

# Developing adaptation monitoring and evaluation in Scotland

*Anna Moss, University of Dundee*

*April, 2017*

## Summary

Monitoring and evaluating (M&E) is a central part of assessing the effectiveness of our efforts to tackle climate change. Scotland (and the wider UK) was one of the pioneering countries in the development of an adaptation M&E framework, and is one of a handful of countries that have a system that is fully operationalised. Scotland is now able to lead the way in showing how learning and adjustment of the process can strengthen M&E and ensure it remains fit for purpose.

This report assesses Scotland's existing framework in light of recent independent assessments of progress on climate change adaptation, and theory resulting from practical experience internationally. We identify areas of strength and areas needing improvement. The findings from the report are then used to provide recommendations which aim to increase the strength and utility of the current framework, respond to critique from independent assessment and will inform development of adaptation policy in Scotland.

## How to read this report

This report makes a number of observations on the current M&E framework. To guide the reader each section has a summary setting out:

- ✓ Areas of current strength
- ✗ Areas in need of improvement
- Conclusions

The conclusions from all sections are then used to formulate:

- ⚙ Recommendations

## Key findings

### ✓ **Areas of current strength:**

Scotland's M&E framework has an ambition to provide a comprehensive understanding of adaptation that encompasses the three general purposes of *Management*, *Learning* and *Accountability*. There is a clear structure that supports adaptation policy with annual reporting of adaptation progress. The independent expertise providing advice and the external evaluation process helps maintain transparency and credibility. The framework provides a cycle of review and response which could enable an overall flexible approach to be taken. The need to monitor both the adaptation process and outcomes is acknowledged, and the use of both quantitative and qualitative data enables tracking of why things are changing, as well as how. The framework in Scotland utilises data and information from multiple scales, and has the ability, and ambition, to monitor and evaluate all sectors impacted by climate change.

### ✖ **Areas in need of improvement:**

The Adaptation Programme does not fully consider how M&E would work once operational. Currently the elements of the framework are not maximising the ability to work effectively together. The reporting lacks detail of progress and has no clear vision of what is being aimed for, how to get there and when. The framework is, therefore, failing to adequately measure the process, and there are significant gaps in data which limit the ability to monitor outcomes in some areas. There also needs to be a stronger emphasis on how individual policy areas can and will respond to changing context and assessment of effectiveness. The lack of quantified objectives, clear policy milestones and associated timescales, limits the ability to plan an effective flexible approach. Cross-sectoral M&E is very limited and there is no systematic method employed to monitor and evaluate across different spatial levels.

### **Recommendations**

Adaptation to climate change is a continuous process with M&E providing a means of checking progress. However, development of an M&E system is **also** an iterative, non-linear process. To remain fit for purpose the M&E systems need to be continuously assessed and adjusted. We recommend that the Scottish Government:

- ✿ Identify a 'senior owner' for each thematic objective of the adaptation programme, who could be held accountable for the delivery of the adaptation measures and to ensure the overall coherency and relevance of adaptation interventions detailed within the objectives.
- ✿ Develop a standard reporting format which prompts/ requires identification of targets and milestones, sets out a time table for delivery, assesses risks to non-achievement and actions to remedy, and identifies linkages and multiple dependencies across adaptation programme objectives.
- ✿ Develop a protocol for assessing relevance of individual adaptation policies and interventions in addressing the associated objective.
- ✿ Identify the data gaps across each SCCAP theme. Set out prioritisation and methodology to fill key gaps. Explore ways to improve data collection (notification of updates or new data sets) and general feedback.
- ✿ Identify where there are shared data needs and/or mutual responsibility for data provision to establish a coordinated, coherent, efficient approach with joint partners. Consider how existing internal M&E can be used, and/or utility increased- this could help identify 'quick wins' in improving data availability and minimise pressure on resources.
- ✿ Develop a process indicator methodology which will utilise the information provided by the standard reporting protocols and assessment of relevance. Trial the methodology with a small sample of policy teams and delivery agencies before extending across all relevant areas. This information could also be used to explore the potential for applying a flexible adaptation pathway approach to some areas of the adaptation programme.
- ✿ Produce and promote a clear guide illustrating the purpose and importance of the M&E strands and how they relate to each other. This will clarify the need to ensure that the process, content and output of the M&E are fit for purpose, and highlight the dependencies, mutual benefits and potential for flexible adaptation strategies.

Taking these recommendations forward will require additional resource.

## Index

Background .....	6
Key themes in monitoring and evaluating climate change adaptation .....	6
Key terminology .....	7
Monitoring and Evaluation: Context.....	7
Summary .....	9
Relevant case studies (see Annex 2): .....	9
Monitoring and Evaluation: Process .....	10
Responsibility/ defining ownership (for implementation and delivery).....	10
Structure .....	10
Stakeholder engagement.....	11
Mainstreaming (and aligning to M&E in other policy areas) .....	12
Review and response (flexibility) .....	12
Summary .....	13
Relevant case studies (see Annex 2): .....	15
Monitoring and Evaluation: Content .....	15
Measuring adaptation.....	15
Process vs outcome indicators.....	16
Quantitative and qualitative data.....	17
Data availability.....	18
Evidence across sectors (horizontal comparison and coordination) .....	19
Evidence across scales (vertical comparison and coordination).....	21
Indirect drivers .....	21
Resource and capacity .....	22
Summary .....	22
Relevant case studies (see Annex 2): .....	23
Monitoring and Evaluation: Output.....	24
Output role (linking context, process and content).....	24
Output suitability for end-users.....	24
Summary .....	26
Conclusion.....	26
Recommendations .....	27
References .....	28
Annex 1: Development of current adaptation policy and associated monitoring and evaluation in Scotland.....	30
International context .....	31
Annex 2: International case studies.....	33
Norway- an emphasis on ‘learning’ .....	33

Germany- an intrinsic link between adaptation and M&E at the outset .....	33
Germany- extensive stakeholder engagement.....	33
Netherlands- flexible adaptation management.....	34
France- a largely process-based system .....	34
Finland- self-assessment to provide qualitative data .....	35
Finland- inter-ministerial working group.....	35

## Background

Over the last three years Scotland has produced the first Scottish Climate Change Adaptation Programme (SCCAP) along with an associated monitoring and evaluation (M&E) framework<sup>1</sup>. The independent assessment of the SCCAP published in September 2016 by the Adaptation Sub-Committee (of the UK's Committee on Climate Change) (ASC), is a key component of this framework and it set out a number of recommendations for development, including ones specific to M&E.

Whilst many countries are currently developing national adaptation monitoring and evaluation (M&E) systems, a small number have already started operationalising them and reporting on adaptation progress. Practice to date shows that national adaptation M&E systems differ regarding scope, content, methods used and responsibilities of actors but it is already possible to identify some key lessons being learned from the process.

Considering developments in adaptation M&E theory resulting from practical experience in a growing number of countries, along with critical analysis of Scotland's existing system it is necessary to review the current approach to identify areas of current strength and areas in need of improvement identified by the ASC and through comparative assessment. This knowledge can then be used to: build on M&E in Scotland to increase the strength and utility of the current framework; address the deficiencies identified by recent assessment of the SCCAP and associated M&E; and develop a second SCCAP that responds to recommendations from the independent assessment and best practice knowledge.

The analysis is based on experience in developing the current M&E framework, key literature on adaptation M&E and using case studies<sup>2</sup> from other countries. The report considers the main elements of Scotland's adaptation M&E framework:

- **Scottish Climate Change Adaptation Programme (SCCAP)<sup>3</sup> and progress reports<sup>4</sup>**
- **Climate Change Adaptation indicators<sup>5</sup>**
- **Independent assessment by the ASC<sup>6</sup>**
- **Public Sector Climate Change Reporting<sup>7</sup>**

## Key themes in monitoring and evaluating climate change adaptation

The long timescales and inherent uncertainties associated with climate change, as well as the relative infancy of adaptation policies and measures mean that M&E is an essential part of the adaptation process. However, M&E development often lags behind policy development, even in some countries which have more established adaptation legislation. Therefore, not only do we need to utilise M&E to understand what adaptation measures are working (or not) and why, but we also need to critically examine the M&E process itself as it is such a new area.

To enable that process, regions need to critically examine their own M&E framework and be prepared to adapt that framework in light of shared knowledge and lessons learned from other regions. There is not, nor should there be, a 'one-size-fits-all' approach to national M&E of adaptation but there are some key aspects of M&E that all frameworks need to consider in order to be fit for purpose and to enable effective, efficient and equitable adaptation:

<sup>1</sup> See Annex 1 for detail of current adaptation policy and associated M&E in Scotland

<sup>2</sup> See Annex 2 for International case studies of M&E practice

<sup>3</sup> <http://www.gov.scot/Publications/2014/05/4669>

<sup>4</sup> <http://www.gov.scot/Topics/Environment/climatechange/adaptation/reporting/SCCAP-Progress-Report-2016>

<sup>5</sup> <http://www.climateexchange.org.uk/adapting-to-climate-change/indicators-and-trends/>

<sup>6</sup> <https://www.theccc.org.uk/publication/scottish-climate-change-adaptation-programme-an-independent-assessment-for-the-scottish-parliament/>

<sup>7</sup> <http://www.keepsotlandbeautiful.org/sustainability-climate-change/sustainable-scotland-network/major-players-and-climate-change-reports/>

- **Context**- How does M&E of adaptation relate to policy and the existing M&E environment? What is the specific purpose of the M&E and how will it be used?
- **Process**- How will M&E be established? How will M&E be implemented? Who will be responsible?
- **Content**- What will be monitored and at what scale? What type of data will be used?
- **Output**- How and when will information be presented? Do the products respond to the purpose of the M&E?

This report critically examines current adaptation M&E in Scotland in light of lessons learned during the development of the current framework, critique arising from independent assessment, structures developed in other early initiating countries and general M&E literature.

## Key terminology

**Monitoring:** A continuous process of examining progress. In the context of adaptation this includes progress made in planning and implementing adaptation interventions, drivers which help shape vulnerability to climate change and the context/ environment in which the adaptation occurs.

**Evaluation:** Systematic assessment of the effectiveness of climate adaptation policies and actions. This involves considering whether objectives and targets have been met (which can be framed in terms of the reduction of exposure or vulnerability to climate change) and the extent to which this achievement can be attributed to the measures taken. Evaluations are undertaken at defined points in the programme cycle.

