptation (CABAO), ministries of environment, Walloon Agency for Air & Climate, sectoral ministries (health, biodiversity, transport, etc.)	National Climate Commission (NCC)	National Working Group Adaptation (CABAO), Flemish Environment Agency, Walloon Agency for Air & Climate
Finland	Ministry of Agriculture and Forestry	National Monitoring Group of the National Adaptation Plan	Ministry of Agriculture and Forestry	National Monitoring Group of the National Adaptation Plan, national research institutes
France	Ministry of the Environment/General directorate for energy and climate, within it the national observatory on the effects of global warming (ONERC)	Ministries in charge of sectoral policies (transport, agriculture, forestry, biodiversity, water, health, mountains, fishery, tourism, natural disaster reduction, research, energy, education and sustainable development) Sectoral agencies such as Ademe (Environmental Agency), Cerema (transport and building), Météo-France (Climate services), INRA (agriculture and forest), INVS (health), etc.	Ministry of the Environment/General Council of the Environment and Sustainable Development (CGEDD), National Council for Ecological Transition (CNTE)	National observatory on the effects of global warming (ONERC)
Germany	Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)	Federal Inter-ministerial working group (IWG Adaptation Strategy)	Federal Inter-ministerial working group (IWG Adaptation Strategy)	Federal Environment Agency (UBA) with consultant Bosch & Partner GmbH
Lithuania	Ministry of Environment		Ministry of Environment	
Netherlands	Ministry of Infrastructure and the Environment	Delta programme (for flood risk, freshwater and spatial adaptation)	Ministry of Infrastructure and the Environment	Possibly the Environmental Assessment Agency (PBL)
Slovakia		Working Group on Adaptation (MZP SR)	Ministry of Environment	Working Group on Adaptation (MZP SR)
Spain	Spanish Climate Change Office (OECC) within the Ministry of Agriculture, Food and Environment		Spanish Climate Change Office (OECC) within the Ministry of Agriculture, Food and Environment	Coordination Commission of Climate Change Policies (CCPCC), Working Group on Impacts and Adaptation (GTIA)
Switzerland	Federal Office for the Environment (FOEN)	Federal Office for Spatial Development (ARE), Federal Office for Civil Protection (FOCP), Federal Office for the Environment (FOEN), Federal Office of Public Health (FOPH), Swiss Federal Office of Energy (SFOE), Federal Office for Agriculture (FOAG), Federal Veterinary Office (FVO), Federal Finance Administration (FFA), Federal Office for Meteorology and Climatology (MeteoSwiss), State Secretariat for Economic Affairs (SECO)	Federal Office for the Environment (FOEN)	Federal Office for the Environment (FOEN)
United Kingdom	England: Department for Environment, Food and Rural Affairs (Defra) Scotland: Minister for Environment, Climate Change and Land Reform	England: The Domestic Adaptation Board, chaired by Defra Wales: The Climate Change Commission	England: The Committee on Climate Change (CCC) Scotland: Scottish Government Wales: The Climate Change Commission	England and Scotland: Adaptation Sub-Committee (ASC)

Committees with responsibilities for MRE of adaptation are different in nature in different countries: they can be temporary or permanent, formal or informal, and can have strict or less strict boundaries for their membership. Some have more formal responsibilities, compositions and structures, while others evolve more organically. For example, in

the United Kingdom, the boundaries of the ASC are formally defined by the Climate Change Act (2008), while, in Finland, the composition of the National Monitoring Group of the National Adaptation Plan is more the result of a search process over time (see case examples of the United Kingdom in Box 2.1 and of Finland in Box 2.2).

Box 2.1 A formalised approach to MRE governance in the United Kingdom

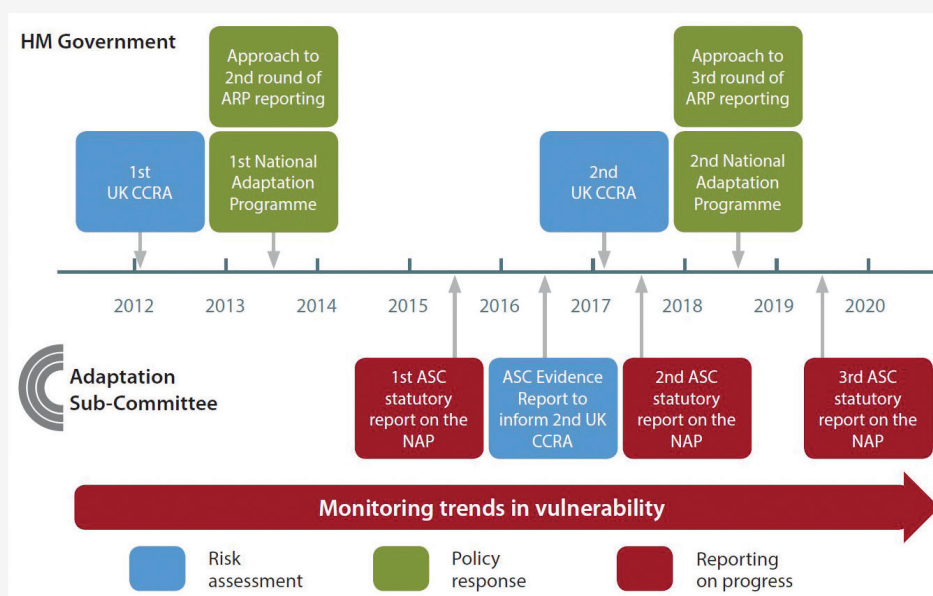
Key messages

- The United Kingdom adaptation policy cycle, including an MRE requirement, is embedded within a legal framework.
- The United Kingdom has established an independent MRE process by forming the Committee on Climate Change (CCC), which provides independent scrutiny of progress on mitigation and adaptation.
- While the National Adaptation Programme (NAP) is the focus of MRE efforts, it is assessed in the broader context of dynamic risks and changing vulnerabilities.

The United Kingdom was one of the first countries to establish a legal framework for adapting to climate change. In addition to establishing legally binding carbon budgets, the Climate Change Act 2008 also put in place requirements to prepare the country for climate change and adapt to its impacts.

The United Kingdom Climate Change Act sets the key phases of the adaptation policy cycle into legislation, including monitoring, reporting and evaluation. The government is required to assess the risks and opportunities facing the United Kingdom as a result of climate change, which takes the form of a 5-yearly Climate Change Risk Assessment (CCRA) process. The objectives, policies and proposals to address those risks are then set out in the National Adaptation Programme (NAP), which is also revisited every 5 years. Supporting this cyclical process is a legal requirement to report on adaptation progress in relation to the NAP, as detailed below.

Figure 2.2 The United Kingdom adaptation policy cycle



Note: ARP: Adaptation Reporting Power.

Source: Based on the requirements of the Climate Change Act 2008.

Box 2.1 A formalised approach to MRE governance in the United Kingdom (cont.)

The CCC was established as an independent, statutory body to advise the United Kingdom Government and report to parliament on the progress made in reducing greenhouse gas emissions and preparing for climate change. The Adaptation Sub-Committee (ASC) forms a key element of the CCC, in part by providing independent advice on preparing for climate change. The ASC also has responsibility under the Climate Change Act 2008 to report to parliament every 2 years with an independent assessment of the progress being made in the implementation of the NAP; the first of these reports was published in June 2015. The government is required to provide parliament with its response to the CCC's progress reports by 15 October 2015.

The ASC's first statutory assessment report on adaptation follows the structure of the NAP and reports on progress across six main themes (the built environment, infrastructure, healthy and resilient communities, agriculture and forestry, the natural environment, and business), plus one cross-cutting theme (local government). It evaluates whether or not appropriate policies and plans are in place to address key climate risks and whether or not the adaptation actions in the NAP have been delivered, and then considers whether or not progress is being made in managing vulnerability. A more detailed review of the methods employed can be found in Box 2.11 in Section 2.3.

Link to additional information: <https://www.theccc.org.uk/publication/reducing-emissions-and-preparing-for-climate-change-2015-progress-report-to-parliament>.

2.2.2 Horizontal and vertical coordination

This section looks at how MRE is coordinated (1) across government departments and sectors (horizontal coordination) and (2) between different administrative levels (vertical coordination). For vertical coordination, the focus is on coordination between national and local levels. International- and EU-level mechanisms related to MRE are described in Chapter 1 of the report.

Horizontal coordination of MRE

Adaptation is inherently a cross-sectoral issue, meaning that effective MRE of adaptation also requires a cross-sectoral approach. The following list shows the sectoral themes that were identified by participants at the Expert Workshop as being relevant to adaptation policy and highlights the need to engage a broad range of ministries in MRE processes: Agriculture and food; Biodiversity/nature; Business, trade, finance and industry; Education and science; Energy; Environment; Fisheries; Foreign affairs; Forestry; Health; Interior affairs/civil protection; Land management/spatial planning/rural development; Transport and infrastructure; Water management, coastal management and river management.

The importance of horizontal coordination in MRE of adaptation is recognised in all European countries. Box 2.2 shows how an inter-ministerial working group has connected sectors in Finland. Other countries in which close cooperation between ministries was specifically identified include France, Germany, Slovakia and Switzerland.

Vertical coordination of MRE

Although adaptation strategies and plans are often first adopted at national level, their implementation requires strong involvement at regional and local levels. Whether because of the local nature of the adaptation action itself or owing to a delegation of responsibilities from national to sub-national levels of administration, exploring what happens at regional and local levels is often of critical importance in tracking progress on adaptation. This highlights the need for vertical coordination in MRE of adaptation across different levels of governance, in addition to horizontal coordination across sectors and fields of action. How do those responsible for MRE at national level seek to connect with and involve other levels of government?

Linking monitoring and evaluation of adaptation across scales can be difficult because adaptation is context specific (Leiter, 2015). If standardised indicators are used and amalgamated at national level, they may lack detail or lead to generalised, and potentially less useful, results. On the other hand, localised, qualitative information limits comparability. Leiter (2015) concludes that a combination of standardised, quantitative indicators and qualitative information can help to connect MRE across governance levels.

Vertical coordination comprises both top-down and bottom-up approaches to involve a wide range of government levels in adaptation and thus a wide range of knowledge on what is important and what can be done. Box 2.3 provides a Spanish example of committees and platforms at different levels of government. In the Netherlands, the Knowledge for

Climate programme defined its activities around so-called 'Hot Spots', regionally based sub-programmes that involved provincial and municipal governments and water boards as well as scientists to develop locally relevant knowledge on climate adaptation ⁽¹⁴⁾. The Dutch Delta programme also had six sub-programmes focusing on the problems of specific regions such as the South-western Delta and the Rotterdam–Dordrecht region ⁽¹⁵⁾. In the work on MRE, these same networks were employed to design a first draft plan for MRE of adaptation in the Netherlands.

The different institutional setups of European countries have implications for the management and governance of MRE systems. For example, in a federal state, the devolved administrations may decide on adaptation policy and also on the methods of MRE, instead of the national government. For water management, a dedicated authority may exist such as the water boards in the Netherlands. To establish what kinds of effects such country-specific administrative and institutional structures have on MRE would require further investigation.

Box 2.2 Working groups facilitate coordination across sectors in implementation and evaluation of adaptation policy in Finland

Key messages

- Inter-ministerial working groups support horizontal coordination and enable exchange of information and good practices across sectors.
- Working groups can provide flexible institutional structures for monitoring and evaluation of adaptation, while their temporary nature may present challenges for cumulative learning.
- The inclusion of monitoring and evaluation in the mandate of a working group tasked with coordination and implementation of adaptation policy more generally facilitates communication and the use of MRE results in policymaking.

In Finland, monitoring and evaluation of national adaptation policy is the responsibility of an inter-ministerial working group that brings together multiple sectors in implementation and evaluation of adaptation policy. The working group was first set up in 2008 to monitor and promote implementation of the NAS (2005) and to steer a national research programme on adaptation. Its original 2-year term was extended in late 2010 until February 2012. During this time, the working group carried out the mid-term evaluation of the NAS (published in 2009). In May 2012, the working group was re-set until the end of 2013 with the mandate to conduct a full evaluation of the 2005 NAS and to revise national adaptation policy on the basis of the evaluation. In 2014 and early 2015, there was no formal working group in place and coordination between sectors and other stakeholders (including regional governments and broader stakeholder groups) was largely carried out through processes relating to the finalisation of the revised national adaptation policy (e.g. official consultations and public hearings that are part of all policy preparation processes). Inclusion of policy evaluation within the national working group's mandate has enabled learning and direct use of evaluation results in policy development. In November 2014, the new National Climate Change Adaptation Plan 2022 was approved and consequently a new working group was set up for 2015–2018 (National Monitoring Group for the National Adaptation Plan). The purpose of the current working group is to coordinate implementation of the new NAP in the public sector, with a specific mandate to monitor and report on the implementation of the NAP and promote evaluation of the effectiveness of adaptation measures.

The working group has been instrumental in facilitating cross-sectoral coordination in Finland and in allowing for exchange of lessons learnt across sectors. Over the years, the working group has had a broad membership base with appointed representatives from most sector ministries, but the exact composition has varied. In addition, key research institutes have been represented in the working group, along with research funding agencies, the Association of Finnish Municipalities, some larger cities and recently also Regional Centres for the Economy, Transport and the Environment. There is no detailed budget for the working group, but its expenses are covered by the state budget and the working time of its members is covered by their organisations. In its first meeting in June 2015, the current working group approved a work plan based on the new NAP that is to be revised annually. Its tasks include setting up a national monitoring system and reporting on the progress of national adaptation policy implementation to the parliament as part of climate policy reporting required by the Climate Act (2014). The working group is chaired by the Ministry of Agriculture and Forestry with a vice chair from the Ministry of Environment and it meets quarterly.

⁽¹⁴⁾ Knowledge for Climate: <http://www.knowledgeforclimate.nl/hotspots>.

⁽¹⁵⁾ Delta Programme: <https://www.government.nl/topics/delta-programme/contents/organisation-of-the-delta-programme>.