**Indicator:** A measurable characteristic or variable which helps to describe an existing situation and to track changes or trends over a period of time.

## Monitoring and Evaluation: Context

### Key challenges:

- The context specific nature of adaptation
- Ensuring that monitoring and evaluation is fit for purpose

The context and purpose of M&E determine the nature and structure of the framework that will be most adequate.

The context specific nature of adaptation means that there is no 'one-size-fits-all' approach that can be applied to all national adaptation M&E. Countries are developing different approaches depending on their specific context (GIZ, 2015). That context will be shaped by many factors including the level of the existing and projected climate change; social, economic and natural capital; and existing decision-making processes. Whilst the specific context will shape the content to monitor, the implementation and operation process, and the design of the output, it is important to establish a clear purpose for the M&E from the start as this will provide the overarching structure.

The purpose for M&E can be generally categorised as being for either management, learning or accountability (Leiter, 2017):

- Supporting the **management** of adaptation processes and actions
- **Learning** how and why adaptation interventions have or have not achieved their objectives
- **Accountability** for whether planned action has taken place and have led to desired results

However, these are not exclusive and adaptation M&E in many countries encompasses more than one of these, and the combination of adaptation M&E in Scotland actually sets out to cover all three general purposes (see Table 1).

Within these general purposes, however, M&E will have more focused aims which will determine whether the M&E will be targeted at:

- Monitoring the implementation of adaptation actions or
- Assessing adaptation outcomes.

This in turn will help determine the content of the M&E and type of information which is most appropriate.

The Adaptation M&E Navigator<sup>8</sup> is a decision support tool for selecting suitable approaches to monitor and evaluate adaptation to climate change. It has been developed by adaptation practitioners (GIZ<sup>9</sup> in Germany) and is based on the practical experiences of adaptation decision-makers from many countries and examples of M&E in action. The Navigator identifies nine specific purposes which form the focus for undertaking adaptation M&E (either during or after an adaptation intervention) (Leiter, 2017)<sup>10</sup>:

### **Monitoring the implementation of adaptation**

- 1) Monitoring how adaptation is integrated into planning processes
- 2) Monitoring how adaptation programmes, projects or actions are implemented
- 3) Monitoring how the National Adaptation Plan (NAP) process is implemented
- 4) Tracking which adaptation activities are taking place at national or sub-national level

### **Assessing adaptation outcomes**

- 5) Assessing the results of adaptation projects or actions
- 6) Assessing the results of a programme or portfolio of adaptation projects
- 7) Assessing whether vulnerability has been reduced as a result of adaptation programmes, projects or actions
- 8) Assessing progress towards adaptation goals, targets or intended outcomes at national level
- 9) Assessing whether resilience to climate change has been improved at national level

Table 1 sets out the strands of adaptation M&E currently in place in Scotland and identifies how their stated purposes align with these categories of purpose and focus. The table shows that in general the SCCAP Annual Reports and Public Body reporting are primarily focused on assessing adaptation implementation and processes, the CXC indicators largely assess adaptation outcomes, with the independent assessment intended to pull both evidence strands together.

Whilst the general purpose and focus of each element of Scotland's M&E has been defined, this does not necessarily mean that in practice the current M&E system is fit for purpose. The relationship between context (purpose), process, content and output should ideally be considered at the outset to maximise the utility of the M&E. However, during the development of the SCCAP, consideration of how the M&E would work once operational was not an intrinsic part of the process and as a result the system is not currently entirely fit for purpose, as highlighted by the independent assessment by the ASC.

*Table 1 Purpose and focus of Scotland's adaptation monitoring and evaluation strands. Numbers relate to the nine specific purposes identified by the Adaptation M&E Navigator (Leiter, 2017). See Annex 1 for detail of current adaptation policy and associated M&E in Scotland.*

<b>M&amp;E element</b>	<b>Purpose</b>	<b>Focus</b>
SCCAP Annual Reports	<b>Management and Accountability</b> <ul style="list-style-type: none"> <li>To identify 'what steps have been taken for each objective: what work has taken place in the last year and what work is planned for the next 12 months'</li> </ul>	<b>Implementation/ Process</b> <b>2, 3</b>
Public Bodies Climate Change Duties	<b>Management and Accountability</b> <ul style="list-style-type: none"> <li>To report on their compliance with the climate change duties</li> </ul>	<b>Implementation/ Process*</b>

<sup>8</sup> <http://www.adaptationcommunity.net/knowledge/monitoring-evaluation-2/multi-level-adaptation-me/adaptation-me-navigator/#>

<sup>9</sup> [https://www.giz.de/en/html/about\\_giz.html](https://www.giz.de/en/html/about_giz.html)

<sup>10</sup> The Adaptation M&E Navigator does not include consideration of assessments that typically take place before implementation starts such as identifying climate change impacts and appraising adaptation options. An exception is the assessment of vulnerability at the start of an intervention if its purpose is to measure adaptation progress over time (Leiter, 2017)

Reporting	<ul style="list-style-type: none"> <li>Consolidate climate change information from the public sector</li> </ul>	1, 3, 4**
CXC Adaptation indicators	<p><b>Management and Learning</b></p> <ul style="list-style-type: none"> <li>Assess trends over time and to understand the nature, extent and effectiveness of adaptation responses</li> <li>Support Scottish Government policy in three key areas: <ul style="list-style-type: none"> <li>Inform and analyse risks for Scotland identified in the CCRA</li> <li>Show progress towards the objectives set out in the SCCAP</li> <li>Inform the independent assessment of the SCCAP</li> </ul> </li> </ul>	<p><b>Outcome</b></p> <p>2***, 7, 8, 9</p>
Independent assessment	<p><b>Learning and Accountability</b></p> <ul style="list-style-type: none"> <li>To 'inform proposals and policies being considered and guide efforts to plan a suitable response for Scotland'</li> <li>To provide 'an interim evaluation of the progress being made to prepare for climate change' based on assessment of: 'Is there a plan?'; 'Is action taking place?'; 'Is progress being made?'</li> </ul>	<p><b>Implementation/ Process</b></p> <p><b>Outcome</b></p> <p>1, 2, 3, 7, 8, 9</p>
<p>* Public Bodies Climate Change Duties Reporting is almost entirely focused on implementation, but they are also asked to address 'What arrangements does the organisation have in place to monitor and evaluate the impact of the adaptation actions?'</p> <p>** Identification of sub-national vs national level activity is possible due to the individual reporting requirements for public bodies which are geographically distinct (e.g. Local Authorities)</p> <p>*** Whilst the majority of indicators are outcome-based, a number of indicators are based on the implementation of specific adaptation measures. Overarching narratives for key adaptation themes along with individual contextual narratives for each indicator provide analysis, where possible, of how the outcome indicators relate to implementation</p>		

Adaptation should be viewed as an iterative, formative process, with M&E used as a means of checking progress against changing conditions (Bours *et al*, 2014a). However, the development of an adaptation M&E system should *also* be viewed as an iterative, non-linear process, and by acknowledging the need for continuous learning and adjustment of the M&E system once it is in place any deficit in the system can be corrected to develop M&E that can remain fit for purpose.

### Summary

- ✓ The elements of Scotland's framework each have a clearly defined purpose and overall aims to provide a comprehensive understanding of **Management, Learning and Accountability**.
- ✓ The framework aims to provide a focus on both the implementation (process) of adaptation interventions as well as the outcome.
- ✗ Consideration of how the M&E would work once operational was not an intrinsic part of the SCCAP development process.
- Development of an M&E system is an iterative, non-linear process, and continuous learning and adjustment of the M&E system can ensure it remains fit for purpose.

### Relevant case studies (see Annex 2):

- Norway - an emphasis on 'learning'
- Germany - an intrinsic link between adaptation and M&E at the outset



## Monitoring and Evaluation: Process

### Key challenges:

- Long timeframes beyond programme and policy cycles
- Political commitment and resource allocation
- Taking ownership for delivery and implementation
- Need for buy-in and mainstreaming
- Flexible approach

### Responsibility/ defining ownership (for implementation and delivery)

In order for an adaptation programme to be successful, there needs to be political and organisational commitment to the establishment, implementation, and resourcing of monitoring and evaluation. This applies not just at national level, but at all levels of implementation in order to be effective and overcome many of the difficulties that M&E can encounter. Senior policy officials can champion, not only adaptation *per se*, but also the importance of adaptation M&E and ensure that findings contribute to a transparent, evidence-based adaptation policy planning and implementation process (OECD, 2015).

In Scotland, annual reporting on progress of policies outlined within the SCCAP, Public Body reporting and the biennial independent assessment have all been established and supported by legislation. This provides a strong signal of political will to support the M&E process and helps to ensure the sustainability of the process and stakeholders' buy-in (GIZ, 2014). However, despite the requirement for an indicator system to support this process, this part of the framework has not been set out in the legislation.

The adaptation indicators were developed by ClimateXChange, financed by Scottish Government and championed by the lead policy team (Energy and Climate Change). The indicators developed by CXC have, to a large extent, embedded themselves into the process: they are explicitly structured in relation to the CCRA and SCCAP; provided the primary evidence base for the independent assessment; and are providing evidential support for policy teams and delivery agencies. However, without being a legislative requirement linked to other reporting there is a danger that they won't fully establish and maintain their necessary role and potential to provide the link between climate change risk, adaptation process and outcome.

Overall delivery of the SCCAP is overseen by the Energy and Climate Change directorate of the Scottish Government, with responsibility for delivery of specific policies and activities being split between multiple parts of the Government and delivery agencies. The associated monitoring role of the Annual Reports is similarly structured, with the Directorate coordinating the collation of information from the individual delivery agencies for each identified policy or action. A major recommendation in the ASC's independent assessment of the SCCAP was the need to identify a 'senior owner' for each of the nine objectives, who could be held accountable for its delivery: *'individual objectives are currently shared between different parts of government without clear ownership and accountability for achieving them'* (Committee on Climate Change, 2016). The very general nature of the objectives means that without assigning overall responsibility, the level of achievement simply becomes a sum of its often quite disparate component parts, as opposed to forming a coherent strategy based on complementary actions.

The use of independent expertise in the evaluating process helps maintain transparency and consequently credibility of the assessment (EEA, 2015). The ASC's evaluating role, as well as the provision of independent advice, research and analysis from CXC therefore strengthen the process in Scotland. There is a danger, however, that relinquishing the evaluation role diminishes the responsibility and engagement in the process within policy teams and there is a clear need for both effective internal and external evaluation to support the process.

### Structure

The structure and methodology employed to monitor and evaluate adaptation should develop from the purpose and context of the M&E system. Figure A1 (Annex 1) illustrates how the various elements of M&E are structured within the

overall framework showing that in Scotland there is a clear structure that supports adaptation policy with annual reporting of adaptation progress, alongside supporting data, analysis and overall evaluation.

The SCCAP Annual Reports are explicitly not intended to be *‘an in-depth assessment of how well Scotland is preparing for climate change’* (Scottish Government, 2016) but focus on what steps have been taken for each objective, what work has taken place in the last year and what work is planned for the next 12 months. The evaluation role in the overall structure of the M&E system is provided by the independent assessment which *‘will evaluate Scotland’s preparedness, based on assessing the implications of trends identified by indicators developed by ClimateXChange, alongside reviewing the long-term decision-making of key actors... to reach a judgement on whether the Programme is putting in place a policy framework that will enable an appropriate level of adaptation over the time period of the Programme and beyond’* (Scottish Government, 2016).

However, by entirely assigning the evaluation role to the independent assessment leaving the SCCAP Annual Reports with a purely monitoring role, the adaptation policies and actions set out for each objective lack a clear and stated vision of what is being aimed for, how to get there and when. The SCCAP would be significantly strengthened if there was a requirement to consider the relevance of each measure in contributing to the objective, along with clear steps which set out exactly what needs to be delivered and by when in order to be ‘on-track’ or ‘completed’. This was a point that was highlighted by the ASC’s assessment and was included in their first recommendation regarding the preparation of the next SCCAP: *‘List the specific actions that will be taken to achieve each objective together with appropriate milestones and timescales’* (Committee on Climate Change, 2016).

This would not diminish the role of the independent assessment, which would still need to assess whether the progress made and the internal assessments of relevance of actions taken are adequate, but this process would ensure that at all levels there is an emphasis on considering the level of adaptation required, the timescale over which this needs to occur and the efficacy of existing and planned policies.

The adaptation indicators were developed in direct response to the risks (and opportunities) identified by the first CCRA and which are addressed by the SCCAP and this structural relationship is clearly maintained in indicator output. Continual dialogue between CXC and the ASC was maintained to maximise the utility of the indicators in supporting the independent assessment, whilst also remaining focused on the issues identified by policy teams and other stakeholders as being of prime interest. However, there is currently a lack of an explicit structural link between the indicators and the annual SCCAP and Public Sector reporting to ensure that data and analysis provided by the indicators is fully utilised in this process.

Adaptation and related M&E systems could be better coordinated and supported by:

- setting out clearly how at all levels the development of adaptation policy and adaptation M&E are intrinsically linked;
- highlighting how improving the understanding of and coordination of the two will improve the effectiveness and efficiency of adaptation practice as a whole; and
- setting explicit goals that can be measured and for which progress can be assessed (EEA, 2015).

## Stakeholder engagement

Whilst organisational level commitment and resourcing is essential, during development of an M&E framework it is also critical that there is a high degree of engagement with all sectors and levels that will contribute to the implementation and delivery of the M&E, as well as with the intended recipients. A comprehensive and successful M&E system is reliant on the timely provision of suitable data and information and it is therefore important to ensure that those responsible for its generation, collation and delivery are fully aware of the purpose and structure of the M&E and contribute to its development where appropriate. The overall purpose and structure of the M&E should therefore be clearly communicated to all individuals and teams in the sectors and levels of government and organisations from which data and information is being/will need to be collected.

Often it is the contributors to the M&E process that will also be key users of the end results and this dependency should be emphasised to encourage extensive and timely contribution. The indicator identification and development phase is

particularly dependent on stakeholder involvement, ownership and buy-in, in order to gain knowledge of and secure access to data (GIZ, 2014). Since climate change impacts across all sectors, a participatory/collaborative approach to M&E is important to properly operationalise the system. Securing the commitment of contributing parties is therefore critical to support the process (GIZ, 2013).

Engagement with policy teams, delivery agencies and key data providers formed an extensive part of the development of the CXC indicators. During the initial development, however, the non-explicit connection between the indicators and the rest of the M&E structure created difficulties in establishing full engagement in some sectors and levels despite endorsement by the Energy and Climate Change directorate.

Developing the second SCCAP will require re-engagement with key stakeholders involved in the process and output of all parts of the M&E framework to ensure the effective ‘ownership and accountability’ recommended by the ASC (2016).

### **Mainstreaming (and aligning to M&E in other policy areas)**

Successful engagement at all levels will also assist in effective mainstreaming. Just as adaptation practice needs to be mainstreamed, so too does adaptation M&E. This means that M&E of adaptation needs to be integrated into and/or utilise existing M&E structures and procedures where relevant and possible. This was also a key recommendation arising from the UNFCCC’s Adaptation Committee workshop<sup>11</sup> in 2013 (UNFCCC, 2014). Connecting with existing processes can facilitate ownership, reduce costs and encourage future use. However, some existing processes may lack the necessary flexibility and/or institutions may have limited capabilities which will limit the extent to which they can be utilised (GIZ, 2013).

Whilst the SCCAP states that ‘adaptation should be integrated into existing development and implementation practices’ (Scottish Government, 2014) it does not include a clear indication that M&E should be similarly integrated. It is not clear to what extent the SCCAP annual reporting utilises existing internal M&E structures, but it does not appear that there is a unified or clear structure to provide the link.

The Public Bodies Climate Change Duties Reporting mechanism provides a clear M&E structure which can feed into the SCCAP Annual Reporting and independent assessment process. Mainstreaming is identified as being an integral part of the process with the stated aim to ‘assist with integrating climate change objectives in corporate business plans and embed climate change action in all departments’ (Sustainable Scotland Network, 2016).

The CXC indicators aim to utilise existing M&E wherever possible and relevant, to encourage buy-in from stakeholders, minimise reporting effort, facilitate policy connections and align M&E mechanisms in Scotland. However, the process of compiling the indicators identified many gap areas as well as areas where existing M&E was not suitable for wider use due to e.g. lack of detail, reluctance to make publicly available etc.

The Scottish Government’s top level M&E framework is the National Performance Framework<sup>12</sup> which aims to provide ‘a clear vision for Scotland with broad measures of national wellbeing covering a range of economic, health, social and environmental indicators and targets’. Whilst adaptation has clear links to a number of the National Outcomes<sup>13</sup>, adaptation M&E is currently not aligned with or integrated into this framework.

### **Review and response (flexibility)**

There is a need to improve our understanding of how to strike a balance between setting and monitoring explicit objectives in adaptation policy whilst maintaining flexibility to allow for the consideration of emerging issues (EEA, 2015). The long timescale over which climate change unfolds, the uncertainty regarding the scale of actual impacts and intervening factors (such as socio-economic change or non-climatic environmental degradation) will affect adaptation outcomes and make it very difficult to determine the efficacy of an intervention (GIZ, 2015). Adaptation needs to be

<sup>11</sup>[http://unfccc.int/files/adaptation/cancun\\_adaptation\\_framework/adaptation\\_committee/application/pdf/ac\\_me\\_ws\\_report\\_final.pdf](http://unfccc.int/files/adaptation/cancun_adaptation_framework/adaptation_committee/application/pdf/ac_me_ws_report_final.pdf)

<sup>12</sup><http://www.gov.scot/About/Performance/purposestratobjis>

<sup>13</sup><http://www.gov.scot/About/Performance/scotPerforms/outcome>

viewed as a process of continual adjustment rather than being a specific objective or end point, and adaptation M&E also needs to be an iterative on-going process of learning and revision (GIZ, 2014).

Possible strategies for M&E systems to manage the inherent uncertainties include:

- Establish baselines where possible to track key contextual changes
- Ensure that the evaluation process considers the original context of the adaptation programme in addition to any emergent conditions that require the strategy to be altered
- Assess how adaptation measures can cope with unknowns or change (particularly important for long-term projects where there is a risk of a potentially maladaptive response) (Bours *et al*, 2014a).

This need to consider ‘flexibility and robustness’ was also outlined in the second CCRA (Committee on Climate Change, 2017)

The Scottish adaptation M&E framework provides a cycle of review and response which should enable an overall flexible approach to be taken. However, within the elements of the framework there needs to be a stronger emphasis on how individual policy areas can and will respond to changing context and assessment of effectiveness. The CXC indicators provide an explicit link between policy and adaptation metrics, but will be strengthened by the addition of process indicators (see Content section).

A number of regions and sectors are increasingly utilising a flexible adaptation ‘pathways’ approach. These approaches ‘focus on the uncertain and long-term nature of climate change by employing a risk-based decision framework involving thresholds and trigger points that enable the systematic adjustment of adaptation strategies in response to new information and changing circumstances’ in ways that are as efficient and transparent as possible (Moss & Martin, 2012). The ASC’s independent assessment and the second CCRA identified the need to set quantified objectives, clear adaptation policy milestones and targets and associated timescales (Committee on Climate Change, 2016; 2017). Once established, these could be utilised to develop a pathways approach in some key areas. The CCRA also identified the need to:

- Implement ‘low-regret’ actions ‘to reduce risks associated with climate variability’
- Identify decisions that have long lifetimes and intervene early to avoid ‘lock-in’
- Fast track early adaptation steps for decisions that have long lead times (Committee on Climate Change, 2017)

These are elements that are identified as being enabled by a flexible pathways approach.

## Summary

### **Responsibility/ defining ownership (for implementation and delivery)**

- ✓ The legislation provides a strong signal of support of the M&E process, and the indicators are embedded in the process, providing evidential support for assessment and policy delivery.
- ✗ However, the indicator system is not a legislative requirement so there is a danger that they won’t fully establish and maintain their necessary role.
- Senior policy officials can champion adaptation M&E and ensure that findings contribute to a transparent, evidence-based adaptation policy planning and implementation process.
- ✓ There is a clear policy team lead for adaptation.
- ✗ However, objectives within the adaptation programme do not have clear ownership for overseeing delivery.
- Assigning overall responsibility will enable each objective to form a coherent strategy based on complementary actions rather than being a sum of its component parts.
- ✓ Independent expertise providing advice and the evaluation process helps maintain transparency and credibility.
- ✗ However, it is important that ‘senior owners’ maintain responsibility for assessing the relevance and effectiveness of adaptation measures.