Box 2.3 Supporting monitoring of adaptation using committees and platforms at different government levels: experiences from Spain

Key messages

- A clearly defined set of committees and platforms with tasks ranging from high-level steering to exchange of practical experiences enhances procedural clarity for all participants, produces a sense of a common enterprise in adaptation and may also create a positive attitude towards monitoring and evaluation.
- Horizontal and vertical coordination for adaptation governance are both complemented with top-down and bottom-up approaches for engaging the widest possible range of stakeholders. This networking results in strengthening of the adaptation monitoring process.
- Recent efforts in improving vertical coordination for governance (local–regional–central) have resulted in increasing information exchange.

Governance of the adaptation monitoring process is a component of the governance of adaptation to climate change: the Spanish National Adaptation Plan (PNACC) is used for both. The PNACC, adopted in July 2006, is the reference framework for the development of adaptation policies in Spain. It poses a plan for its governance, including coordination between all public administrations and the participation of all the stakeholders potentially involved in adaptation to climate change in Spain.

Since the adoption of the PNACC, several initiatives and activities have been implemented that contribute to the monitoring of its progress, which concern three topics: (1) coordination and participatory bodies, (2) monitoring reports and (3) the AdapteCCa platform:

- **Coordination and participatory bodies:** Several coordination and participatory bodies and initiatives are involved in the governance for the implementation of the PNACC. The National Climate Council (CNC), the Coordination Commission of Climate Change Policies (CCPCC) and its Working Group on Impacts and Adaptation (GTIA) are the most relevant bodies for administrative information and coordination, and for technical aspects. The wide range of participatory initiatives are resulting in increasing numbers of stakeholders becoming involved in the PNACC stream and networking, mainly by means of the 'Program on PNACC Sectoral Workshops'. These bodies and initiatives provide feedback and monitor the outcomes achieved within the PNACC periodically.
- **Monitoring reports:** Monitoring and reporting on the progress of implementation of the PNACC are carried out by producing periodical monitoring reports, mandated by the PNACC, aligned to its structure of 'axes' and 'pillars', and using the plan for its governance. So far, three PNACC monitoring reports have been produced for the periods 2006–2008, 2008–2011 and 2011–2014. The monitoring reports are drafted and adopted after several cycles of reviewing. The Spanish Climate Change Office (OECC) leads the process, in consultation with the GTIA, informed by the CNC and finally adopted by the CCPCC, in a widely networked and consulted process.
- **The role of AdapteCCa:** The AdapteCCa platform was launched in 2013 for the exchange of information and the enhancement of coordination — both vertical and horizontal — among administrations and key stakeholders on impacts, vulnerability and adaptation to climate change in Spain. It is a flexible tool to reinforce governance and, as such, it plays a role in promoting the monitoring process.

At regional level, nearly all of the Spanish autonomous communities have adopted adaptation strategies, plans or initiatives. The lines of work in which the autonomous communities have developed their strategies and plans are coherent with the PNACC, and PNACC monitoring reports have included information on these regional frameworks. AdapteCCa also includes specific public information on the regional adaptation frameworks and initiatives, and allows private networking areas for the GTIA and other interest groups, which are used in the monitoring process.

Challenges

The Spanish PNACC includes a monitoring and reporting component that has been implemented through the monitoring reports described above. These reports synthesise and assess the progress in the development and implementation of the PNACC activities. However, the overall evaluation of the PNACC has not yet been addressed. This would comprise an overall assessment of the impact achieved through public adaptation policies and their contribution to strengthening the resilience of Spain to climate change. Such an overall evaluation of the PNACC poses major challenges related to issues

Box 2.3 Supporting monitoring of adaptation using committees and platforms at different government levels: experiences from Spain (cont.)

such as the long-term time horizon, the difficulty in attributing results to concrete adaptation actions and measures, the metrics for adaptation, the uncertainties and the baseline, among others. Ways to address these challenges will include an inclusive process with a range of methodologies, from adaptation indicators to sectoral self-assessment and surveys, and a complementary approach of internal and external evaluation.

Other aspects that need to be improved in the monitoring and reporting process are the heavy workload and limited resources for the effort to compile, analyse and synthesise the information, and the time-consuming process of consultation and coordination between a very large number of administrative units and stakeholders.

Regarding the links between administrative levels, and despite the increase in the quality and quantity of the regional information included in the consecutive PNACC monitoring reports, there is room to improve the consistency among central and regional levels in monitoring.

Links to additional information: Third PNACC Monitoring Report 2011–2014 (in Spanish) http://www.magrama.gob.es/es/cambio-climatico/temas/impactos-vulnerabilidad-y-adaptacion/3_informe_seguimiento_pnacc_tcm7-312797.pdf; AdapteCCa platform <http://www.adaptecca.es>.

Engaging the municipal level in MRE was identified as a challenge by several participants of the Expert Workshop. Box 2.4 shows how the involvement of

local government in the national working group in Finland has evolved over the years to ensure sufficient representation of local government views.

Box 2.4 Involvement of local government in MRE of adaptation in Finland

Key messages

- The involvement of municipalities in national-level MRE may require multiple iterations to find a suitable institutional arrangement.
- Using intermediaries to communicate local and regional perspectives at national level offers a way to link sub-national levels to national-level MRE of adaptation.

When the national inter-ministerial working group on adaptation was first set up in Finland in 2008, the Association of Finnish Municipalities was invited to represent the perspective of local and regional decisionmaking. Later it was observed that the sub-national levels were not sufficiently represented and some larger cities that were active in climate issues and adaptation were invited to formally join the working group in 2012–2013. One of the messages arising from the stakeholder consultations during the NAS evaluation process in 2012–2013 was that there should be a stronger connection with local governments. In the current working group, sub-national governments are represented by the Association of Finnish Municipalities and a member from one of the regional Centres for the Economy, Transport and the Environment. The latter organisation has a specific intermediary role with the remaining regional government agencies. Additional efforts to better include the perspective of local governments have included special meetings of the working group dedicated to regional and local matters (more regional and local representatives have been invited to these meetings) and inclusion of local government perspectives in events and seminars organised by the National Monitoring Group as part of its communication and awareness-raising activities.

2.2.3 Engaging stakeholders

When examining stakeholder participation in MRE of adaptation, a broad definition of the term 'stakeholder' is used, referring to all parties that are affected by or affect adaptation policies. Beyond government stakeholders at national and sub-national levels, the following groups of stakeholders are considered: private sector, interest groups (e.g. NGOs and farmers' associations), scientists and researchers, and the general public.

Engaging a broad range of stakeholders is crucial for effective adaptation. Stakeholder support is generally

needed to ensure long-term viability of organisations, as well as policies, plans and programmes (Bryson, 2004). National-level adaptation policies often rely on stakeholders in the design and implementation stages; the same stakeholders can also provide vital insights for MRE. They can help to gather necessary data and expertise; share results of monitoring and evaluation efforts with relevant audiences; raise awareness; and encourage learning from good practice. Box 2.5 shows an example from Germany in which a broad range of government and other stakeholders were involved in the development and implementation of the monitoring system.

Box 2.5 The importance of cooperation in an inter-departmental monitoring process in Germany

Key messages

- A coordinating institution is needed to structure, coordinate and moderate the process of developing an overarching indicator system in order to make best use of the existing competencies and knowledge base.
- Cooperation of appropriate national authorities, supported by scientific and private institutions, is important for the scientific and political acceptability of the monitoring system.
- Collaborative processes are time consuming but ensure commitment of the relevant national authorities and ministries in an inter-departmental strategy process.

The German Strategy for Adaptation to Climate Change (DAS) (2008) was designed as an inter-departmental strategy by the federal government, addressing 15 action fields and cross-sectional themes. The DAS highlights the areas that are, or are likely to be, affected by climate change, and presents basic options and requirements for action in relevant sectors.

An initial progress report on the implementation and further development of the DAS is due at the end of 2015. Part of this progress report is an indicator-based monitoring report, which was published in May 2015. This monitoring report describes all the consequences of climate change related to the sectors covered in the DAS, the measures implemented in attempts to overcome these impacts and any past and current developments to inform decisionmakers and raise awareness in the general public.

The indicator system underlying the monitoring report and the overall progress report was developed through an inter-departmental process with the participation of numerous experts from competent agencies at federal and state levels and scientific and private institutions. It was important to involve all government departments in this process because of the broad range of areas affected by climate change and the need for adaptation measures in all affected sectors, and to ensure that political agreement was reached.

A consultant (Bosch & Partner GmbH) was commissioned to design and moderate the process of the indicator system development by bringing together the competencies and existing knowledge from individual sectors and departments. The consultant cooperated closely with the Environment Agency (Umweltbundesamt — KomPass (Kompetenzzentrum Klimafolgen und Anpassung)) and the Ministry of Environment (Bundesministerium für Umwelt, Naturschutz, Bau und Reaktorsicherheit). The work started in 2009. Technical experts and political decisionmakers from many different governmental and non-governmental institutions were involved in this process in various ways, including:

- expert meetings and workshops;
- bilateral expert meetings for profound discussions;
- involvement in the political bodies set up for DAS, namely the Federal Inter-ministerial Working Group on Adaptation Strategy (IMA) and the States Standing Committee for Adaptation to the Consequences of Climate Change (AFK).

Box 2.5 The importance of cooperation in an inter-departmental monitoring process in Germany (cont.)

In August 2012, an iterative process to build political commitment commenced and lasted for nearly 2 years. The DAS indicators were agreed among government departments at federal and state levels. In order to reach an agreement, it was important that:

- the most important themes and action areas were well described and linked to the relevant DAS action field and cross-sectional theme;
- the thematic priorities were clearly defined; and
- the indicators were politically relevant.

The process of combining scientific participation and political commitment had a number of benefits. It raised awareness for the need of climate change adaptation, stimulated the engagement of important stakeholders and supported the identification with the monitoring report and the DAS itself. Overall, the feedback on the monitoring report was very positive and constructive. The intensive participation process was time consuming; however, the value of the results justified the approach. Furthermore, the participation of so many experts has contributed to the excellent reputation of the monitoring report at national and federal level, particularly with regard to its content and the methods used.

The revised version of the entire set of indicators was finally agreed and adopted by IMA in July 2014. The monitoring report, informed by the indicator system, was finalised in its technically and politically agreed form in February 2015.

Link to additional information: <http://www.umweltbundesamt.de/publikationen/monitoringbericht-2015>.

All countries agree that involving a broad range of stakeholders is important. The stakeholders seen to be important can be categorised into private sector, interest groups/NGOs, scientists/researchers and the

general public (see Table 2.2). Specific sectors were mentioned that can be linked to known impacts of climate change, for example insurance, agriculture and energy production.

Table 2.2 Involving stakeholders in MRE of adaptation

Stakeholder categories	Examples of stakeholder groups and organisations
Private sector	Industry, trade associations Insurance Social-economic Council (representing industry at national level) Finance Data providers Consultancy
Interest groups and NGOs	Sector agencies: Energy production Forestry Agriculture Hospitals NGOs: Environment
Scientists and researchers	Universities/scientific community/academics: knowledge base development Education: secondary role/informal education
General public	Open forums of stakeholders Public at large: opinion polls, phone survey, data crowding

Source: Expert Workshop.

The involvement of stakeholders in adaptation planning and implementation precedes their involvement in MRE of adaptation. The 2014 report on adaptation policy processes (EEA, 2014) illustrates that the involvement of non-public actors is much more common in the planning and implementation stages of adaptation than in MRE at this point in time. Table 2.3 presents the involvement of different stakeholder groups in adaptation and in MRE of adaptation (including governments). Countries generally have a growing actor network: it often starts with involving ministries and new stakeholders are gradually added.

Involving many stakeholders in MRE requires significant effort. In Germany, the process of collecting and discussing indicators for monitoring adaptation was reported to be intensive and time consuming, but also rewarding in the end (see Box 2.5). The involvement of many stakeholders and government levels was described as a challenge for Spain as well (see Box 2.3). In Sweden, a series of dialogue events were organised to involve the private sector in the assessment of the progress made with adaptation (see Box 2.6). Several other countries are working on the involvement of NGOs and the private sector, such as Finland and the United Kingdom. An extensive process

involving a large number and range of stakeholders in the development of the MRE methodology may not be feasible in every country. However, countries can learn from each other and, in this way, setting up MRE systems can become more efficient over time. Experience of involving stakeholders in the development of indicators is further described in Section 2.3.

Another challenge is the validity of stakeholder views on adaptation progress. There can be a lack of transparency regarding the process of incorporating expert and stakeholder views into MRE methodologies and how these views are balanced with information from other sources. Do stakeholders represent an individual expert voice or do they speak on behalf of a sector or region? How representative are their views? Some sectors are very broad and members may have conflicting views on progress and appropriateness of adaptation efforts. Clarity and transparency regarding the role of stakeholders in MRE of adaptation is essential and it is important not to rely on a single perspective or voice. These issues are pertinent to the role of stakeholders in selecting and informing methods (especially indicators), as is explored in the next section.

Table 2.3 Overview of stakeholder involvement in adaptation and in MRE of adaptation

Country	Ministries	Other levels of government	Science	Private sector	NGOs	General public
Austria	●	●	●	○	○	○
Belgium	●	●	●	●	●	○
France	●	○	●	●	●	○
Finland	●	●	●	○	○	○
Germany	●	●	●	●	●	
Lithuania	●	●				
Netherlands	●	●	●	○	○	
Slovakia	●	○	●	○	●	
Spain	●	●	○			
Switzerland	●	○	●			
United Kingdom	●	●	●	●	●	

Note: ○, involvement of the stakeholder group in the adaptation process; ●, involvement of the stakeholder group in the adaptation process and in MRE of adaptation.

Sources: Expert Workshop; MMR reports submitted under Article 15 in 2015.

Box 2.6 Engagement of the trade, insurance and industry sectors in assessing climate change adaptation policy in Sweden

Key messages

- Dialogue events provided an opportunity to representatives of the trade, insurance and industry sectors to gather and discuss climate change adaptation issues, and encouraged the development of a business network focused on climate change adaptation.
- The insurance sector expressed a strong interest in being actively involved in expert groups and knowledge exchange events, and in supporting adaptation action at the municipality and home owner levels.

Sweden finalised the first assessment of their adaptation policy, resulting in the publication of 'Background report: Checkpoint 2015 on climate change adaptation' in March 2015. Close cooperation with national and regional authorities was one of the requirements of the assessment process. The research community and municipalities were also involved in the dialogue. Furthermore, while not a prerequisite for the assessment, the trade, insurance and industry sectors were widely engaged. Their involvement was driven by the importance of getting a better understanding of the climate change impacts and related problems that companies foresee in their fields, as well as the need to identify how the Swedish climate policy may assist and support companies to overcome these problems, and how the private sector can contribute to the development and implementation of climate adaptation policies.

Four dialogue events were organised in September 2014. They involved approximately 60 participants from the private sector, who were invited in collaboration with relevant business organisations. The events were aimed at four groups that are affected by climate change in different ways:

- companies whose production is affected by climate change in Sweden (e.g. agriculture, forestry, tourism, the building industry), organised together with The Federation of Swedish Farmers;
- companies whose production chains are affected by climate change in other parts of the world (e.g. import/export companies), organised together with the Confederation of Swedish Enterprises;
- companies that have risk as their core business idea (mainly insurance companies), organised together with Insurance Sweden; and
- companies that have climate change adaptation as their core business idea (e.g. innovation), organised together with the Swedish Agency for Economic and Regional Growth and the Association of Swedish Environment Technology Industries.

The dialogue events demonstrated that the business sector demands a clearer allocation of responsibilities, a stronger political drive behind the issue of climate change adaptation and more resources for education and information dissemination. Even in cases where sector representatives demonstrated a high level of adaptation knowledge, there was not always evidence to suggest that the relevant sector was also well prepared to confront climate change impacts. The insurance sector was one of the exceptions, acting as one of the main drivers for climate adaptation initiatives in Sweden. Increasing efforts are being made to ensure that this objective is achieved for the other sectors as well. The events also emphasised the importance of the business community as a resource of information and its potential to make a difference in adaptation policy along with various public actors.

In addition, one of the most important outcomes of the discussion among industry representatives was the establishment of a network to develop tools and services for climate change adaptation as a business sector.

Link to additional information: <http://www.smhi.se/tema/nationellt-kunskapscentrum-for-klimatanpassning/nyheter-fran-kunskapscentrumet/underlag-till-kontrollstation-2015-for-anpassning-till-ett-forandrat-klimat-1.79820>.

2.3 Methodological approaches

Key messages

- National-level MRE systems benefit from being flexible and pragmatic, using methods that are appropriate to the national context (including needs, priorities, resources and data availability).
- A mixed-methods approach to MRE, which combines multiple sources of information, provides a strong basis for assessing adaptation progress and performance.
- Qualitative methods complement quantitative approaches and reveal critical contextual information that can help to explain the narrative behind the numbers.
- Indicators play a key role in national MRE systems. In a number of countries, they have been created through an iterative and interactive process involving experts and other stakeholders.
- It is not necessarily the value of an individual indicator that needs to be considered, but whether or not the set of indicators provides a coherent and robust picture of adaptation progress.

National-level MRE systems are shaped by the drivers and purposes that led to their development (see Section 2.1) and reflect the national adaptation policy context and governance structures (see Section 2.2). As a consequence of these contextual factors, much of the emerging literature on adaptation MRE warns against 'one-size-fits-all' approaches (Spearman and McGray, 2011). This places an emphasis on practitioners learning about, and reflecting upon, methods applied in a range of different situations in order to understand what might work best for them. For example, in the Netherlands, an MRE system is being developed to meet the nation's specific requirements and context while at the same time ensuring that this provides a consistent approach for all sectors (and impacts).

It should be noted that, so far, many countries have tended to focus on the monitoring aspect of MRE, which has led to a greater emphasis on the development of indicator sets to track progress. For example, the German MRE system was established with monitoring as the primary function, with a set of activities proposed to advance evaluation aspects at a later stage. In Spain, the main focus of work has been on monitoring the Spanish National Climate Change Adaptation Plan (PNACC), but less has been done on evaluating the impacts of the

PNACC. However, more countries, including the United Kingdom and France, are now reaching the point of evaluating adaptation progress and performance and are now considering a broader range of methods.

The aim of this section is to identify and examine the methods countries have employed, and to identify lessons from the approaches used. As adaptation MRE is a continuous process, there are valuable lessons for countries looking to refine and improve existing MRE systems, as well as for countries at a more developmental stage. The section is structured around the following main methodological themes:

- *adaptation indicators* — the types of indicators being used at national level; how these have been developed and applied; and the benefits and challenges of using indicators;
- *stakeholder perspectives* — the methods used to gather the views and opinions of stakeholders and the benefits of incorporating such information into MRE systems;
- *applying a mixed-methods approach* — how different MRE methods and multiple sources of information (including quantitative and qualitative data) can be combined within a national level MRE system to provide a more robust and nuanced picture of adaptation progress and performance;
- *addressing the challenge of attribution* — how countries have begun to address the challenges of attribution (an issue identified repeatedly at the Expert Workshop).

2.3.1 Adaptation indicators

Indicators play an essential role in the monitoring, reporting and evaluation of policies, programmes and projects. They are a critical means by which processes, outputs and outcomes are tracked and assessed. When applied to climate adaptation, they can act as signposts of progress and implementation, 'providing clues and direction on how change is occurring and if outcomes are being achieved' (Climate-Eval Community of Practice, 2015). Indicators can provide a valuable way to monitor adaptation policy implementation, as well as changing vulnerability and resilience, on an on-going basis. This monitoring information can then provide an important source of evidence for evaluations at key points during the policy cycle.

National adaptation strategies and plans often provide the strategic direction for adaptation, but do not always clearly specify outcomes and targets (Hammill et al.,

2014; OECD, 2015). Consequently, MRE systems are often required so that indicators can be developed and assigned to these priorities. Indicators can allow for comparison at sub-national level, across sectors or in relation to a range of climate-related risks. Such comparisons can help in identifying hot spots of vulnerability that, in turn, can lead to improved prioritisation of adaptation investments.

In 2014, 10 countries out of 22 reported that they were implementing or developing indicators on climate impacts, risks and adaptation (EEA, 2014). Table 2.4 provides further details regarding indicator development for these countries, plus other countries for which information could be gathered in 2015. It highlights the prominent role that indicators play as countries develop MRE systems.

Types of indicators

“An indicator provides evidence that a certain condition exists or certain results have or have not been achieved and can be either quantitative or qualitative”

(EEA, 2014).

European countries have developed a range of different types of indicators to inform MRE of adaptation at national level. These indicators are often grouped into sets according to climate risk (e.g. in the United Kingdom, separate indicator sets were formulated for

Table 2.4 Indicator development within national-level MRE systems in Europe

Country	Status of indicator sets and types of indicators being developed (*)
Austria	An indicator system for monitoring and reporting on adaptation for 14 sectors, outlined in the Austrian Adaptation Strategy, has been developed. It includes 45 qualitative and quantitative indicators to monitor the processes, outputs or outcomes of adaptation interventions.
Belgium	The measures in the approved Flemish Adaptation plan (part of the Flemish Climate Plan 2013–2020) are evaluated annually in a progress report. A scale of progress is established for each measure. The future NAP will take a similar approach, with each action linked to qualitative or quantitative indicators. Other more specific plans have an in-built monitoring system in which weather events will trigger adaptation measures (e.g. the heat wave and ozone peak plan).
Finland	Evaluations of the NAS (2009, 2013) applied a five-step scale to indicate the level of adaptation in different sectors (see Box 2.10). Efforts to develop suitable adaptation indicators were initiated in 2015 to support the monitoring and evaluation of the NAP 2022.
France	Annual monitoring of progress is undertaken for 19 areas and one cross-sectoral theme outlined in the NAP (2011–2015). For each area and theme, an action sheet outlines one to six actions, each comprising several components that must be undertaken in that area, totalling 84 actions and 230 measures. These actions can be broadly categorised as (1) production and dissemination of information, (2) adjustment of standards and regulations, (3) institutional adaptation and (4) direct investment (from OECD, 2015).
Germany	Indicator system for reporting on climate change impacts and adaptation areas outlined (in the NAS). 102 indicators: 97 for impacts and adaptation and 5 overarching indicators (e.g. awareness of the public, research funding, international funding, funding for municipalities).
Ireland	Ireland is in the process of developing adaptation indicators.
Lithuania	The planned MRE systems will be indicator-based and linked to NAP (3-year cycle). It will focus on six main sectors. Indicators are likely to be qualitative.
Malta	No information specifically available on indicators. Monitoring of the NAS (2012) is conducted through the screening of Malta's National Environment Policy (NEP) under the sections related to climate change.
Netherlands	In total, 41 adaptation indicators (qualitative + quantitative) are under development/consideration, but not all will necessarily be used in the end.
Slovakia	Slovakia is in the process of developing adaptation indicators.
Spain	Spain is in the process of developing an impact, vulnerability and adaptation indicator system.
Switzerland	Switzerland is not planning to develop any new indicators, but is planning to use existing data sets that provide information on adaptation and/or the development of climate-related risks or vulnerabilities. The status of indicators varies between sectors in the adaptation strategy (some are completed, some are in development, some have not started to determine indicators).
United Kingdom	As part of its statutory role to evaluate the progress of the National Adaptation Programme, the UK Committee on Climate Change (CCC) has developed a set of 33 indicators aligned to the themes and adaptation priorities identified in the NAP. These indicators are complemented by research and analysis undertaken by the ASC and presented in the evaluation report and previous non-statutory progress reports.

Note: (*) Information gathered in discussion with experts and in consultation with countries.

flood risk and for water scarcity). Indicator groupings are also commonly aligned to the sectors or themes emphasised within key national adaptation policies such as the NAP/NAS (e.g. in Germany, indicators are organised across 13 action fields and 2 cross-sectoral fields to be consistent with the German NAS). As well as providing a useful link between monitoring and evaluation and policy, these indicator sets are also important in providing a balanced and consistent picture of progress and performance. As there is no single measure of adaptation, it is important that MRE systems utilise a combination of indicators to provide a nuanced understanding of progress in each theme or sector.

Based on experiences so far, indicator sets developed for national-level adaptation are predominantly quantitative in nature, but qualitative indicators have also been applied. In this report, indicators have been grouped into two non-exclusive categories, which present different ways of considering what indicators

are designed to measure and why. These categories are explored in Box 2.7.

In terms of the aspects of climate change and adaptation being measured, participants of the Expert Workshop reported a wide range of indicators being applied. Indicators include those focused on future and realised climate change impacts, exposure, vulnerability, adaptation actions and responses, as well as longer term outcomes. Similarly, a mix of process, output and outcome indicators have been applied. An important message that can be distilled from this variety is that it is not necessarily the value of an individual indicator that needs to be considered, but instead whether or not the set of indicators developed for a specific sector or theme provides a coherent and robust picture of adaptation progress as a whole. The importance of combining multiple indicators reflects the multifaceted nature of adaptation, the lack of a universally applicable indicator for adaptation and practical considerations such as data coherence and availability.

Box 2.7 Categories of indicators

Indicators from an adaptation perspective

Indicators can be used to measure different aspects of climate change. These include:

- climate impacts (e.g. changing flood frequency);
- adaptation policy responses and actions (e.g. a change in water management policy);
- vulnerability (e.g. rate of residential development on the floodplain);
- realised climate losses (e.g. annual damage costs from flooding).

Indicators from a policy cycle perspective

Indicators can be designed to measure a process being undertaken, a specific output to be achieved or delivered, or a broader outcome:

- a process-based approach defines the key stages in a process that could realistically be expected to contribute to positive adaptation outcomes, without specifying those outcomes at the outset (e.g. indicators that illustrate a process is under way, such as the formulation of a coastal adaptation planning committee);
- an output-based approach follows the direct results of an adaptation policy or action, without assessing if these results actually lead to better adaptation outcomes (e.g. indicators that an output has been achieved, such as 'X' km of upgraded sea defences);
- an outcome-based approach seeks to define an explicit outcome or result of the adaptation action, indicating a reduction in vulnerability or better adaptive capacity (e.g. indicators that show a coastal community is now less vulnerable to coastal inundation). Outcome indicators can be considered at different points in time. Therefore, we might conclude that, as a result of adaptation measures, a coastal community is currently less vulnerable to coastal flooding and that it is likely to be less vulnerable for the next 25 years (taking into account climate projections); however, we may be less certain if that outcome will be achieved in, say, 2070. As a result, a useful way of considering this issue in MRE is to assess progress towards outcomes.

Process indicators capture present-day contributions towards a long-term aim (Bours et al., 2014a), making them useful for adaptation MRE, as outcomes of adaptation policies and actions often cannot yet be determined. Consequently, they are an important feature of many emerging MRE systems. The degree to which countries have focused on process, output or outcome indicators varies. For example, the Netherlands and Lithuania have, or plan to have, a strong focus on process indicators (although the

Netherlands also intends to develop indicators for outputs and outcomes in the future). In Germany, indicators have been developed to inform an improved understanding of the causes and effects (impact indicators) of climate change, its consequences and subsequent policy responses. Process indicators are included, but there is a greater focus on outputs and outcomes. Process, output and outcome indicators are all applied within a broader 'learning system' approach taken in Austria (see Box 2.8).

Box 2.8 Use of indicators for adaptation monitoring: lessons learned from Austria

Key messages

- Indicators have the potential to shed light on adaptation progress for selected issues, but cannot show the complete picture, and thus need to be complemented with other sources of information.
- An indicator system needs to stay flexible and be designed as a learning system to take into account future climate impacts and new adaptation challenges and measures.

Objective and development process of indicators

In Austria, indicators (referred to as criteria) are used to track the progress and implementation of the Austrian National Adaptation Strategy and Plan, published in October 2012. The process of developing a monitoring and evaluation system started in early 2013 and it applies a mixed-methods approach, combining (1) an indicator-based approach alongside qualitative and quantitative data sources and (2) information gained from a stakeholder survey on the implementation of adaptation actions.