- Establishing effective internal evaluation, in addition to external, will support the process by ensuring that the adequacy and potential contribution of measures is considered.

### **Structure**

- ✓ There is a clear structure that supports adaptation policy with annual reporting of adaptation progress, alongside supporting data and analysis and overall evaluation.
- ✗ However, the SCCAP annual reports lack detail of progress in delivery of adaptation measures, and no clear vision of what is being aimed for, how to get there and when.
- Setting explicit goals for which progress can be measured and having a consistent process setting out what is to be delivered and by when will facilitate internal and external evaluation.
- The SCCAP could be significantly strengthened if there was a requirement to consider the relevance of each measure in contributing to the objective.
- ✓ A strong relationship between the CXC indicators and the CCRA and SCCAP, and dialogue between CXC and the ASC maximised indicator utility in support of the independent assessment.
- ✗ However, there is a lack of an explicit structural link between the indicators and the annual SCCAP and Public Body reporting to ensure the indicators are fully utilised in this process.
- Clearly set out how, at all levels, the development of adaptation policy and M&E are linked; and highlight how this link can improve the effectiveness and efficiency of adaptation practice.

### **Stakeholder engagement/ Mainstreaming**

- ✓ Engagement with policy teams, delivery agencies and key data providers formed an extensive part of the development of the CXC indicators.
- ✗ However, the non-explicit connection between the indicators and the rest of the M&E structure created difficulties in establishing full engagement in some sectors and levels.
- ✓ The importance of mainstreaming adaptation is clearly identified in the adaptation programme and the Public Bodies Climate Change Duties Reporting mechanism.
- ✗ However, there is not a clear indication that adaptation M&E should be similarly integrated.
- Emphasise how indicators aid reporting requirements, ensure the effective 'ownership and accountability'; and show how a collaborative process is of mutual benefit.
- Connecting with existing processes can facilitate ownership, reduce costs and encourage future use.

### **Review and response**

- ✓ The adaptation M&E framework provides a cycle of review and response which could enable an overall flexible approach to be taken.
- ✗ However, there needs to be a stronger emphasis on how individual policy areas can/will respond to changing context and assessment of effectiveness.
- ✗ There is a lack of quantified objectives, clear adaptation policy milestones and targets and associated timescales, which limits the ability to plan an effective flexible approach.
- Routinely identifying milestones and targets for adaptation interventions, specifying a timetable and considering potential effectiveness, will enable delivery of flexible adaptation strategies.
- ✓ International dialogue and comparative research by CXC maintains awareness of adaptation M&E 'best-practice' which can be used to inform further development of M&E.
- Maintain observation and communication with other regions regarding M&E to allow for learning from successes and failures.

### Relevant case studies (see Annex 2):

- Germany - extensive stakeholder engagement
- Netherlands – flexible adaptation management

## Monitoring and Evaluation: Content

### Key challenges:

- Adaptation has no single target, therefore there is no single metric
- Adaptation is context specific- therefore it is hard to develop broad geographical or cross-sectoral indicators
- Long timeframes make it difficult to measure impact of interventions
- Non-climatic social, economic and environmental drivers increase the complexity
- Ensuring data is adequate whilst managing feasibility and resources

### Measuring adaptation

Unlike M&E of climate change mitigation efforts, the context specific nature of adaptation means that there is a lack of a common metric to measure success (GIZ, 2015). This complexity largely accounts for the relative infancy of adaptation monitoring and the variation in approaches taken.

Progress in adaptation is typically measured using an indicator framework. Indicators provide evidence that a certain condition exists or certain results have (or not) been achieved. An indicator framework should standardise and communicate complex and often disparate data and information. As outlined earlier (see '**Context**' section) the context, purpose and focus of each element of the framework determines whether the indicators will be targeted at:

- monitoring the development and implementation of adaptation measures, and can be used to inform and justify adaptation decisions; or
- measuring the change that occurs as a result of adaptation decisions, and can be used to focus on the long-term effectiveness of adaptation policies and actions.

This in turn helps determine the specific content of the M&E and the type of information which is most appropriate. The terminology can vary amongst M&E frameworks, however, with subtle differences in resulting indicator assignment and categorisation. GIZ's comparative analysis of national adaptation M&E frameworks identified four key ways that adaptation progress is monitored (GIZ, 2014):

- Monitor the **vulnerability** or resilience of a system to **exposure** to climate change (with the assumption that reduced vulnerability/enhanced resilience = successful adaptation)
- Monitor the **impacts** of climate change on socio-ecological systems
- Monitor the **progress** in implementing adaptation **actions** (with the assumption that successful implementation = adaptation)
- Monitor the results (**outcomes**) of adaptation **actions**: reduced exposure to climate stresses, reduced vulnerability/ enhanced resilience

Whereas the EEA (2015) identifies three categories in its review of adaptation M&E:

- A **process**-based approach (e.g. indicators that illustrate a process is under way, such as the formulation of a coastal adaptation planning committee);
- An **output**-based approach (e.g. indicators that an output has been achieved, such as 'X' km of upgraded sea defences);
- An **outcome**-based approach (e.g. indicators that show a coastal community is now less vulnerable to coastal inundation).

Whilst some frameworks focus on just one or two categories, others utilise all of the above (with varying terminology) to set the adaptation within a contextual indicator framework providing information on the critical factors (e.g. climate



change hazards, the exposed system and its vulnerability), which drive change in the system. This approach has been taken by the CXC indicator framework (Figure 1) which uses indicators of:

- **Risk** (or opportunity)- monitoring aspects of exposure to climate change hazards or vulnerability of the system to those hazards.
- **Impact**- monitoring the realised consequences of that exposure or vulnerability (these may be economic, structural, social, or environmental).
- **Action**- monitoring responses or adjustments aimed at enabling society, infrastructure and the environment cope with the effects of climate change.

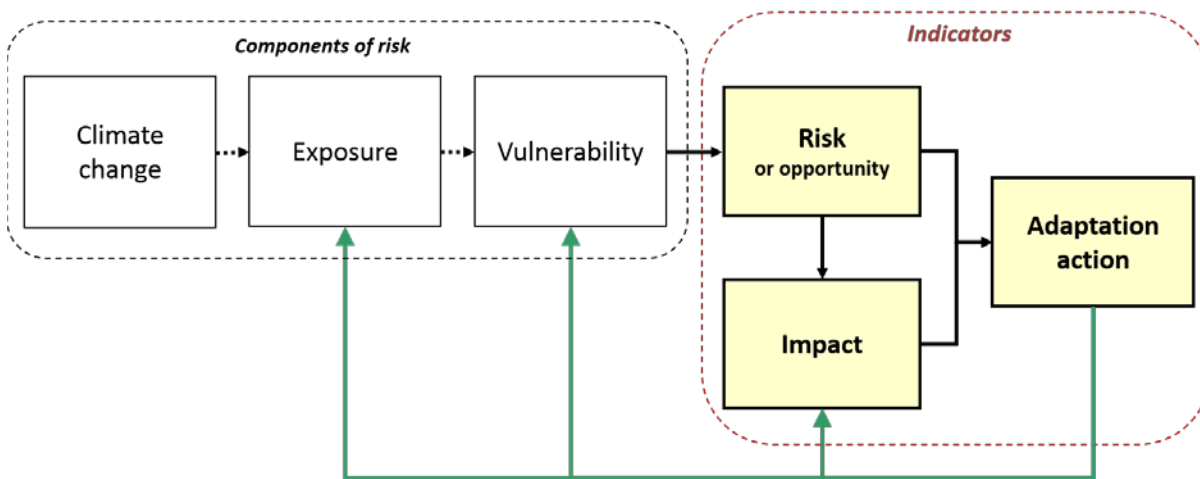


Figure 1 ClimateXChange Adaptation Indicator framework

### Process<sup>14</sup> vs outcome indicators

Process monitoring is essential in supporting adaptive management as this requires the ability to check that policies and interventions are on track. By demonstrating that an action has been taken or a stage of implementation reached, process indicators support accountability in the short term. In addition, given that climate changes unfold over a long timeframe, beyond usual programme cycles, process indicators can also monitor *effort* towards achieving longer-term aims. Whilst process indicators provide very direct information, defining a process and monitoring its progress does not ensure successful adaptation- there also needs to be an understanding of the *effectiveness* of that process in achieving the desired outcome.

Monitoring of adaptation outcomes needs to encompass the direct changes that result from implementation of policies and actions, but also recognise that other factors can affect these outcomes. To meet the accountability requirement of the M&E framework, it will be necessary to identify how the intervention has contributed to that outcome (though in many cases, the adaptation outcome will not materialise, in a measurable way, during typical programme cycles). To meet the learning requirement of an M&E framework, there needs to be an understanding of how the change has taken place. Therefore, it may be necessary to also monitor key non-climatic drivers and overarching metrics such as reduced vulnerability or increased resilience.

As adaptation is a long-term, iterative process it can sometimes be difficult to distinguish between process and outcome, as what can appear to be an outcome in the short-term, may simply be a step in a long-term process (GIZ, 2014). For example, ‘*number of people trained...*’ could be an outcome indicator if an adaptation programme objective is to introduce a training programme; but it could also be a process indicator if the programme objective is wider in scope e.g. capacity building (Bours *et al*, 2014b).

Table 1 shows that Scotland has adopted a system with an overall hybrid approach which requires monitoring across both categories (process and outcome). However, currently the framework is largely failing to measure the process and

<sup>14</sup> This includes **process** and **output** indicators as defined by EEA (2015)

there are significant gaps in data which limit the ability to monitor outcomes in some areas. The CCRA identified that there is ‘no routine collection of data and other evidence to assess whether policies are successful in achieving their objectives’ (CCC, 2017). At all levels, organisations need to consider not only how they will adapt and what their objectives are, but also how they will know they are progressing towards and achieving those objectives.

As previously identified, the ASC assessment highlighted the difficulty in assessing progress within the SCCAP due to the lack of milestones and targets. The terminology used within the SCCAP, against which evaluation occurs, is very open-ended e.g. ‘Increase awareness...’, ‘Improve understanding...’; ‘Publish resources...’ Without clearly identifying what achievement against these terms means, it is very difficult to monitor the development and implementation of adaptation policies beyond very broad and non-transparent categorisation.

There is therefore an urgent need to establish a more structured reporting process which will enable:

- The development of process indicators
- External evaluation of progress
- Internal evaluation and adaptive management

A thorough process indicator methodology should include:

- Setting out adaptation measures and policies against clear and measurable adaptation objectives
- Assessing the relevance and adaptation potential of those measures
- Identifying milestones and targets for each measure
- Establishing a timetable for delivery of milestones
- Considering risk of non-achievement and potential actions to remedy
- Identifying links to and dependencies on other measures

### Quantitative and qualitative data

A monitoring framework needs to consider the utility of both quantitative and qualitative data, though most M&E frameworks use a mix of the two. Gathering both types of data and information will allow for more comprehensive understanding of adaptation progress- allowing tracking of not just how things are changing, but also why (GIZ, 2014).

When monitoring implementation and progress, data is often qualitative in nature (e.g. clarifying the stage in a process that has been reached; responses to questionnaires or standard reporting forms). The utility and effectiveness of this type of (often subjective) data can be increased by applying a transparent method to convert it to quantitative data e.g. the stages of a process could be given a rank-order; performance data on policy implementation or institutional strengthening can be given a weighted score.

The SCCAP reporting is fundamentally qualitative and largely in the form of listing process and actions that have occurred against each policy/proposal. Although the SCCAP does make reference to various monitoring programmes which are explicit to delivery of policies and proposals e.g. ‘*Marine Scotland will use marine research strategies and monitoring programmes to gather data on the impact climate change is having on the seas.*’; ‘*Manage and monitor changes to Scotland’s transport infrastructure environment to detect impacts and changes on biodiversity and vegetation growing cycles*’, this quantitative information is not utilised to directly report progress.

The Public Bodies Climate Change Duties Reporting utilises a standard climate change reporting form but this invites qualitative information only (although one section does request information regarding details of data utilised in assessment: ‘*Please provide details of monitoring and evaluation criteria and adaptation indicators used to assess the effectiveness of actions*’ (Sustainable Scotland Network, 2016))

Qualitative methods complement quantitative approaches and can reveal critical contextual information that provides a narrative explanation for the numbers (EEA, 2015). The CXC indicators are primarily quantitative, however their accompanying indicator documents and overarching narratives provide this qualitative context. The qualitative information is consistently framed across each indicator and encompasses analysis of what is happening now, in the past and projected to happen in the future; interpretation of trends in relation to key drivers; and identifies significant



patterns of change (spatial, categorical, temporal). The indicators are also brought together into over-arching narratives based on key themes which put the indicators into the context of adaptation policies and interventions.

The contextual, localised nature of adaptation can diminish the utility of purely quantitative data for policy and management purposes. It is therefore likely that a combination of standardised, quantitative indicators and qualitative information can help to connect M&E across governance and management levels (EEA, 2015). Scotland's M&E framework utilises quantitative indicators, alongside stakeholder self-assessments, and consultations with experts. This evidence is then drawn together within the ASC assessment and the CXC narratives. A mixed methods approach can draw in evidence from multiple sources, and has the potential to ensure that the overall narrative of adaptation progress is robust, consistent and contextualised (EEA, 2015).

### Data availability

There is considerable variation in the degree to which national adaptation M&E frameworks are data-intensive. Some systems are devised around data which is easy to access, already collected and potentially utilised already within other existing M&E systems. Whereas others highlight the need for more complex and comprehensive data and information to adequately monitor and evaluate the complexity of adaptation systems.

The resources available for the collection and analysis of information are likely to be limiting to some extent. The use of pre-existing indicators can be a pragmatic and efficient approach in response, and one which has been adopted by many national M&E strategies (either entirely or partially) (EEA, 2015). This approach can also help ensure buy-in to the process from stakeholders already familiar with these data sources. However, prioritising the use of indicators which were originally designed for another purpose can lead to the use of information that is not as relevant to the intended outcomes of the adaptation programme.

The availability and quality of data, whilst being an important consideration for the development of robust indicators, should not be the only driver. Indicators should not be entirely 'data driven' (determined by availability or developed in a particular way because of data constraints) - an issue identified by the second CCRA (CCC, 2017): '*many of the available indicators to measure adaptation progress are data-driven rather than use-driven*'. Some indicator frameworks choose to identify indicators which are considered fit for purpose but for which data is not currently available. This ensures that gaps are clearly highlighted and the data need and ambition of the monitoring framework is apparent.

The CXC indicator programme went through an extensive period of consultation with stakeholders to understand both what the indicators should cover as well as what data was available for the purpose. Whilst the published CXC indicator lists do not make explicit reference to any identified gaps, the overarching, thematic narratives highlight the critical current indicator omissions.

In general, the ASC assessment noted that more data is needed '*to monitor risks, assess progress in the implementation of policies, and inform future adaptation decisions*' (CCC, 2016), but they also identified several key areas of data deficiency. These included existing policies and strategies within various sectors which need to begin or expand associated monitoring e.g.

- Flood Risk Management Strategies (SEPA)
  - Reduction in surface water flood risk
  - Number and capacity of SuDS<sup>15</sup>
  - Planning applications in flood risk areas (numbers granted, advice sought, SEPA objections)

However, some of the recommendations for increased data collection simply acknowledge the overall lack of knowledge across major areas and present the relevant organisations with more general suggested areas for monitoring effort e.g.

- Scottish Natural Heritage
  - Impact of climate change on the condition of sites and species
  - Effectiveness of conservation measures

<sup>15</sup> Sustainable Drainage Systems

The ASC's recommendation regarding infrastructure data acknowledges that the problem is that data is not collected in a consistent way across the sectors. This has also been identified in the second CCRA and by CXC researchers compiling the adaptation indicators. In all sectors and at all levels, even when data is available there can be barriers preventing its use:

- Data is fragmented and not available for the required spatial extent
- Data is temporally limited- collection occurs on an ad hoc basis, collection of data has ceased, or collection of data is planned but not yet available
- Data is not available in a useful format
- Data needs to be combined with other data sources to provide useful information
- Data is not in the public domain and access is limited by cost or confidentiality

**CCRA (2017):** *'The main data gaps identified in this assessment are mostly linked to climate change impacts and changes in future vulnerability. Where data are available, there are issues relating to incompleteness and incompatibility between data formats. Data collection is not strategically planned at a multi-organisation level. Data access, including in some cases the commercialisation of publicly funded data, constitutes a significant obstacle to research and innovation in the UK'.*

There needs to be early and continuous dialogue between the scientific and research community, and policy-makers and practitioners to ensure that data and information needs can be met. Gaps need to be identified, prioritised and procedures set out to ensure that critical gaps can be filled:

- **Lack of available data**
  - Increase monitoring effort
    - Identify who is best placed to fill these gaps
    - Develop the methodology to show how this data can and will be collected
- **Lack of suitable data**
  - Improve coverage
    - Identify where good quality data is being collected and apply the process elsewhere
    - Ensure the spatial and temporal scale of collection is fit for purpose
  - Improve compatibility
    - Improve communication between data collectors to maximise data coherency
  - Increase the utility of data collection methodology
    - Consider how qualitative data can be meaningfully integrated
    - Consider if additional information requests/ questions can be added to existing systems
    - Consider if the same questions can be asked in a different way that is more likely to yield analysable answers
- **Lack of accessible data**
  - Improve collation of data
    - Improve the design of the database to increase usability of data
  - Increase openness
    - Encourage data sharing (especially from e.g. industry)

The second CCRA highlighted the potential for new 'Big Data' initiatives and open access data portals could enable innovative ways to collate data needed for future assessments.

### **Evidence across sectors (horizontal comparison and coordination)**

Climate change impacts on all sectors, and an adaptation programme (and associated M&E) needs to fully reflect this extent. The adaptation M&E framework in Scotland has the ability, and ambition, to monitor and evaluate all relevant sectors, but currently monitoring is not adequate for all sectors and cross-sectoral monitoring and evaluation is very limited.

The SCCAP annual reports address all sectors included in the SCCAP and therefore cover all sectors. However, the first SCCAP does not address all risks/opportunities identified by the first CCRA and has been criticised for some of these omissions and for being particularly weak with regard to e.g. digital infrastructure, business and international issues (though these are now more fully addressed in the 2<sup>nd</sup> CCRA). The SCCAP also addresses considerably more identified Natural Environment risks than for the Built Environment or Society. The process of developing the first SCCAP drew on the urgency levels attached to the risks identified by the CCRA, as well as an engagement process with policy teams and government agencies to establish which risks they believed should be taken into the SCCAP to be addressed. However, the relationship to this urgency level does not follow through clearly within the SCCAP reporting and there is no distinction made which identifies the policies and proposals that are the most critical and relevant to address the issue.

The CXC indicators aim to monitor issues addressed by the SCCAP (and as such they reflect the dominance of the Natural Environment within the programme). However, data restrictions resulted in many issues which are addressed by the SCCAP not having associated CXC indicators at present- this is particularly the case with the Society theme. The ASC independent assessment covers all areas addressed by the SCCAP, highlights significant gaps that are not being addressed and makes recommendations with regard to establishing priority, relevance and effectiveness of policies/proposals within and between sectors.

To aid accountability within the M&E framework, as well as encourage learning from successful procedures and outcomes across sectors, it is useful to be able to make clear, easy and fair comparisons across horizontal, sectoral levels. The SCCAP annual reports include separate tables detailing the progress made against each policy area identified in the SCCAP, along with a status of 'completed', 'on-track', 'revised', 'on-going'. This enables some rudimentary comparison between sectors but specific comparisons are not made in the reports. The ASC assessment utilises these tables to provide an overview and comparison of the three programme themes based on the proportion of policy areas in each status category. They also provide their own distinction between policies with an identified timescale and those without, and include the number where there is no identified response. The assessment utilises a standard reporting method to assess the priority adaptation issues within each programme theme which enables a quick comparison between each priority area.