Indicators have been developed in an iterative process based on a literature review and expert knowledge gained through stakeholder interviews and one workshop with national and provincial policymakers. Nearly all indicators chosen have been used for other policy questions and circumstances before and, thus, data sources are available. The indicators selected describe the adaptation process (e.g. mainstreaming adaptation into funding programmes), the output (e.g. share of biologically cultivated land) or the outcome (e.g. decreased number of exposed infrastructure and buildings in flood risk areas). The final set of 45 indicators covers 13 sectors of the NAP with around four indicators assessing each sector (some provide information for more than one sector). The first Climate Change Adaptation Progress Report was published in November 2015 after adoption by the Austrian Council of Ministers.

Lessons learned

The Austrian MRE approach is designed as a learning system, which is kept open for future amendments. The need for a flexible indicator system with an iterative development process became apparent when, for example, identifying indicators that needed to be clearly relevant to the main adaptation aspects, make use of existing data (or data collected with little effort), be robust and — if quantitative — based on statistically validated data, be repeated in an appropriate timeframe (every 3 years) and be measurable at national level.

So far, the identification of indicators that relate clearly to the main adaptation aspects has been one of the principal challenges. Some aspects of climate change adaptation are not (yet) measurable and in general there are few quantifiable adaptation targets; thus, there remain gaps within the indicator set. Within some fields of the NAS, data are currently not available, although data collection would be possible. All these data and general gaps are mentioned and described in the Austrian progress report. The stakeholder survey, which is also included in the report, provides more information on some of these aspects. When combined with the indicators, such qualitative information can contribute to a more complete overview of adaptation progress, providing a valuable synopsis.

Link to additional information: http://www.bmlfuw.gv.at/umwelt/klimaschutz/klimapolitik_national/anpassungsstrategie/fortschrittsbericht.html (German); https://www.bmlfuw.gv.at/umwelt/klimaschutz/klimapolitik_national/anpassungsstrategie.html.

The challenge of developing medium and longer term outcome indicators is reflected in the limited number found in current MRE systems. Instead, a mix of process and output indicators (and sometimes shorter term outcome indicators) is commonly used to understand progress towards broader outcomes. Outcomes are often articulated in terms of increased resilience or decreased vulnerability to a given risk or in a specific sector. The challenge then exists to test the causal link between adaptation policy responses and these broader outcomes. The United Kingdom approach aims to achieve this by combining indicator types to inform a broader understanding of progress towards outcomes in which the preparedness of society to specific climate risks is used as an overall frame. This presents an ambitious approach that seeks to link the existence of plans and policies (process indicators) and NAP actions (often a mix of process and output indicators) to changing vulnerability to critical climate risks (vulnerability indicators). Both quantitative indicators and qualitative information are used to understand progress towards outcomes. Examples of such mixed-methods approaches are explored in more detail in Boxes 2.10 and 2.11.

Benefits and challenges of developing indicators

Consultations undertaken with MRE experts, including at the Expert Workshop, highlighted the benefits and challenges of developing indicators. All experts viewed indicators as an important tool for reporting on progress relating to adaptation policy. Quantitative indicators were seen as attractive and practical, as they can communicate clear messages that are easy for policymakers to grasp. Some experts specifically referred to perceptions of objectivity and robustness that are often associated with quantitative indicators, which make them particularly useful when communicating key messages regarding adaptation progress. Experts also felt that standardised, well-described indicators allow repeated measurement and the opportunity to create a time series, enabling the identification of trends. The use of pre-existing indicators (in some cases adapting them to purpose) is an accepted and pragmatic approach that brings advantages in terms of efficiency, as well as providing multiple perspectives on adaptation.

Indicators are central pillars of many climate adaptation MRE systems at national level; however, the experiences of countries highlight a number of practical challenges for practitioners. The availability of data is the primary challenge identified and, consequently, indicators often are supplemented by information gained through surveys and expert elicitation, as is explored later in this section. Data availability issues can include challenges related to lack of data,

poor spatial coverage, lack of spatial and temporal coherence and the timeliness of new data. These issues are often reinforced by a tendency to use existing data sets that may have been developed for different purposes and are aligned to different policy cycles.

While indicators are clearly a valuable asset for the policy evaluator, it is vital to remember they are only an *indication* of progress and performance. An over-reliance on indicators as a single, primary source of information on adaptation effectiveness and efficiency can lead to inappropriate assumptions regarding causality. The application of indicators can help to reduce complexity to a manageable state by identifying and measuring essential components and relationships within the system, but this results in trade-offs in credibility, robustness and legitimacy (Miller et al., 2012). The aggregation of indicators, or the use of composite indicators, can mean that further information is lost. This places greater importance on the careful consideration of how indicators are used when communicating monitoring and evaluation results (see Section 2.4). Recognising the limitations of quantitative indicators is critical if they are to be used successfully. Used in isolation, indicators are not effective in revealing the narrative behind complex issues such as climate adaptation, and rarely tackle the questions of 'why' or 'how' adaptation is influencing vulnerability or resilience.

The process of developing indicators

The design of indicator sets is usually the responsibility of a single organisation that often has broader responsibilities for adaptation and/or MRE (see Section 2.2). At the same time, this process usually relies on the contribution of a range of stakeholders, including scientific experts, stakeholders within key sectors and organisations with existing responsibilities for monitoring and data collection. Based on the experiences of European countries developing MRE systems, there are three main motivations for this wider engagement: first, to ensure that the indicators selected are 'fit for purpose' and are scientifically robust; second, to check the feasibility of data collection; and third, to provide transparency and independence.

Most countries have taken a pragmatic approach by developing indicator sets comprising a collection of pre-existing indicators that together provide insights into impacts, vulnerability and the appropriateness of adaptation policy responses. This places further emphasis on establishing effective means of cooperation with a wide range of stakeholders in order to ensure that the indicators are appropriate and that data are available. Box 2.9 highlights the systematic approach undertaken to develop an

indicator system in Germany, which emphasises the importance of transparency in the design and selection of indicators and the benefits of documenting the process to improve future indicator sets. It also illustrates the range of stakeholders and experts that can be involved in the process of indicator development.

In order to avoid some pitfalls of using quantitative indicators, such as potentially misleading data or over-simplified messages, some level of expert interpretation of quantitative indicators is essential. This can be provided by experts within the organisation responsible for coordinating the MRE system or by engaging external experts, as explored below.

Box 2.9 A systematic approach to indicator development in Germany

Key messages

- A well-structured system for documenting the process of developing indicators can support the monitoring and reporting system as a whole.
- It was important that federal ministries authorised the participation of national agencies, enabling them to actively contribute to the inter-ministerial working process. Indicator fact sheets facilitate technical exchanges with the experts and support the technical and political agreement of the indicators.
- Background papers ensure transparency and facilitate the development of additional indicators in the future.

A key element of the German Adaptation Strategy (DAS) is an initial progress report on the implementation and further development of the DAS, which is due at the end of 2015. To support this progress report, an indicator-based monitoring report was published in May 2015. An indicator system, developed through an inter-departmental process, therefore plays a vital role in providing information for both the monitoring and the progress reports.

The DAS indicator system consists of 102 indicators developed across 15 themes or action fields. Numerous experts from agencies at federal and state levels, and scientific and private institutions participated in this process, and the final output received political agreement. The process began by determining what needed to be monitored in terms of 'impacts' of climate change and associated 'responses' (adaptation measures or activities implemented). These were then collated and grouped into 'indication fields' aligned to specific sectors or identified as being cross-sectoral. The following criteria were applied to determine whether or not an indicator was suitable for the DAS indicator system:

- The indicator must be closely associated with climate change issues and adaptation.
- The 'impact indicators' should describe areas that are currently affected by climate change or are expected to be affected in the future.
- The 'response indicators' should describe activities that support the adaptation process and, where applicable, also describe developments that counteract this process.
- Data must be available for formulating the indicators. The indicator must provide certainty that the data will remain available for the foreseeable future, and that it can be procured at reasonable cost and effort nationwide.

A documentation system, consisting of indicator and data fact sheets, supports the process of updating the indicator documentation, the data sources and the reporting process itself. Indicator fact sheets provide justification of why an indicator was chosen, identify weaknesses with regard to the interpretability, availability and comprehensibility of data and determine the areas of responsibility (remits) for updating. Data fact sheets (Excel files) contain both the data sets required for calculating or illustrating the indicators and the relevant metadata sets.

Ensuring transparency and enabling improvements to indicators in the future were important considerations in the German approach to indicator development. Comprehensive documentation of discussions and background papers helps to improve transparency and to facilitate the development of additional indicators in the future. A 'user manual' has also been developed to provide guidelines for all work required for future updates of the indicators and for allocating roles among different contributors.

Links to additional information: <http://www.umweltbundesamt.de/en/publikationen/evaluation-of-the-german-strategy-for-adaptation-to> (in English); <http://www.umweltbundesamt.de/publikationen/evaluierung-der-das-berichterstattung-schliessung> (in German).

2.3.2 Stakeholder perspectives

Quantitative indicators are usually used in conjunction with qualitative methods such as gathering views and opinions of stakeholders, including particular communities of expertise ⁽¹⁶⁾. Nearly all countries acknowledge the benefits of such information, but they use different approaches to gain these perspectives. In some cases, consultation with civil society, sector experts and the general public is a requirement specified within broader adaptation legislation (e.g. in Malta, the need for consultation is emphasised in the Climate Action Act, 2015), while, in other cases, it is a voluntary but valued means of gathering information. Stakeholder perspectives are perceived to play an important role in validating quantitative indicators and in revealing critical contextual information that can help to explain the narrative behind the numbers.

Methods to gather stakeholder perspectives

Stakeholder perspectives provide predominantly qualitative evidence regarding the progress being made towards long-term outcomes. Emphasis is often placed on selected stakeholders assessing adaptation progress and identifying gaps, often from the perspective of a specific sector (e.g. infrastructure) or theme (e.g. biodiversity). These approaches are sometimes referred to as 'self-assessments', namely experts providing their own assessment in relation to aspects of adaptation progress and performance.

A range of methods has been used in European countries for collecting stakeholder perspectives, including surveys, workshops, in-depth interviews, consultations and the establishment of expert panels. These methods appear to be implemented in different ways depending on the context in which they are used; however, they are often based on the principles of expert elicitation (the synthesis of opinions of technical and scientific experts), an approach that is commonly used when quantitative data are insufficient or when data need to be validated or contextualised.

The different applications and interpretations of methods is evident when the use of surveys is considered. In Switzerland, a survey of adaptation progress among canton-level governments is being conducted, which contains mostly closed questions and a limited number of open fields. Such an approach may aid analysis, enabling greater comparability between responses. In contrast, the survey of sectors undertaken in France was less structured and more open in nature, so was able to gain nuanced insights into the links between climate risks and adaptation policies and

actions. Discussions at the Expert Workshop revealed a number of practical considerations that appear to shape the type and application of methods. These include the time and resources required to design, undertake and analyse data collection methods and the need to balance the benefits of a detailed survey, interview programme or workshop series with the time constraints of participants.

As the number of countries developing MRE systems increases, knowledge exchange between countries is becoming an additional source of expert knowledge; experiences in other countries can inform the methodological approaches taken. For example, the United Kingdom CCC commissioned a study into the use of global and national indicators (Horrocks et al., 2012), and Switzerland has examined approaches used elsewhere. There are also examples of European countries engaging national experts from other countries in the review and development of their MRE approaches, which further supports the transfer of knowledge across national boundaries. As well as generating information for this report, the Expert Workshop held in Copenhagen, Denmark, in 2015 provides a further example of such knowledge sharing.

Benefits of gathering stakeholder perspectives

Generating information for MRE through the engagement of sectoral and thematic experts has a number of benefits. It can prevent an over-reliance on indicators, help to validate quantitative data and enable the exploration of the questions of 'how' and 'why'. In turn, a deeper understanding of the causes and processes underpinning adaptation progress can reveal a clearer picture of causality and, therefore, support the attribution of outcomes to adaptation measures (or at least can support the determination of the contribution they have made). The significance of stakeholder perspectives in facilitating 'improvements in understanding what is actually happening on the ground' was stressed by one participant at the Expert Workshop. Other participants indicated that involving stakeholders from specific sectors can help to foster commitment and improve learning. Consequently, this can help to strengthen the implementation of adaptation policies and actions and can inform MRE processes.

Self-assessment approaches in Finland emphasised the fact that sectoral experts know their sector best; therefore, they can provide practical insights regarding the enablers and barriers to adaptation that quantitative indicators cannot identify (see Box 2.10). In a number of examples, the stakeholders targeted through self-assessment processes were those who

⁽¹⁶⁾ As stated in Section 2.2 in this report, the term 'stakeholder' is used to refer to all parties who are affected by or affect adaptation policies.

Box 2.10 Evaluation of the National Adaptation Strategy using self-assessment and stakeholder perspectives: experiences from Finland

Key messages

- Self-assessments by actors responsible for the implementation of adaptation measures offer a cost-efficient method for generating insights on adaptation progress and enhancing learning among participating actors.
- The collection of multiple stakeholder perspectives and the use of different data sources facilitate balanced evaluation results.

The latest evaluation of the Finnish NAS in 2012–2013 built on a number of methods and information sources to assess the level of adaptation in different sectors, including self-assessment by government actors and the collection of stakeholder perspectives through workshops, surveys and interviews.

As a first step in the evaluation process, a self-assessment was carried out by sector representatives in the National Coordination Group for Adaptation, who assessed the status of implementation of adaptation measures in their sectors. The self-assessment was supplemented with information collected in an expert survey. These experts were asked to evaluate the success of implementation of the adaptation measures, overall progress of adaptation in sectors, possible bottlenecks for adaptation and key needs for additional measures and tools to support adaptation. Additional data for the evaluation were collected in four thematic interviews, focusing on adaptation measures in the industry, health, insurance and built environment sectors, as well as in a workshop directed at adaptation experts and practitioners.

Based on the aggregated data and stakeholder views, each sector's level of adaptation was described as a position on a five-step scale of adaptation. This qualitative indicator combines multiple, primarily process-based, elements relating to the implementation of the NAS, such as recognition of the need for adaptation in the sector, availability of knowledge on climate impacts, identification and status of implementation of identified adaptation measures, level of cross-sectoral cooperation and level of mainstreaming of adaptation into regular processes and activities in the sector. Details of the different steps are described below.