The Public Bodies Reporting also utilises a standard methodology to collect information, thus helping enable comparisons between the 'major players'. However, this comparison is not currently conducted as part of the M&E process and would require agreement on a systematic methodology to quantify the qualitative information. The CXC indicators use a standard symbolic system to report on the trend for each indicator, providing a quick overview across all sectors. However, many indicators in the first iteration are currently unable to show a trend due to insufficient data. Furthermore, the absence of indicators for some adaptation issues results in some sectors being under-represented and therefore comparisons are not possible. To overcome some of this deficit, the indicators aim to provide qualitative comparisons across sectors by identifying related indicators and contextual narrative to highlight connectedness across sectors and action areas.

Not only does adaptation need to occur across all sectors, adaptation is also inherently a cross-sectoral issue requiring a cooperative approach. **CCRA (2017):** *Effective adaptation cannot be undertaken without an acknowledgement of the cross-cutting nature of risks, opportunities and adaptation. Without this consideration, the resulting actions can be suboptimal in terms of their costs and benefits, lead to unintended consequences, or fall short of the effort needed to manage the risk or opportunity.* Many countries have established inter-ministerial working groups to ensure close cooperation and exchange information and good practice.

Just as adaptation requires a cross-sectoral approach, adaptation M&E also needs to operate across those sectors and consider integration between their existing M&E structures. Data collection needs to be planned both within organisations and between organisations where there are shared interests and outcomes. For example, there is a need for a cross-cutting approach to understand and monitor community resilience and the ability to recover post-event, as well as the interface between communities, infrastructure networks and emergency response. Interdependencies related to land use and the consequences for sustainable soil and water management are also highlighted as cross-sectoral areas where currently data and action are both deficient (CCC, 2016).

## Evidence across scales (vertical comparison and coordination)

Adaptation M&E typically gathers information at multiple levels- project, organisation, regional or national. Given that adaptation takes place at multiple scales, building a complete picture of adaptation progress is only possible if information from all levels can be combined: ‘interdependencies make issues of scale highly relevant for evaluators who seek to understand change, attribute its causes, and produce relevant knowledge products’ (Leiter, 2015). However, issues of scale and cross-scale dynamics are rarely considered.

Leiter (2015) identifies three approaches which can be utilised to conduct M&E across multiple scales<sup>16</sup>:

- Standardised metrics at all scales which can be easily aggregated and feed into the M&E system.
- Level-specific metrics which address common, national level, themes.
- Informal links and synthesis across scales.

The three avenues are not mutually exclusive and some countries utilise a combination to offset the limitations of each and maximise their use of multiple level information. Adaptation M&E in Scotland utilises level-specific metrics as well as informal links. The SCCAP reporting operates at the national level but utilises information from multiple scales and sectors tasked to deliver the programmes, policies and proposals to provide supporting evidence, as well as detailing specific case studies. The CXC indicators (and the ASC assessment evidence) utilise and present data at sub-national level where available and appropriate, along with accompanying analysis to highlight and contextualise significant differences. However, there is not a systematic method employed to monitor and evaluate across the different levels. There is the potential for future SCCAP reports and indicators to utilise the sub-national, sector-level data collected from the standard reporting by Public Bodies to create standardised metrics as this includes a section explicitly referencing the objectives of the SCCAP. However, it will be necessary to agree on a systematic methodology to quantify the qualitative information.

Common frameworks and methodologies could facilitate the linkage of methods across national, regional and local contexts (EEA, 2014). The development of process indicators should ideally establish standardised metrics which could be understood and applied at multiple levels. Linking information between scales does not need to be confined to the more restrictive indicator process, and it is important that mechanisms are in place that enable sharing qualitative insights too. Standardising requirements for access and format of available data and information across levels will also facilitate the process.

## Indirect drivers

Wider social and economic factors can compound the climate risk and make assessment of the effectiveness of adaptation measures very complex to determine, with evidence to suggest that indirect economic losses due to climate change are at least of the same order of magnitude as direct losses but this is not routinely monitored (CCC, 2017).

The second CCRA highlights the need to understand that the spatial distribution of climate change impact is dependent on the social, economic and cultural environment, which are in themselves subject to change. It is necessary to understand these dynamics in order to develop appropriate and effective local adaptation strategies (CCC, 2017). Adaptation interventions are rarely undertaken simply with the aim to counteract the effect of climate change alone, and effective M&E can, and should, have a role in improving our understanding of the complex socio-economic and environmental contexts within which adaptation occurs (Bours *et al*, 2014c).

CXC indicators currently include a number of indicators that aim to capture elements of overall resilience and adaptive capacity, and acknowledge that these can be influenced by numerous (unmeasured) non-climatic drivers. However, there is no systematic monitoring of social and economic drivers of resilience and adaptive capacity.

(See **Review and Response** in the **Process** section)

<sup>16</sup> These approaches could be used horizontally across sectors as well as vertically across different levels.

## Resource and capacity

Adaptation M&E requires resourcing. Identifying what data is needed, what is available and what is missing can be a labour-intensive and time-consuming task. Furthermore, it is an iterative process that requires committed funding on a regular basis. This will ensure indicators can be updated when appropriate (due to the availability of new data, analysis, recognised best practice and changing policy) and policy can be responsive.

Even if resource demand is decreased by using data already collected and integrating adaptation M&E into existing M&E structures, there is still a requirement for additional resources to establish the framework, gather and synthesise data and information, and effectively communicate the findings. This process can be significantly aided by allocating an overarching M&E role to a specific organisation. A number of countries have created specific research hubs, technical groups or committees which can provide that support, create an analytical framework and dedicated resources. Scotland's ClimateXChange is one such example. The Scottish Government has endorsed and financially supported (over the last six years) the establishment and development of ClimateXChange which enabled the development of the indicator framework, provides ongoing support and is an acknowledgement of the need for dedicated resources to support adaptation M&E. This commitment is further evidenced by identifying (and funding) the ASC to provide overarching external evaluation to the framework.

However, the ability for all organisations to access monitoring and conduct M&E at regional, local and organisational level is also resource dependent. The second CCRA identified that currently, whilst 'responsibility for delivering adaptation is increasingly devolved to the local level' (CCC, 2017), the capacity and available resources to fulfil these responsibilities are not always adequate at this level. The resourcing of adaptation is therefore an issue to monitor in itself, and in order to understand adaptive capacity at these levels it will be necessary to devise ways to monitor the extent to which local decision-makers have the resources and means to adapt.

## Summary

### ***Measuring adaptation***

- ✓ The framework requires monitoring of both the adaptation process and outcomes. Using both quantitative and qualitative data enables tracking of why things are changing, as well as how.
- ✗ However, the framework is failing to adequately measure the process and there are significant gaps in data which limit the ability to monitor outcomes in some areas.
- ✓ The indicator framework endeavours to provide evidence associated with all the risks from the first CCRA that are addressed by the SCCAP.
- ✗ However, approximately one third of the risks and opportunities identified for Scotland in the first CCRA are not addressed by the first SCCAP.
- At all levels, organisations and policy teams need to consider how they will know they are progressing towards and achieving their objectives.

### ***Data availability***

- ✓ The indicators provide an extensive resource of data and contextual narrative. Extensive stakeholder engagement established what should be monitored and what data was available.
- ✗ The indicator process is very data intensive; and available indicators are often data-driven rather than use-driven.
- ✗ There are significant gaps in data. Data collection is not strategically planned at a multi-organisation level and data access is a significant obstacle.
- Identifying suitable indicators but for which data is not currently available, will highlight gaps and ensure the data need and ambition of the monitoring framework is apparent.
- Early and continuous dialogue between the scientific/ research community and policy-makers/ practitioners will ensure critical gaps are identified and resource provided to fill them.
- A lack of suitable or accessible data can be addressed by: improving coverage, compatibility and data methodology; and improving database design and encouraging data sharing.

### ***Evidence and comparisons across sectors (horizontal) and scales (vertical)***

- ✓ The M&E framework in Scotland has the ability (and ambition) to monitor and evaluate all sectors impacted by climate change. Some limited comparisons between sectors can be made.
- ✗ Currently monitoring is insufficient in many sectors and cross-sectoral monitoring and evaluation is very limited. Specific comparisons between sectors and policy areas are difficult to make.
- ✓ The ASC and CXC use simple symbolic and/or colour coded systems to provide quick overviews across sectors. The indicators provide qualitative comparisons across sectors and action areas.
- ✗ Many indicators are currently unable to show a trend due to insufficient data, resulting in some sectors being under-represented and therefore comparisons are not possible or reasonable.
- Qualitative data from reporting mechanisms which utilise standard, structured processes can potentially be converted to quantitative (ranked) data for simple comparisons.
- M&E needs a cross-sectoral approach. Data collection should be planned both within organisations and between organisations where there are shared interests and outcomes.
- ✓ The M&E framework utilises data and information from multiple scales- by unifying level-specific information under national level themes, or providing informal links and synthesis across scales.
- ✗ However, there is not a systematic method employed to monitor and evaluate across the different levels.
- Common frameworks and methodologies can facilitate the linkage of methods across scales. Process indicators should use metrics which could be understood and applied at multiple levels.
- Qualitative insights should also be shared. Standardising requirements for access and format of available data and information across levels will also facilitate the process.

### ***Complexity and indirect effects***

- ✓ The CXC indicator framework acknowledges that non-climatic factors can compound the risk and make assessment of the effectiveness of adaptation measures very complex to determine.
- ✗ There is limited evidence of social and economic factors which can compound the risk and make assessment of the effectiveness of adaptation measures very complex to determine.
- ✗ Indirect economic losses are at least of the same order of magnitude as direct losses but this is not routinely monitored.
- Process indicators can be used to determine if progress in delivering adaptation interventions is on track, even if it is not yet possible to determine their effectiveness.
- Flexible adaptation 'pathways' provide a practical means to manage uncertainty and the long-term requirements of adaptation in ways that are as efficient and transparent as possible.

### ***Resource and capacity***

- ✓ The Scottish Government have endorsed and financially supported CXC which acknowledges the need for dedicated resources to support adaptation M&E.
- ✗ Adaptation M&E is an iterative, labour-intensive process. Continued resourcing is needed to gather and synthesise data and information, and effectively communicate the findings.
- Utilising existing data and M&E structures, coordinating shared data needs, and maximising efficiency of adaptation intervention, will decrease resource demand.
- ✗ Whilst responsibility for delivering adaptation is increasingly devolved to the local level the capacity and available resources to fulfil these responsibilities are not always adequate.
- Monitor the extent to which local decision-makers have the means to adapt and to contribute to adaptation M&E (access or conduct research, collect data internally or utilise external data).

### **Relevant case studies (see Annex 2):**

- France - a largely process-based system



- Finland - self-assessment to provide qualitative data
- Finland - inter-ministerial working group

## Monitoring and Evaluation: Output

### Key Challenges:

- Varied stakeholder needs
- Coherently linking multiple outputs
- Frequency and timing needs to fit the policy cycle

### Output role (linking context, process and content)

It is essential that monitoring and evaluation outputs are aimed at and able to address the rationale for which the M&E system has been established.

The SCCAP Annual Reports set out to identify ‘what steps have been taken for each objective: what work has taken place in the last year and what work is planned for the next 12 months’ (Scottish Government, 2016) and they do clearly set out the achievements over the previous period against each objective and identified policy area. However, as the SCCAP only sets out three very general ‘objectives’ for each of the three themes it makes it a difficult task to adequately assess what progress has been made towards intended outcomes at national level (CCC, 2016).

The Public Bodies reporting documents are all made publicly available online. Their standard format ensures the information is structured in a uniform way, with sections prompting largely qualitative information to be provided to report on their compliance with the climate change duties. The reports can be accessed from a single online location which further ensures that public sector climate change information is consolidated as per the stated aim. Whilst the reporting format provides a uniform structure, there is considerable scope for a varying level of detail and type of information to be provided. Whilst this ensures the format is flexible, it can limit the ability of the output to be used for comparisons between public bodies and sectors.

The CXC indicators aim to assess trends over time and to understand the nature, extent and effectiveness of adaptation responses. The individual indicator documents are structured in a uniform way to provide trend information where possible along with contextual information to provide additional detail and clarity. By maintaining clear links between the indicators and the structures of the CCRA and SCCAP, the CXC indicator outputs aim to meet their purpose of supporting Scottish Government policy.

The ASC’s output has the specific role of bringing this evidence together to evaluate progress that has been made and ‘inform proposals and policies being considered and guide efforts to plan a suitable response’. This is clearly summarised in a single report which assesses adaptation priorities according to: ‘Is there a plan?’, ‘Is action taking place?’, ‘Is progress being made?’ and setting out recommendations (with owners and timescales) for development of the SCCAP.

### Output suitability for end-users

There are few examples of ‘one-stop reports’ which summarise the entire rationale, development, implementation and results of national M&E frameworks as a whole (GIZ, 2014). Information is usually split across multiple reports, with countries typically producing two different types of output:

- Supporting material (e.g. reporting templates, guidelines, indicator factsheets)
- Reports on the process and results

The former is usually aimed at the implementers of the framework and the latter at the intended beneficiaries, though these can potentially be one and the same. Providing a unifying document which outlines the purpose, context and structure of the component parts of adaptation M&E could clarify the system for end users and facilitate buy-in to the overall process. This will increase cooperation and contribution levels.

Whilst ensuring coherency across the elements and providing clarity regarding how elements relate, it may be necessary to produce multiple outputs to serve different purposes and meet the needs of multiple audiences (GIZ, 2015). Therefore, outputs not only need to ensure they serve the overarching purpose of the M&E system but may also need to meet a multitude of requirements (EEA, 2015):

- Raising awareness of adaptation across sectors and governance levels;
- Supporting stakeholder learning and building adaptive capacity;
- Assessing trends;
- Providing evidence and associated recommendations for adjusting or implementing adaptation policies and measures;
- Highlighting knowledge and data gaps.

Presenting information in a clear and user relevant way will help ensure that end users ‘buy in’ to the process which will help reinforce the ongoing strength and utility of the elements of the adaptation M&E. The structure of outputs needs to be easily understood. Simple summaries of findings and relevance, and graphical representation can help convey complex data. Top-level summaries and guidance can be facilitated by utilising colour-coding and/or simple symbols (e.g. the use of trend arrows). This can provide a means to quickly compare within and across sectors and clearly highlight areas of particular progress and/or concern. However, there is a danger that reducing complex issues, with multiple contributing drivers, down to very simple summaries will detract from the need to consider the context within which those indicators or progress summaries reside. Providing contextual analysis is also critical. Detailed methodology and analysis should be clearly signposted. Though it is often more appropriate for this level of detail to sit behind top level figures and summaries rather than over-complicate the main message.

CXC conducted extensive stakeholder engagement to ensure that the planned output (reporting format, content and visualisation) would meet the needs of end-users, and this influenced the development of symbology, extent of contextual detail, provision of a quick glance table, and key themes for overarching narratives. Overall the intention was to produce a ‘pyramid’ of information with high-level summary information and an increasing degree of detail towards the bottom, with a number of suitable access points dependent on end-user needs.

The structure of the outputs also needs to bear in mind not just the needs of internal reporting but the suitability for use in other monitoring mechanisms and evaluation levels as well. Therefore, there needs to be strong communication between organisations and governing levels to maximise learning opportunities and to build institutional capacity (EEA, 2014). Where the results of adaptation M&E are intended to help revise existing policies and management strategies or develop new ones, it is important to ensure that the output is synchronised with this policy cycle.

The ASC’s assessment identified that the structure of the SCCAP and subsequent progress reporting results in sector-specific activity being ‘fragmented across several SCCAP objectives, risking a lack of co-ordination and delivery’ (CCC, 2016). Whilst this highlights the cross-cutting nature of adaptation, the provision of additional sector-structured sections or summaries could improve the utility of the progress reports.

Whilst, in general, adaptation policy is applied at the national level, the majority of adaptation delivery is at a local level. However, there is currently very minimal output that can enable interpretation of M&E findings at this level in Scotland. Stakeholder engagement by Adaptation Scotland and CXC has also identified the potential demand for regional perspective reporting formats. Providing local level (e.g. Local Government) summaries and interpretation where relevant and possible should increase the utility of the M&E process, enable the interpretation of national level policy into local level action, and encourage buy-in to the M&E process at both local and national level.

Output documents also need to be easily accessible. All the strands of Scotland’s national level M&E are freely accessible online. Although there is not a single dedicated location which brings all the output together, CXC’s website and indicator output and the ASC assessment provide links to each where relevant. In addition to top level output, it is important to ensure that data, information and analysis is appropriately managed and maintained to ensure open and transparent access to it. Part of this process should be ensuring that data gaps are explicit and providing easy means to flag up the availability of new data. With the support of major data providers, the establishment of a systematic (online)



process to keep track of sector and local knowledge of new or improved data sources would be possible. This in turn could encourage the support of more peripheral (but nonetheless essential) data providers.

### Summary

- ✓ There is a clear, structured cycle of reporting: the legislation establishes the requirement for reporting and external evaluation.
- ✓ Most of the M&E process is freely available online: SCCAP reports, Public Body reports and the ASC assessment; CXC indicators and narratives are accessible via dedicated web pages.
- ✓ Achievements over the previous year are clearly set out against each objective and identified policy area in the SCCAP Annual Reports.
- ✗ However, as the SCCAP only sets out three very general ‘objectives’ for each of the three themes it is difficult to assess that progress has been made towards intended outcomes at national level.
- ✗ Sector-specific activity is fragmented across several SCCAP objectives- risking a lack of co-ordinated action and reducing utility of the reporting process if this structure is maintained.
- ✗ Adaptation policy is applied at the national level, but the majority of adaptation delivery is at local level with minimal output that can enable interpretation of M&E findings at this level.
- Providing sector level structure or summaries (acknowledging cross-sectoral interdependencies) will increase accessibility and utility of the information and increase buy-in to the process.
- Providing local level summaries and interpretation should increase the utility of the M&E process, enable interpretation of national policy into local level action, and increase buy-in.
- ✓ CXC consulted extensively with potential end-users to establish a reporting format and visualisation for the 100+ indicators and overarching narratives which best met their needs.
- ✗ Adaptation and adaptation M&E are continuous processes, and data needs and availability are constantly changing-creating immense logistical difficulties for a data intensive indicator system.
- By maximising engagement, buy-in and mainstreaming adaptation M&E at all levels, the burden of locating and accessing data, and ensuring its suitability will be shared.
- Improving ways to update data, notify of new dataset availability, provide expert analysis and feedback, could share the burden of a data intensive system alongside maximising its utility.

### Conclusion

Scotland has established a strong structure, legislative base and ambition for adaptation M&E. Independent expertise provides evidence and advice, and an external evaluation process helps maintain transparency and credibility. However, currently the elements of the framework are not maximising their ability to work effectively together, the adaptation process is not adequately measured and there is a limited ability to utilise M&E to develop an efficient, flexible approach to adaptation. Each thematic area of adaptation strategy needs to have some leadership to ensure the planned measures are coherent and relevant, and momentum is maintained. Standardising reporting and assessment methodologies within and between sectors and levels will also facilitate M&E and the wider adaptation process. The current reporting lacks detail of progress and has no clear vision of what is being aimed for, how to get there and when. Therefore, the framework is failing to adequately measure the adaptation process, and there are significant gaps in data which limit the ability to monitor outcomes in some areas. However, increasing data availability is a potentially time and resource demanding process and a coordinated, considered approach would be advised to maximise utility and minimise resource demand.

Scotland (and the wider UK) was one of the pioneering countries in the development of an M&E framework, and is one of a handful of countries that have a system that is fully operationalised. Scotland is now able to lead the way in showing how learning and adjustment of the process can strengthen M&E and ensure it remains fit for purpose.