Step 1	• Need for adaptation is recognised among a group of pioneers in the sector • Little research has been done on the impacts of or adaptation to climate change • Some adaptation measures have been identified but have not yet been implemented
Step 2	• Need for adaptation measures is recognised to some extent among decisionmakers in the sector • Impacts of climate change are known indicatively (qualitative information), taking account of the uncertainty involved in climate change scenarios • Adaptation measures have been identified, plans for implementation have been made and some measures have been launched
Step 3	• Need for adaptation measures is quite well recognised (majority of decisionmakers) • Impacts of climate change are quite well known (quantitative information), taking account of the uncertainty involved in climate change scenarios • Adaptation measures have been identified and their implementation has been launched • Cross-sectoral cooperation on adaptation measures has started
Step 4	• Need for adaptation measures is widely recognised and accepted in the sector • Adaptation is incorporated into regular decisionmaking processes • Impacts of climate change are well known, within limits of the uncertainty linked to scenarios • Implementation of adaptation measures has been widely launched and their benefits have been assessed at least to some extent • Cross-sectoral cooperation on adaptation measures is an established practice
Step 5	• Adaptation measures under the Adaptation Strategy are recognised or otherwise implemented in the sector

In some sectors, the evaluation drew on the views of a handful of experts, but in most sectors multiple perspectives were collected from different stakeholder groups. In addition, the evaluation utilised results of the NAS mid-term evaluation (2009) and results of international studies that had evaluated Finland's NAS.

Links to additional information: Finland's National Climate Change Adaptation Plan 2022 (in English): http://mmm.fi/documents/1410837/1888935/MMM-%23193086-v1-Finland_s_National_climate_Change_Adaptation_Plan_2022.pdf/c2bfec7b-ae73-4247-b666-26a3ed363f99 (Annex II summarises key results and recommendations of the evaluation); Evaluation of Finland's NAS (in Finnish only): <http://mmm.fi/luonto-ja-ilmasto/ilmastonmuutokseen-sopeutuminen>.

implemented measures (e.g. France and Switzerland) or stakeholders that are specifically mentioned in the NAS/NAP being evaluated (e.g. Austria). Engaging those best placed to enhance adaptation policy implementation in the MRE process ensures that MRE reflects local and sectoral contexts, but also provides a valuable way of reflecting on practice and improving learning.

2.3.3 *Applying a mixed-methods approach*

A clear message from the Expert Workshop, reinforced by a recent report (OECD, 2015), is the need for blended or 'mixed-methods' approaches. A mixed-methods approach to MRE makes use of multiple sources of information and combines both the quantitative and qualitative methods (for example using a range of indicators, alongside stakeholder perspectives gained through self-assessments, surveys and consultations with experts). This allows for more effective triangulation of information gathered through MRE processes as different data sources can be checked against each other to ensure that the overall narrative of adaptation progress is robust, consistent and contextualised.

A mixed-methods approach can help to overcome some of the limitations of quantitative indicators and qualitative data provided by stakeholders. By drawing upon multiple data sources, across a range of scales and sectors, MRE systems can provide a more accurate and nuanced picture of adaptation progress and performance. For example, a country may wish to understand adaptive capacity within government but also make use of existing data on, for example, changing ecosystems and habitats; gathering information on these aspects will require different methods and generate different types of data. A national level MRE system needs to be flexible, and be able to synthesise information from multiple sources. A system that utilises mixed methods is likely

to be more flexible than one reliant on limited types and sources of data.

Experience from countries with more established national-level MRE processes highlights the use of mixed methods that combine multiple data sources within an overarching MRE system. In particular, it appears that while indicators play a prominent role, they are often supported by other methods. For example, in Belgium, vulnerability assessments (using both qualitative and quantitative information) are combined with a set of 'easy-to-use' indicators that focus on the implementation of adaptation measures. Finland, which was one of the first countries to implement an MRE system, has combined reports on adaptation actions, self-assessments, workshops gathering expert views and a survey of regional adaptation (as described in Box 2.10). Similarly, in the United Kingdom, indicators and self-reporting by those responsible for managing key risks are used alongside expert judgement (see Box 2.11). The strength of any MRE system often lies in the ability to collate and analyse multiple sources of information into a consistent and robust evaluation.

Ultimately, it is likely to be the task of the organisation that coordinates MRE at national level to interpret exactly what this combination of quantitative and qualitative data is saying regarding key trends that are likely to be affecting society's vulnerability to climate change risks. From this analysis, it will be possible to make an informed judgement about the level of progress being made in managing vulnerability or enhancing resilience. By planning a mixed-methods approach to MRE from the outset, and by considering the strengths and weaknesses of different information sources, it is possible to improve the range and quality of information that can be analysed and evaluated. It is then the quality, thoroughness and independence of this evaluative aspect that is likely to influence whether or not MRE processes lead to improvements in future adaptation policy and practice.

Box 2.11 Combining quantitative indicators with qualitative information to assess adaptation progress in the United Kingdom

Key messages

- The United Kingdom approach provides a statutory, independent assessment of progress in delivering the National Adaptation Programme.
- The approach assesses how vulnerabilities to key risks are changing and considers whether or not NAP actions have been delivered and whether or not plans and policies are in place. This provides a broader understanding of the changing context in which adaptation is occurring, which is critical for the assessment to be meaningful.
- The United Kingdom assessment process makes use of indicators along with a range of other data sources (including stakeholder perspectives), which are then analysed to provide an independent view of adaptation progress.

The 2008 Climate Change Act requires the United Kingdom Government to conduct a Climate Change Risk Assessment (CCRA) and, in the light of the risks identified, develop a National Adaptation Programme (NAP). The Adaptation Sub-Committee (ASC, as part of the independent Committee on Climate Change) is tasked under the Act to evaluate every 2 years the progress being made in delivering the NAP. This forms part of a larger report to parliament on both climate mitigation and adaptation.

The adaptation assessment report follows the structure of the NAP, focusing on six priority themes: the built environment, infrastructure, healthy and resilient communities, agriculture and forestry, the natural environment, and business. A cross-cutting chapter on local government is also included. To evaluate the progress being made by the NAP, the ASC has considered three key questions for specific adaptation priorities identified under each theme:

- **Is there a plan?** The ASC has assessed whether or not policies and plans in each area address the relevant climate risks. For example, the National Planning Policy Framework explicitly considers climate change and provides a basis for land-use planning decisions that account for current and future flood risks.
- **Are actions taking place?** The ASC assessed the 371 actions listed in the NAP, as well as any other relevant activity that may be helping to reduce the impacts of climate change.
- **Is progress being made in managing vulnerability?** To arrive at an overall assessment, the ASC has considered the available data to determine whether vulnerabilities to climate change risks are increasing or decreasing.

The assessment is informed by a set of indicators that the ASC has identified and, in some cases, developed. These indicators measure any trends in changes to exposure and vulnerability over time, and any observed impacts. For each indicator, an assessment of the 'direction of trend' (increasing, decreasing or static) and 'implication of trend' (is the risk increasing?) is made.

The ASC uses information derived from the indicator set, along with a variety of other sources, to assess adaptation progress. These other sources include a series of non-statutory annual progress reports that the ASC produced between 2010 and 2014 in the run-up to its statutory report in 2015. These reports examined specific risks and themes in detail and drew upon the expertise and knowledge of key organisations across relevant sectors. The indicators used in the 2015 report were identified through these annual 'deep-dive' assessments.

The ASC widely consulted with key organisations as part of the statutory assessment process. All organisations that had actions attributed to them in the NAP were contacted and given the opportunity to provide the ASC with an update on the implementation of their actions. In addition, where significant data gaps existed, the ASC commissioned specific research projects. The ASC then analysed this combination of qualitative and quantitative data and came to a judgement regarding each of the three key questions outlined above. A 'traffic light' system (red, amber and green indicators) was then used to highlight the progress for the key adaptation priorities in each thematic area of the NAP. Figure 2.3 (from the statutory adaptation assessment report) illustrates the overview of progress for adaptation priorities within the 'agriculture and forestry' NAP theme.

Box 2.11 Combining quantitative indicators with qualitative information to assess adaptation progress in the United Kingdom (cont.)
Figure 2.3 Overview of adaptation progress for agriculture and forestry

Overview of progress			
Adaptation priorities?	Is there a plan?	Are actions taking place?	Is progress being made in managing vulnerability?
1. Water demand by agriculture	Amber	Amber	Amber
2. Flooding of agricultural land	Amber	Green	Amber
3. Fertility of agricultural soils	Amber	Amber	Red
4. Climatic suitability of tree species	Green	Green	Green
5. Prevalence of new and existing pests and diseases	Green	Green	Grey
6. Innovation and knowledge transfer	Green	Amber	Amber

Note: The criteria for Red, Amber, Green or Grey status for each of the three questions are as follows:

Is there a plan? Green — where needed, plans or policies are in place that fully address the adaptation priority in the context of climate change. Amber — plans or policies are in place that partially address the adaptation priority. Red — no specific policies or plans are in place.

Are actions taking place? Green — all relevant NAP actions are complete or on-track, other relevant actions or commitments are being implemented. Amber — not all relevant NAP actions are on-track, partial delivery of other actions or commitments. Red — NAP actions mostly delayed or dropped, other relevant actions being behind schedule.

Is progress being made in managing vulnerability? Green — trends in vulnerability are reducing or not increasing; there is high uptake of low-regret adaptation measures; long-term decisions are accounting for the future climate. Amber — some trends in vulnerability are increasing; scope to increase low-regret adaptation, decision partially or inconsistently account for the future climate. Red — most trends in vulnerability increasing; minimal or zero uptake of low-regret adaptation; long-term decisions not taking the future climate into account. Grey — insufficient evidence available to make a judgement.

Thirty-six specific, time-bound recommendations were made within the assessment report where further progress is felt to be most important. The government provided parliament with its response to these recommendations in October 2015.

Links to additional information: The report 'Reducing emissions and preparing for climate change: 2015 Progress Report to Parliament': <https://www.theccc.org.uk/publication/reducing-emissions-and-preparing-for-climate-change-2015-progress-report-to-parliament>; The ASC's adaptation indicator set: <https://www.theccc.org.uk/charts-data/adaptation-indicators>.

As well as the report itself, the website contains links to the full list of indicators used, the updates received on the 371 NAP actions, reports from research projects commissioned and technical annexes for each NAP theme that summarise the key trends identified by the indicators.

2.3.4 Addressing the challenge of attribution

Attributing outputs and outcomes is a particular challenge for MRE of adaptation. As regards climate risks and impacts, identifying a causal link to climate adaptation policies and actions (processes and outputs) and to changes in vulnerability and resilience (outcomes) at national level is a major challenge. This stems partly from the long timescales and uncertainty associated with adaptation, as described in Chapter 1 of this report. Attribution is also challenging because of the sheer range of social, economic and environmental factors that can influence long-term outcomes, many of which are external to specific adaptation policies or actions. No single solution exists for the 'attribution challenge'; however, a number of factors can be identified that may help MRE practitioners to address it.

Use of both qualitative and quantitative information

It is difficult to determine the existence of a causal relationship between a policy action and an outcome using only quantitative indicators. As outlined in Section 2.3.3, a mixed-methods approach, making use of both quantitative and qualitative data sources, can produce a more comprehensive assessment of the relationships between policy actions and outcomes.

Mapping expectations and assumptions

Attribution is easier to assess if expected relationships between climate change risks, adaptation policies and actions and outcomes (changes in vulnerability and resilience) are mapped out to begin with. This recognition has led to a growing interest in 'Theory of Change' approaches for adaptation MRE (see Box 2.12), although, as yet, few examples are evident at national level.

Some of the principles of the 'Theory of Change' approach are applied in the Netherlands, where 'signposts' are used to help assess whether or not the Dutch NAS is meeting the underlying conditions that have been identified as being critical to its success (see Box 2.13 for further details). In Switzerland, an

impact model forms the basis of the MRE approach (see Box 2.14) and this begins to set out the logic underpinning the flow from concept to outcome and impact, potentially allowing for a deeper analysis of assumptions and a better understanding of the adaptation process.

In Switzerland, a 'Theory of Change' approach is not used specifically; however, there are strong similarities in the way an impact model forms the basis of the MRE system (see Box 2.14). This model places emphasis on understanding the complex relationships within the adaptation process and on examining the expected, and actual, causal links between concept and impacts. This reveals the assumptions made during the development of the NAS that can then be tested using the impact model approach.

Clearer articulation of policy objectives

A number of participants at the Expert Workshop stated that, if aims and objectives had been more precisely specified within national adaptation policies and plans (NAS/NAP), it could have been easier to attribute outputs and outcomes to policies. Without this clarity, MRE systems are required to 'identify' instead of 'track' a causal chain between policies and outcomes, which is a much harder task. More precisely defined objectives can be useful, especially if they include an articulation of the assumptions made (possibly by developing a 'Theory of Change', see Box 2.12), thus enabling the MRE system to test the validity of these assumptions and allowing outputs and outcomes to be tracked.

Ensuring adaptation initiatives are connected

Attribution may also be made easier if risk assessment, national adaptation policy and MRE processes are carefully coordinated and brought closer together. The tendency for MRE systems to be aligned to existing adaptation governance structures is useful in this regard. In the United Kingdom, the first cycles of the national CCRA, NAP and MRE of the NAP are all complete; it is now easier to see how these elements could be better coordinated.

Box 2.12 'Theory of Change'

'Theory of Change' is a critical thinking approach to programme design, monitoring and evaluation. This approach identifies a long-term outcome(s) then 'works backwards' to outline the building blocks and the relationships between them that would lead to the accomplishment of a long-term goal. 'Theory of Change' explicitly identifies assumptions ('if Y occurs, we expect X to happen') enabling these assumptions to be tracked and evaluated. 'Theory of Change' may be of particular use for national-level adaptation MRE, as it can 'tie together diverse projects and programmes into a coherent and strategic portfolio that enhances linkages across climate change adaptation sectors and scales' (Bours et al., 2014c). The implementation of adaptation measures can be seen as a way of testing the hypotheses of the explicitly formulated 'Theory of Change' on adaptation.

Box 2.13 Using the monitoring wheel to assess the state of climate adaptation in multiple sectors: experiences from the Netherlands
Key messages

- The monitoring wheel helps policymakers and stakeholders to assess the progress with of the monitoring and evaluation of adaptation policies in sectors. In this way, achievement can be accounted for and sectors can learn.
- An innovative element of the monitoring wheel is the definition and evaluation of signposts. They determine the validity of choices made and, as such, provide a link between short-term decisions and the longer term vision.
- The first applications of the monitoring wheel showed that flood protection is the most advanced policy area within the Netherlands for adaptation, whereas multiple other fields are still in the early stages of development.
- However, as also depicted by the monitoring wheels, much is going on in the other sectors, although not automatically assigned to climate adaptation.

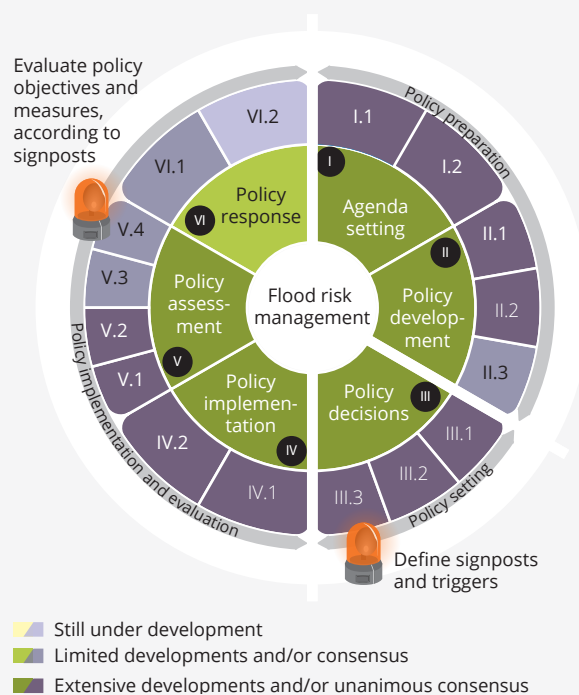
In the Netherlands, the monitoring wheel was proposed as a tool to assess the development and effectiveness of adaptation policies, measures and actions. For sectors that are relevant for the NAS, it uses a colour-based system to depict the 'state-of-play' in steps of the policy cycle (inner cycle) and 16 underlying performance areas (outer circle). The basis for the colours used in the wheel for each sector is a list of 41 process, output and outcome indicators.

The innovative part of this concept is the definition (step III.3) and evaluation (step V.4) of signposts. These signposts specify information that should be tracked for each sector to determine whether or not a plan is meeting the conditions for its success. These signposts can be climate related (e.g. frequency of heat waves, maximum river discharge) or non-climate related (financial resources, political conditions, socio-economic and technological developments). In addition, critical values of signpost variables (triggers) need to be specified beyond which additional actions are needed. To date, this has been done for only a few sectors (e.g. flood protection is based on a maximum discharge of the Rhine river of 16 000 m³/s; chosen flood measures and actions are based on specific founding until 2050). Signposts determine the validity of choices made and help to determine adjustments that might be needed to the strategy and/or its policies. As such, they provide a link between short-term decisions and the longer term vision.

Monitoring wheels have been developed for various sectors in the Netherlands (Figure 2.4). In this early phase of development, the main purpose is to learn. Later, when a monitoring and evaluation system is adopted and is frequently repeated, the wheels can also be used to compare sectors and account for progress. The first development showed that flood protection is the most advanced policy area within the Netherlands for adaptation. Relevant targets have been set in the Delta decisions and policies, and measures are defined to achieve the targets. In addition, some form of monitoring has been set-up, even for the output of the policy process. In other sectors, such as health and nature conservation, climate adaptation policies are seldom explicitly developed. But, even in most of these other sectors, much is going on already, although seldom assigned an adaptation policy.

Links to additional information: van Minnen et al., 2015, <http://www.pbl.nl/publicaties/ontwerp-voor-een-monitoring-en-evaluatiesysteem-voor-de-nationale-adaptatiestrategie>.

Figure 2.4 The monitoring wheel for flood protection and risk management as an example to show the progress and level of implementation in adaptation policies in the Netherlands



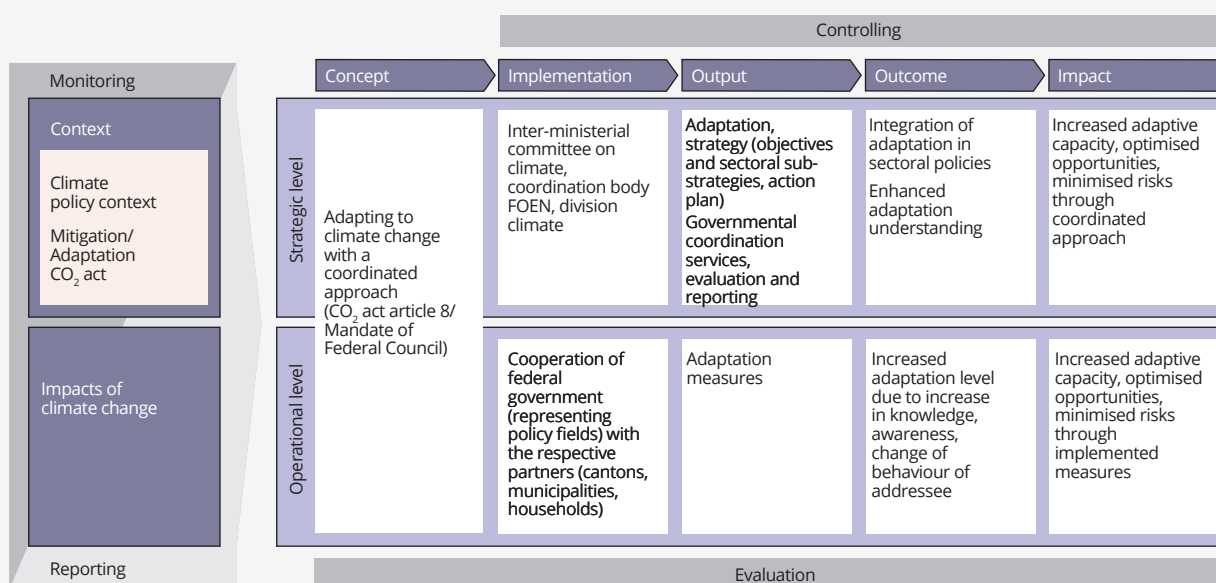
Box 2.14 Using an impact model to inform a national MRE system: experiences from Switzerland

- An impact model is a simple and efficient tool to demonstrate, communicate and facilitate discussion on the complex relationships associated with climate change adaptation.
- Indicators can provide relevant information on risks and vulnerabilities, but cannot provide as much relevant information on the effectiveness of adaptation measures.
- The key challenges for the Swiss MRE system are (1) to set objectives and thresholds for evaluating adaptation, (2) to capture the causality between the expected and the actual outcome of an adaptation measure and (3) the short timeframe between the adoption and the evaluation of the action plan.

The Swiss Adaptation Strategy provides a framework for coordination at federal level. In the first part, the objectives, challenges and fields of action for adapting to climate change are identified. The second part comprises an action plan with 63 adaptation measures. With the adoption of the action plan by the Federal Council, the Federal Office for the Environment (FOEN) was mandated to report to the Federal Council on the progress made, and the effects achieved, by the end of 2017. In response to this mandate, the FOEN is setting up the framework for the development of an implementable, user-friendly and meaningful monitoring and evaluation system for tracking climate change adaptation in Switzerland.

An impact model (see Figure 2.5) forms the basis of the Swiss national MRE system. The model consists of five evaluation 'objects' (concept, implementation, output, outcome and impact) and sets out the logic underpinning the flow from one object to another. Furthermore, the model distinguishes between the strategic level (the setting up of a coordination framework for adaptation) and the operational level (the implementation of adaptation measures).

Figure 2.5 The impact model used in Switzerland



The FOEN is planning to apply the impact model to all cross-sectoral risks identified in the adaptation strategy and for the adaptation measures to address these risks (as summarised in the action plan). Initially, indicators were to be developed to evaluate the effectiveness of adaptation; however, it was concluded that, while they may provide important information on vulnerability or risks, they are less informative when it comes to assessing effectiveness of adaptation.

The impact model is a simple and effective tool to demonstrate, communicate and facilitate discussion on the complex relationships associated with climate change adaptation. It has helped to optimise the use of existing knowledge and experience of stakeholders within Switzerland and it has supported learning. However, a number of challenges were identified, including setting objectives and thresholds for evaluating adaptation; capturing the causality between the expected and the actual outcome of an adaptation measure; and the short time between the adoption of the action plan and its evaluation.

Link to additional information: <http://www.bafu.admin.ch/klima/13877/14401/14899/index.html?lang=de> (in German, French and Italian).

2.4 Informing adaptation policy and practice

Key messages

- Experience of applying monitoring and evaluation results to improve adaptation policy and practice is limited, as only a few countries have MRE systems in place, and these have only been established recently.
- Some evidence is available that monitoring and evaluation results inform the revisions of adaptation strategies and plans. However, little is known about the influence of these results on adaptation practice.
- Countries have started to use various methods to communicate monitoring and evaluation results. Communicating results to the intended target groups is largely focused on published reports.
- Sharing experiences and learning about the use of monitoring and evaluation results will further improve adaptation policy and practice.

Monitoring, reporting and evaluation are essential in the policy cycle for the continuous improvement of adaptation policy and practice. This section aims to highlight the extent to which monitoring and evaluation results are currently being taken up in adaptation policies and sheds light on the implications for adaptation practice. Furthermore, current practices in enhancing the impact and communicating the results of monitoring and evaluation are presented, along with related experiences involving relevant stakeholders. Finally, this section explores how the link between monitoring and evaluation results and policy responses might be strengthened to better inform policy development, as well as practice and enhance learning.

2.4.1 Application of monitoring and evaluation results to inform future adaptation policy

As summarised by Expert Workshop participants, monitoring and evaluation results can be utilised in a number of ways, including:

- raising awareness of adaptation in various sectors and levels of governance;
- building capacity among stakeholders and supporting learning (e.g. to foster mainstreaming in other sectors);

- identifying shifting baselines for climate change impacts and adaptation;
- assessing trends for vulnerability in specific sectors or for specific risks;
- providing concrete recommendations for adjusting policies and measures (policy revision and intervention);
- identifying knowledge and data gaps; and
- highlighting further research needs.

This list shows that countries see the application of monitoring and evaluation results as closely connected to the identified purposes of MRE (see Section 2.1), which to some extent is a precondition for really making use of the results. It is critical to examine how the results of monitoring and evaluation are actually being used and how they influence adaptation policy and practice in European countries. Evidence shows that experience of the actual application of MRE of policy and practice is still limited (see Table 2.5). This is mainly a result of the current status of adaptation policy implementation in Europe, where only a few countries have developed and, more importantly, are applying MRE systems. Consequently, there is limited evidence of the actual influence of monitoring and evaluation results on policy and practice.

So far, European countries use monitoring and evaluation results mainly to adjust and revise their NASs and NAPs (e.g. Finland, France, Spain, the United Kingdom). As a result, national-level MRE systems predominantly influence policymaking at national level. This, in turn, may well lead to changes at sub-national level, although there is no evidence of such a cascading effect to date. Little is known about MRE of adaptation practice on the ground; thus, the influence of monitoring and evaluation results on adaptation practice (as opposed to policy) is difficult to judge.

Box 2.15 presents an example from France that illustrates how outcomes from monitoring and evaluation can be used for the further development of a NAP.

The following example from Belgium (Box 2.16) presents the experiences and lessons learned during the evaluation of a national plan addressing one specific climate risk (heat waves). It shows how the results of the evaluation are used to further improve the heat wave action plan and its effectiveness.

Given the fairly limited information and practical experiences on the application of monitoring and

Table 2.5 Examples of the application of monitoring and evaluation results across European countries

Country	Application of monitoring and evaluation results
Austria	The first Austrian Implementation Report was adopted by the Austrian Council of Ministers in October 2015. The aims are to monitor the implementation of the Adaptation Strategy, to provide an overview on the progress of adaptation and information on key trends of vulnerabilities, to create awareness of the need of adaptation and highlight gaps and key challenges and to provide a basis for continued development (review) of the NAS.
Belgium	Systematic application of adaptation monitoring and evaluation results is yet to take place, but evaluation results are being used to improve an action plan addressing heat waves as a specific climate risk.
Finland	Results of the NAS evaluation (published in 2013) were used in the revision of the strategy, published in late 2014.
France	Mid-term self-evaluation of the NAP (published in early 2014) has been integrated into the Ministry roadmap (published in early 2015) to improve the most important failures of the first plan. The final evaluation findings will act as an entry point for the final evaluation of NAP 2011–2015.
Germany	The first monitoring report of the German Adaptation Strategy (DAS) supports the progress report (expected publication in late 2015). The monitoring report gives information on climate change impacts and ongoing adaptation. Together with information from the vulnerability assessment, it provides a base from which to develop adaptation policies further.
Lithuania	Every 2 years, the Government of the Republic of Lithuania prepares a report on the implementation of the NAS to the parliament. The outcomes of the MRE will feed into further development of the Action Plan (2013–2016) and updating of the NAS.
Netherlands	Limited application of results so far. Nevertheless, evidence is available that a group of policymakers at national and regional/local level have become interested in the development of the MRE system and its possible results. Their interest focuses on learning from MRE and getting more systematic insights in the process towards achieving adaptation goals.
Spain	Monitoring reports are available and widely disseminated to all stakeholders with responsibilities in the planning and management of sectors and systems that need to integrate adaptation to climate change. The outcomes of the monitoring reports complement each other and inform policy and practice. Monitoring reports are a key element in designing the successive Working Programmes of the National Adaptation to Climate Change Plan.
Switzerland	The main objectives of MRE activities are continued development and improvement of the adaptation strategy. The evaluation of the development process of adaptation strategy is finalised and possibilities of improvements are discussed with involved stakeholders. The reporting to the Federal Council in 2017 is based on the progress report, a self-assessment of Federal Offices implementing adaptation measures (available at the end of 2015, and every 2 years thereafter) and the evaluation of effectiveness of the adaptation strategy.
United Kingdom	In June 2015, the CCC published the report 'Reducing emissions and preparing for climate change: 2015 Progress Report to Parliament', the first statutory report on adaptation (and mitigation) progress. In October 2015, the government provided its response to the findings and recommendations.

Source: Questionnaire prior to the Expert Workshop.

evaluation results across Europe to date, significant efforts will be needed in the coming years to implement MRE systems and to communicate and use MRE findings. Much has been achieved in recent years in terms of developing adaptation plans and strategies; however, MRE will be instrumental in informing policymakers and decisionmakers

about whether, and how, adaptation policies have been implemented and how effective adaptation measures are in meeting set objectives. Sharing experiences and learning about the use of monitoring and evaluation results can play an important role in ensuring they affect future policy and practice positively.

Box 2.15 Use of monitoring and evaluation results: moving towards a full policy cycle in France

Key messages

- The inclusion of indicators and their definitions in the NAP supports focused monitoring of its implementation.
- A formalised process and structural involvement of high-level agencies and committees in MRE improves the uptake of conclusions and recommendations in the next round of policymaking.

The French National Adaptation Plan for 2011–2015 includes actions and measures designed to help France prepare for, and exploit, new climatic conditions. Annual monitoring of the NAP's implementation is carried out by the National Observatory on the Effects of Global Warming (Observatoire national sur les effets du réchauffement climatique, ONERC) based on indicators defined in the plan. Results are published on the ONERC website. The annual review informs theme leaders (usually the Directorate-General of a ministry) of progress. The NAP had also secured the budget needed to go on with the adaptation measures.

In addition, a mid-term review of the NAP based on a self-assessment process was carried out in late 2013 and was presented in early 2014 to the National Council of Ecological Transition (Conseil National de la Transition Ecologique, CNTE), which is composed of members of parliament, members of the European Parliament, local and regional government representatives, members of the Economic, Social and Environmental Council, NGOs, civil service representatives and representatives from the scientific community. Based on the results, the CNTE made recommendations to improve the implementation of actions suggested in the NAP, and defined priorities for the remaining implementation period. These priorities include the need to strengthen the adaptation activities in the fields of education, communication and dissemination and to extend adaptation activities into new sectors. The mid-term review also assessed the degree of alignment between local-level adaptation actions (within regional strategies or local plans) and the National Climate Change Adaptation Plan actions.

The final evaluation of the NAP 2011–2015 is conducted in two phases: first, a diagnosis (end of October 2015) and, second, the preparation of the second NAP. The diagnosis was more comprehensive and included recommendations for actions on climate change adaptation. It was carried out as an external evaluation independent of the stakeholders. In June 2015, the General Council of the Environment and Sustainable Development (Conseil Général de l'Environnement et du Développement durable, CGEDD) was appointed to conduct the first part. Results of the diagnosis was presented directly to the minister of the environment and will be presented to the CNTE by the end of 2015 or early 2016. The synthesis report is intended to be available publicly online in the MRE section of the ONERC website and included in an ONERC annual report to the prime minister and the parliament in 2016. In addition to the evaluation report, the preparation of the second NAP (due in 2016) will be informed by the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report and outcomes of the Conference of Parties (COP21) in Paris.

Links to additional information: French National Action Plan (in English): <http://www.developpement-durable.gouv.fr/The-national-climate-change.html>; MRE section of NAP (in French): <http://www.developpement-durable.gouv.fr/Suivi-et-evaluation-.html>; Mid-term review (in French): http://www.developpement-durable.gouv.fr/IMG/pdf/ONERC_Rapport_evaluation_mi-parcours_PNACC_VF_web.pdf; Wiklimat (in French): <http://wiklimat.developpement-durable.gouv.fr/index.php/Wiklimat:Accueil>.

The following success factors were put forward by participants of the Expert Workshop as ways to strengthen the link between MRE results and adaptation policy and practice, and to ensure that the application of MRE results is maximised:

- make the MRE results easy to understand and transparent;
- engage with stakeholders (when discussing preliminary results but also when considering the

implications for communication when developing MRE systems);

- enhance communication on MRE (use various means, focus on target groups);
- focus on dissemination, awareness raising and capacity building; and
- use MRE results to make sure that adaptation is a priority on the political agenda.

Box 2.16 Evaluation of the national heat waves management plan in Belgium**Key messages**

- Evaluation of the implementation of the heat waves action plan provided important information for updating the plan and improving the effectiveness of its actions.
- Specific perspectives on the scientific basis of the action plan and its communication contribute to ensuring the relevance of the updated plan and its measures.

In response to the heat wave in summer 2003 that caused an increase in mortality, Belgium developed a national action plan called the 'Federal Ozone and Heat Wave Plan', which in 2014 was adapted to form regional and federal action plans. After the first 10 years of implementation, an evaluation was conducted to provide scientific information as background to update the plan in 2015–2016. The scientific report was published in 2014.

The evaluation was carried out by the working group 'Heat Wave and Ozone Peaks' that was set up on 5 November 2003 to prepare and coordinate communication actions of the action plan. The group works under the National Environmental Health Cell.

The scientific report was coordinated by this group, with contributions from the Royal Meteorology Institute (RMI) and Belgian Interregional Environment Agency (IRCEL - CELINE) for the monitoring of environmental aspects and contributions from the Scientific Institute of Public Health (ISP) for the monitoring of health impacts and mortality. The scientific report analysed meteorological parameters, air quality and mortality during the period 2003–2013 to provide conclusions on environmental and sanitary aspects and perspectives on future responses to heat waves and ozone peaks.

The evaluation of the report has allowed the testing of some hypotheses and processes within the plan. The report concludes that the thresholds determined in 2003 for triggering the heat wave action plan have proved to be appropriate. Nevertheless, there are still some potential improvements required. For example, the evaluation recommended a complementary study to decrease uncertainties of the mortality monitoring model (Be-MOMO). Since the report was published, this has been undertaken. A separate evaluation of the associated communication campaigns implemented in the last decade is being considered. Together with the published evaluation, these studies will contribute to the updating of the National Ozone and Heat Wave Plan in 2015–2016.

A recent heat wave (in July 2015) has highlighted some additional needs to be taken into account in the future, including the need to revise current criteria to activate the different phases of the regional action plans, the need to improve the correlation between health criteria and environmental threshold values, and the need to study the time lag between heat waves and the occurrence of their health impacts.

Links to additional information: Evaluation report (in French): <http://environnement.sante.wallonie.be/files/document%20pdf/rapport%2010%20ans%20vague%20de%20chaleur%20et%20pic%20ozone.pdf>; Evaluation report (in Dutch): Wetenschappelijke evaluatie van de milieu- en gezondheidssurveillance na 10 jaar toepassing van het hittegolf- en ozonplan in België (available on www.zorg-en-gezondheid.be/hittealarm).

2.4.2 Communication of monitoring and evaluation results

Although the implementation of national-level MRE systems is still at an early stage, some countries have begun the process of communicating monitoring and evaluation results. There is a tendency to do this by publishing formal reports on the results of

monitoring and evaluation. So far, available reports from Austria, Germany, Finland, France, Spain and the United Kingdom have mainly targeted adaptation policymakers. Most country reports focus on monitoring adaptation, but the Finnish reports present evaluation results. Box 2.17 outlines examples of the progress made in communicating monitoring and evaluation results at national level.

Box 2.17 Progress in communicating and reporting monitoring and evaluation results: experiences from Austria, Finland, France, Germany, Spain and the United Kingdom

Austria

The information presented in the Austrian progress report launched in September 2015 is based on a survey ('self-assessment' on the status of implementation of all adaptation measures included in NAP), which was completed by a number of sector-specific indicators. The results will be used as input for further developing of the Austrian adaptation strategy and plan. The report also highlights future needs and the scope for action for policymakers and decisionmakers at national and provincial level.

Link to additional information (report in German): https://www.bmlfuw.gv.at/umwelt/klimaschutz/klimapolitik_national/anpassungsstrategie.html

Finland

Evaluations of the implementation of the Finnish Adaptation Strategy (mid-term evaluation in 2009 and full evaluation in 2012–2013) looked at whether or not, and if so how, the measures presented in the NAS have been mainstreamed in different sectors. Results of the evaluations were summarised by presenting each sector's position on one of five 'adaptation steps', reflecting the level of adaptation based on the following elements: (1) recognition of adaptation needs, (2) availability of knowledge on climate impacts, (3) identification and implementation of adaptation measures, (4) cross-sectoral cooperation and (5) level of mainstreaming (note: not all categories are included in all five steps). For further details, see Box 2.10 in Section 2.3.

Links to additional information: Finland's National Climate Change Adaptation Plan 2022 (in English): http://mmm.fi/documents/1410837/1888935/MMM-%23193086-v1-Finland_s_National_climate_Change_Adaptation_Plan_2022.pdf/c2bfec7b-ae73-4247-b666-26a3ed363f99 (Annex II summarises key results and recommendations of the evaluation); Evaluation of Finland's National Adaptation Strategy, 2013 (in Finnish): <http://mmm.fi/luonto-ja-ilmasto/ilmastonmuutokseen-sopeutuminen>

France

The French National Adaptation Plan anticipates the need for annual monitoring of its implementation and it is requested that the documentation be made public. These results feed into a comprehensive review undertaken in 2013; the final review is scheduled for the end of 2015 and will lead to a revision of the adaptation policies.

Link to additional information (in French): <http://www.developpement-durable.gouv.fr/Plan-national-d-adaptation-au,37066.html>

Germany

In May 2015, Germany published its first monitoring report prepared by the Federal Government's inter-ministerial working group on adaptation to climate change (IWG Adaptation Strategy). The report is based on 102 indicators representing 15 sectors addressed in the German Adaptation Strategy (DAS). Five indicators are designed as overarching indicators; they represent overarching activities on behalf of the Federal Government, which are intended to support the process of adapting to climate change. Each indicator is presented in detail, including graphs and text. The monitoring report will be taken into account when developing the progress report for the DAS, which is expected to be published by the end of 2015.

Links to additional information: Monitoring report 2015 (in German): http://www.umweltbundesamt.de/sites/default/files/medien/376/publikationen/monitoringbericht_2015_zur_deutschen_anpassungsstrategie_an_den_klimawandel.pdf; Report 'Establishment of an Indicator Concept for the German Strategy on Adaptation to Climate Change' (in English): <http://www.umweltbundesamt.de/publikationen/establishment-of-an-indicator-concept-for-german>.

Box 2.17 Progress in communicating and reporting monitoring and evaluation results: experiences from Austria, Finland, France, Germany, Spain and the United Kingdom (cont.)**Spain**

Monitoring reports on the progress of the Spanish National Climate Change Adaptation Plan are carried out periodically by the Spanish Climate Change Office (OECC), in coordination with the Working Group on Impacts and Adaptation (GTIA), and adopted by the Coordination Commission of Climate Change Policies (CCPCC) and the National Climate Council (CNC). So far, three monitoring reports have been produced and published in 2008, 2011 and 2013.

Link to additional information (in Spanish): http://www.magrama.gob.es/es/cambio-climatico/temas/impactos-vulnerabilidad-y-adaptacion/plan-nacional-adaptacion-cambio-climatico/sis_ind_imp_vul_adp_cc_esp.aspx

United Kingdom

The United Kingdom published its first progress report on the NAP implementation in June 2015. It was prepared by the CCC's ASC, building on the ASC's non-statutory progress reports published over the last 5 years. The United Kingdom progress report concludes with 36 recommendations to promote the pace and scale of climate change adaptation and to help the government prioritise areas for further intervention.

Link to additional information: http://www.theccc.org.uk/wp-content/uploads/2015/06/6.736_CCC_ASC_Adaptation-Progress-Report_2015_FINAL_WEB_070715_RFS.pdf.

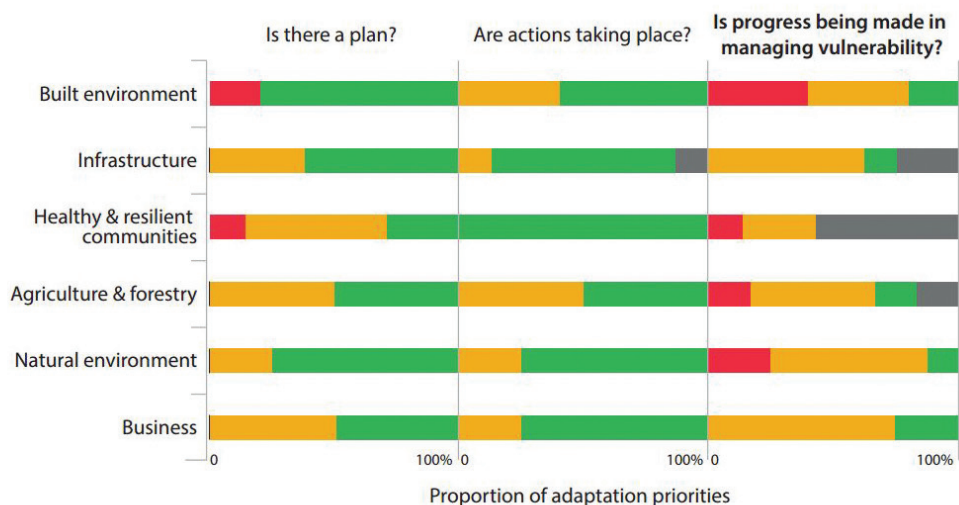
Participants at the Expert Workshop emphasised that various means of communication are important to convey the right messages from monitoring and evaluation results. First, results need to be understood easily by the intended target group and must be highly relevant to them. In general, the target group can vary from policymakers to decisionmakers, affected stakeholders or the broader public. The varying levels of knowledge on the topic should be considered when communicating monitoring and evaluation results to stakeholders. Closely related to the chosen target group, it is important to decide whether or not the results are to be made publicly accessible or are to be limited to the intended target group (e.g. to public authorities). In case of the United Kingdom progress report, the intended target groups are government officials and policymakers. For these specific target groups, important information is visualised in figures by using different colour schemes. For example, one diagram shows the progress being made by the NAP at a glance (Figure 2.6).

Quantitative indicators are viewed as a valuable communication tool; however, it is a challenge to provide a 'headline' that does not over-simplify the message by losing contextual information required for sense. Examples on the presentation of quantitative indicators are available in the first German monitoring report. The figures presented therein show, at a glance, the trends of climate change impacts or adaptation relevant indicators (upwards, decrease,

trend reversal, no trend) for different sectors, and indicates if the progress is positive (green), negative (red) or not possible to judge (black). In the German monitoring report, the graphical presentation of indicators is complemented with explanatory text with further analyses. Figure 2.7 shows actual forest fires in Germany between 1985 and 2013 (green line — decreasing trend) in comparison with the number of days per year with high hazard classes (brown line).

Furthermore, as scientists or policymakers are, generally, not explicitly trained in communication, involving communication experts in the process (e.g. public relations department, graphic design), as has happened in the Netherlands and the United Kingdom, can create added value and enhance the impact of the monitoring and evaluation results.

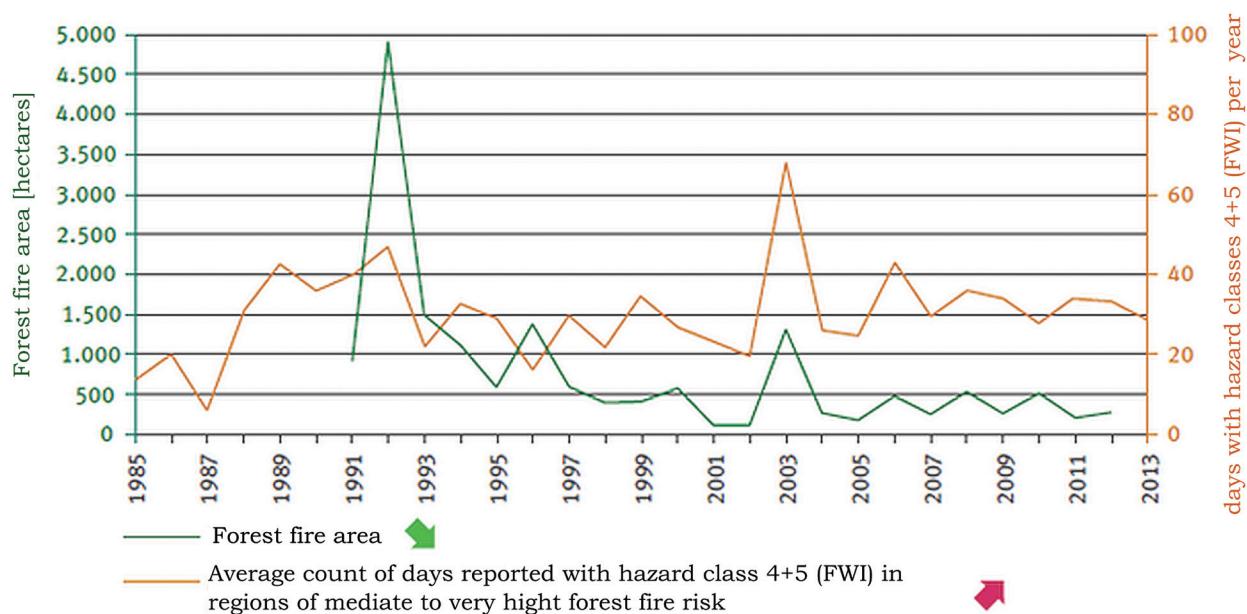
Direct interactions with stakeholders to discuss (preliminary) monitoring and evaluation results are crucial. Sharing knowledge and fostering learning through participation can help to increase the acceptance of adaptation policies and actions among stakeholders. Thus, in many countries, consultations with governmental actors to discuss preliminary results are carried out. Germany has used press conferences to provide information and inform the wider public. The Netherlands is also becoming more active in cooperating with the media on the issue of MRE. Experiences from the Netherlands show that media attention helps in raising public and political awareness for the topic.

Figure 2.6 Summary of the ASC's assessment of progress of the NAP

Notes: The colours depict the proportion of 'adaptation priorities' within each theme, categorised as either:

- Red: plans and policies, delivery of actions, or progress in addressing vulnerabilities, are lacking.
- Amber: adaptation priority has been partially addressed, some evidence of progress in some areas.
- Green: plans are in place, actions are being delivered, progress is being made.
- Grey: insufficient evidence to form a judgement.

Source: United Kingdom Progress Report: http://www.theccc.org.uk/wp-content/uploads/2015/06/6.736_CCC_ASC_Adaptation-Progress-Report_2015_FINAL_WEB_070715_RFS.pdf.

Figure 2.7 Example on quantitative indicator showing the risk of forest fires and the actual forest fires in Germany

Note: Increasing trend — brown line; decreasing trend — green line.

Source: Bundesanstalt für Landwirtschaft und Ernährung (Waldbrandstatistik der Bundesrepublik Deutschland), DWD (regionalisierter kanadischer FWI). German monitoring report: http://www.umweltbundesamt.de/sites/default/files/medien/376/publikationen/monitoringbericht_2015_zur_deutschen_anpassungsstrategie_an_den_klimawandel.pdf.

3 Looking ahead

Chapter 2 presented insights into key aspects of monitoring, reporting and evaluation (MRE) of adaptation, drawn from experiences in European countries that have established, or begun to develop, approaches to MRE at national level. This chapter highlights issues that will shape the future of MRE of adaptation at national levels and for which additional work will be needed to further support adaptation policies.

There is a need to strengthen the knowledge base about MRE in European countries and to foster learning from the evaluation of adaptation policies

This report provides new insights into adaptation MRE systems at national level in Europe and constitutes a first attempt to consolidate emerging information across European countries. Given the early nature of adaptation MRE in Europe and the limited set of available information sources, it reveals a number of knowledge gaps that need to be addressed to further support the effective and efficient implementation of climate adaptation policies and actions at national level in Europe.

On the one hand, there is a specific need to support further the evaluation of climate change adaptation policies at the national level and learn from this. Few countries have evaluated their adaptation policy. Many, however, seek support on how to undertake this essential task. This is mainly because MRE improves understanding of the effectiveness and efficiency of adaptation policy and adaptation action, together with the changing context of vulnerability within which these policies are deployed. In addition, learning about what works and what doesn't provides an assessment of the effectiveness and efficiency of implemented adaptation measures/actions that will in turn feed back into the revision of policies and their objectives.

The following matters can therefore be highlighted as key domains for progressing knowledge:

- Improve the understanding of policy implementation and evaluation, for example in terms of:
 - have member countries/institutions done what they said they would do in the NAPs/NASSs?
 - was it effective and efficient?
 - did it help reduce vulnerability or increase resilience?
 - what have countries/institutions learned from implementing adaptation?
- Improve the understanding of the information challenges for evaluating adaptation policies, for example in terms of:
 - collecting, assessing and aggregating data and analysing lessons across sectors and levels;
 - learning from implemented policies and measures within a particular sector, across sectors and across governance levels.
- Learn from the commonalities and differences between European countries.

On the other hand, support is needed to better understand the governance of MRE adaptation policies. Governance plays a critical role in the way adaptation policy as a whole and MRE of adaptation specifically is developed, coordinated and implemented. A lot is known about governance in EU member countries and their differences. However, little is known as to what extent governance of MRE of adaptation is different from governance of MRE of other policies across member countries; and about the rationales for particular governance and institutional set-ups and their advantages and drawbacks, for example to address the multilevel and cross-cutting dimensions of adaptation.

The following matters can therefore be highlighted as key domains for progressing knowledge:

- Analyse in more detail the MRE of adaptation processes in relation to:
 - the allocation of responsibilities;
 - the coordination of activities across sectors;
 - the coordination of activities across governance levels (Leiter, 2015) and the relevance of monitoring, reporting and evaluation at those different levels;
 - the evaluation process (reporting to whom, how, when?) and the degree of independence vis-à-vis policy makers;
 - the relationship between governance and institutional setups and fostering learning that can inform adaptation policy and practice in the short and medium terms;
 - the participation of non-public stakeholders.
 - Connect to and learn from various networks and institutions that address policy evaluation (e.g. the EEEN (European Environmental Evaluators Network), INOGOV (Innovations in Climate Governance) networks, audit offices). It is critical to learn from MRE experiences in other new policy areas and to understand how a culture of MRE is built up since the challenges the adaptation policy domain faces are bound to have similarities with those in other new policy areas (e.g. climate change mitigation policy).
 - Review quantitative approaches and qualitative methods that have been used in European countries for evaluating adaptation policies, and review experiences where quantitative and qualitative information are gathered through a set of tools (e.g. process, outputs and outcomes indicators; self-assessments; expert judgments) and combined to form an assessment of adaptation policy.
 - Review which quantitative and qualitative information would be desirable to have at national and EU levels in order to provide an integrated overview of progress on adaptation, and support and comply with European processes such as:
 - the European Commission preparedness scoreboard of EU member states to be fully operational for the report on the EU Adaptation strategy in 2017;
 - the next round of EU Monitoring Mechanism Regulation (MMR) reporting under Article 15 in 2018.
- In addition, review the extent to which a common set of quantitative and qualitative information at national and EU levels can be mapped out, and link, when relevant, with international processes such as the UN Sustainable Development Goals and the Sendai Framework under UNISDR and their related data and indicators.
- Better understand the advantages and drawbacks of single MRE systems versus inter-operable systems that rely to a large extent on mainstreaming adaptation into sectoral monitoring, reporting and evaluation practices. Better understand how the consistency and coherence of MRE of adaptation systems with countries' context (for example for policymaking and data availability) could be analysed.

A better use of the variety of existing data sources can help develop adaptation indicators and evaluate policies

As MRE of adaptation matures, there is an increasing need to evaluate adaptation policies and the related spending/expenditures at country level. This means combining multiple sources of information, provided through quantitative approaches and qualitative methods. In this context, indicators, self-assessments and expert judgments provide instrumental tools and a strong basis for assessing adaptation progress and performance.

Therefore the following activities would be useful to support developing approaches to MRE that rely on mixed methods:

- Examine how multiple perspectives and sources of information (e.g. quantitative and qualitative information on progress on adaptation policies, socio-economic data) can be combined to build a coherent and robust picture of past and recent changes in vulnerability or resilience in Europe. Socio-economic data include damage costs and impacts on human health from disasters, which are being increasingly collected across Europe and driven by, amongst others, EU and UN policies (e.g. by statistical institutes, re-insurance companies, the European Commission Joint Research Centre and the research community such as EMDAT/CRED).

- Examine how indicators of expenditure on adaptation (e.g. with European and national statistical institutes) could be developed since it is expected that tracking the deployment of funds will gain more attention in future as implementation of adaptation policy continues to progress across Europe. This would benefit from experiences in adaptation projects and programmes for developing countries where expenditures tracking has been in operation.

There is a need to further coordinate the development of adaptation policies and MRE systems

The way NAS/NAP objectives are formulated often makes it difficult to assess whether they are being achieved. This means it is difficult to demonstrate the effectiveness of NASs/NAPs in addressing climate change risks.

Recent evaluation exercises at national level (e.g. the 2015 United Kingdom ASC Statutory Report) highlight the need for improved clarity of NAS/NAP objectives to support MRE of adaptation. In a number of cases, objectives are formulated in ways that make them hard to measure and it is therefore difficult to say whether they are being met. In addition, objectives tend to have multiple facets, relate to both processes and outputs, and cover a number of climate change risks.

A clear formulation of adaptation policy (primarily strategy and plans) means a more focussed MRE system and eventually an improved knowledge base that can enhance adaptation policy and practice. In turn, a clear formulation of MRE requirements and objectives means policy and plans can be developed with a view to being monitored and evaluated. This way MRE results can be more effectively and efficiently used and inform policymaking and practice, and; evaluations can better demonstrate the effectiveness and efficiency of adaptation policy and practice.

More specific objectives and policy goals, for example associated with outcomes and timescales that can be measured and monitored (achieving specified and acceptable levels of risk; improving resilience to a particular cost-effective standard), would therefore facilitate assessing progress. This could complement objectives that relate to processes being put in place to support, for example, raising awareness, building capacity, or addressing knowledge gaps.

Therefore the following activities would be useful to support an enhanced coordination between the

development of adaptation policy and the related MRE systems:

- Better understand how the development of adaptation policy and of systems for MRE of adaptation are intrinsically linked; review how enhanced coordination and a common understanding of each other's objectives can enhance effectiveness and efficiency of adaptation practice.
- Better understand how to set more explicit and clear objectives that can be measured, monitored and for which progress can be assessed. Improve the understanding about how a balance can be struck between setting explicit objectives in adaptation policy and maintaining flexibility of MRE systems to allow for the consideration of both the continuous flow of information and emerging issues.

There is a need to better understand how MRE results can or do influence policymaking

There is limited evidence yet of the actual influence of MRE results on policy and practice. The need to strengthen the link between MRE results and their consideration in policymaking and practice will grow stronger as more countries progress towards implementation of adaptation.

Therefore the following activities would be useful to support adaptation policy and practice being further informed by MRE results:

- Review the factors that enable MRE results to influence policymaking and practice (e.g. timeliness of MRE results and how they can better dovetail with the timing of other policy cycles); reflect how these could influence the development of the MRE sets of quantitative and qualitative information and the governance for MRE activities.
- Better understand how tailor-made analyses of MRE results to the needs of specific stakeholders and sectors (e.g. in-country reviews; country-to-country peer review) can be instrumental to further inform policy and practice.
- Develop communication tools that are adapted to presenting MRE results to various stakeholders and that encourage learning (e.g. dedicated interviews with policymakers).
- Review factors that enable a culture that value learning and improvement.

There is a need to develop and update MRE of adaptation policy and practice to take into account risks, vulnerability and resilience

Some MRE approaches are, to some extent, focussed on assessing the delivery of a specific policy (NAS/NAP). Others seek to consider policy effectiveness in the wider context of monitoring changing risks, vulnerability and resilience. Without the latter, the potential benefits of MRE might not be fully realised as MRE activities might track whether or not policy actions have

been implemented without providing insights as to whether they lead to adaptation practices that reduce vulnerability.

- Additional work would therefore be useful to understand how to relate MRE of policy to the dynamic context of evolving risks and changing vulnerability, namely linking MRE results to the ever changing understanding of risk, vulnerability and resilience, and better understand how MRE of adaptation can be feasible and manageable in this context.

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