The following recommendations are therefore made:

## Recommendations

- ✿ Identify a 'senior owner' for each thematic objective of the adaptation programme, who could be held accountable for the delivery of the adaptation measures and to ensure the overall coherency and relevance of adaptation interventions detailed within the objectives.
- ✿ Develop a standard reporting format which prompts/ requires identification of targets and milestones, sets out a time table for delivery, assesses risks to non-achievement and actions to remedy, and identifies linkages and multiple dependencies across adaptation programme objectives.
- ✿ Develop a protocol for assessing relevance of individual adaptation policies and interventions in addressing the associated objective.
- ✿ Identify the data gaps across each SCCAP theme. Set out prioritisation and methodology to fill key gaps. Explore ways to improve data collection (notification of updates or new data sets) and general feedback.
- ✿ Identify where there are shared data needs and/or mutual responsibility for data provision to establish a coordinated, coherent, efficient approach with joint partners. Consider how existing internal M&E can be used, and/or utility increased- this could help identify 'quick wins' in improving data availability and minimise pressure on resources.
- ✿ Develop a process indicator methodology which will utilise the information provided by the standard reporting protocols and assessment of relevance. Trial the methodology with a small sample of policy teams and delivery agencies before extending across all relevant areas. This information could also be used to explore the potential for applying a flexible adaptation pathway approach to some areas of the adaptation programme.
- ✿ Produce and promote a clear guide illustrating the purpose and importance of the M&E strands and how they relate to each other. This will clarify the need to ensure that the process, content and output of the M&E are fit for purpose, and highlight the dependencies, mutual benefits and potential for flexible adaptation strategies.

Taking these recommendations forward will require additional resource.

## References

- Bours, D., McGinn, C. and Pringle, P. (2014a) *Guidance note 1: Twelve reasons why climate change adaptation M&E is challenging*. SEA Change CoP, Phnom Penh and UKCIP, Oxford. Available online at <http://www.ukcip.org.uk/wp-content/PDFs/MandE-Guidance-Note1.pdf>
- Bours, D., McGinn, C. and Pringle, P. (2014b) *Guidance note 2: Selecting indicators for climate change adaptation programming*. SEA Change CoP, Phnom Penh and UKCIP, Oxford. Available online at <http://www.ukcip.org.uk/wp-content/PDFs/MandE-Guidance-Note2.pdf>
- Bours, D., McGinn, C. and Pringle, P. (2014c) *Monitoring & evaluation for climate change adaptation and resilience: A synthesis of tools, frameworks and approaches (2<sup>nd</sup> edition)*. SEA Change CoP, Phnom Penh and UKCIP, Oxford. Available online at <http://www.ukcip.org.uk/wp-content/PDFs/SEA-Change-UKCIP-MandE-review-2nd-edition.pdf>
- Committee on Climate Change (2016). *Scottish Climate Change Adaptation Programme- An independent assessment for the Scottish Parliament*. Available online at <https://www.theccc.org.uk/wp-content/uploads/2016/09/Scottish-Climate-Change-Adaptation-Programme-An-independent-assessment-CCC-September-2016.pdf>
- Committee on Climate Change (2017). *UK Climate Change Risk Assessment 2017: Evidence Report*. Available online at <https://www.theccc.org.uk/UK-climate-change-risk-assessment-2017/>
- European Environment Agency (EEA) (2014) *National adaptation policy processes in European countries — 2014*. Available online at <http://www.eea.europa.eu/publications/national-adaptation-policy-processes>
- European Environment Agency (EEA) (2015) *National monitoring, reporting and evaluation of climate change adaptation in Europe*. Available online at <http://www.eea.europa.eu/publications/national-monitoring-reporting-and-evaluation>
- GIZ (2013) *Recommendations for Adaptation M&E in Practice- Discussion paper*. Available online at [http://www.adaptationcommunity.net/?wpfb\\_dl=132](http://www.adaptationcommunity.net/?wpfb_dl=132)
- GIZ (2014) *Monitoring and Evaluating Adaptation at Aggregated Levels: A Comparative Analysis of Ten Systems*. Available online at [http://www.adaptationcommunity.net/?wpfb\\_dl=163](http://www.adaptationcommunity.net/?wpfb_dl=163)
- GIZ (2015) *Developing national adaptation monitoring and evaluation systems: A guidebook*. Available online at [http://www.adaptationcommunity.net/?wpfb\\_dl=268](http://www.adaptationcommunity.net/?wpfb_dl=268)
- Grantham Research Institute on Climate Change and the Environment (GRICCE) (2016) *The Global Climate Legislation Study – 2016 update*. Available online at [http://www.lse.ac.uk/GranthamInstitute/wp-content/uploads/2016/11/The-Global-Climate-Legislation-Study\\_2016-update.pdf](http://www.lse.ac.uk/GranthamInstitute/wp-content/uploads/2016/11/The-Global-Climate-Legislation-Study_2016-update.pdf)
- Leiter, T. (2015) *Linking Monitoring and Evaluation of Adaptation to Climate Change Across Scales: Avenues and Practical Approaches*. In D. Bours, C. McGinn, & P. Pringle (Eds.), *Monitoring and evaluation of climate change adaptation: A review of the landscape*. New Directions for Evaluation, 147, 117–127. <http://onlinelibrary.wiley.com/doi/10.1002/ev.20135/abstract>
- Leiter, T. (2017) *The Adaptation M&E Navigator: A Decision Support Tool for the Selection of Suitable Approaches to Monitor and Evaluate Adaptation to Climate Change*. Available online at [https://link.springer.com/chapter/10.1007/978-3-319-43702-6\\_18](https://link.springer.com/chapter/10.1007/978-3-319-43702-6_18)
- Lonsdale, K.G., Gawith, M.J., Johnstone, K. Street, R. B., West, C. C. and Brown, A. D. (2011) *Attributes of Well-Adapting Organisations*. A report prepared by UK Climate Impacts Programme for the Adaptation Sub-Committee. Available online at: [http://www.ukcip.org.uk/wp-content/PDFs/UKCIP\\_Well\\_adapting\\_organisations.pdf](http://www.ukcip.org.uk/wp-content/PDFs/UKCIP_Well_adapting_organisations.pdf)
- Moss, A. & Martin, S. (2012) *Flexible adaptation pathways*. Report for Scottish Government produced by ClimateXChange. Available online at [http://www.climateexchange.org.uk/files/9713/7365/7868/Flexible\\_adaptation\\_pathways.pdf](http://www.climateexchange.org.uk/files/9713/7365/7868/Flexible_adaptation_pathways.pdf)
- OECD (2015) *National Climate Change Adaptation: Emerging practices in monitoring and evaluation*. Available online at <http://www.oecd.org/env/cc/national-climate-change-adaptation-9789264229679-en.htm>

Scottish Government (2009) *Climate Change (Scotland) Act 2009* (web resource). Available online at <http://www.gov.scot/Topics/Environment/climatechange/scotlands-action/climatechangeact>

Scottish Government (2014) *Climate Ready Scotland Scottish Climate Change Adaptation Programme*. Available online at <http://www.gov.scot/Publications/2014/05/4669>

Scottish Government (2015) *Climate Ready Scotland: Scottish Climate Change Adaptation Programme, Annual Progress Report 2015*. Available online at <http://www.gov.scot/Publications/2015/05/2336>

Scottish Government (2016) *Climate Ready Scotland: Scottish Climate Change Adaptation Programme, Annual Progress Report 2016*. Available online at <http://www.gov.scot/Resource/0050/00500892.pdf>

Sustainable Scotland Network (2016) Public Bodies Climate Change Duties Reporting 2014/2015: Analysis Report. Available online at <http://www.keepsotlandbeautiful.org/media/1557092/climate-change-duties-reporting-2014-15-analysis-report-final-low-res.pdf>

UNFCCC (2014) Fifth meeting of the Adaptation Committee Bonn, Germany, 5–7 March 2014: Report on the workshop on the monitoring and evaluation of adaptation. Available online at [http://unfccc.int/files/adaptation/cancun\\_adaptation\\_framework/adaptation\\_committee/application/pdf/ac\\_me\\_ws\\_report\\_final.pdf](http://unfccc.int/files/adaptation/cancun_adaptation_framework/adaptation_committee/application/pdf/ac_me_ws_report_final.pdf)

UNFCCC (2015) *Adoption of the Paris Agreement- Article 7*. Available online at <https://unfccc.int/resource/docs/2015/cop21/eng/l09r01.pdf>

## Annex 1: Development of current adaptation policy and associated monitoring and evaluation in Scotland

Under the 2008 Climate Change (UK) Act<sup>17</sup> the UK Government are required to publish 5-yearly assessments of risk to help policy-makers by assessing the magnitude of risks and whether action is required in the next five-years. The first UK **Climate Change Risk Assessment (CCRA)**<sup>18</sup> was subsequently published in January 2012 and provided an assessment of the current and predicted threats and opportunities to the UK from climate change and included a separate CCRA for Scotland<sup>19</sup>. The second CCRA<sup>20</sup> was published in 2017, again with a national summary for Scotland<sup>21</sup>.

The Climate Change (Scotland) Act<sup>22</sup> was passed unanimously by the Scottish Parliament in 2009 and was described by the government as ‘the most far-reaching environmental legislation considered by the Parliament during the first ten years of devolution’ (Scottish Government, 2009). It requires Scottish Ministers to lay a programme before the Scottish Parliament, which responds to the CCRA and sets out:

- their objectives in relation to adaptation to climate change;
- their proposals and policies for meeting those objectives;
- the period within which those proposals and policies will be introduced; and
- mechanisms for ensuring stakeholder involvement and public engagement to meet those objectives.

Following the publication in 2009 of the Climate Change Adaptation Framework and associated Sector Action Plans<sup>23</sup>, Scotland’s first statutory **Scottish Climate Change Adaptation Programme (SCCAP)**<sup>24</sup> was published in May 2014. The SCCAP ‘sets out Scottish Ministers objectives in relation to adaptation to climate change, their proposals and policies for meeting those objectives, and the period within which those proposals and policies will be introduced’ (Scottish Government, 2014). There are nine general objectives for the Programme which are spread across three themes: Natural Environment, Built Environment and Infrastructure Networks, and Society. There is a statutory requirement for the publication of annual **SCCAP progress reports**. The status of individual policies and proposals presented in the progress reports is based on self-reporting by their owners in the relevant government departments and delivery agencies.

The Climate Change Act also allows Ministers, to impose other climate change duties, to require reports on compliance with climate change duties, and to designate one or more bodies or persons to monitor compliance and to carry out investigations. In 2015, a Statutory Order came into force requiring listed public bodies to annually report on compliance with the climate change duties (**Public Sector Climate Change Reporting**)<sup>25</sup>. The Order sets out the reporting requirement, list of public sector major players involved<sup>26</sup> and the standard climate change reporting form. This standard form includes the specific request for detail of delivery of policies and proposals contained in the SCCAP.

ClimateXChange (CXC)<sup>27</sup> is Scotland's centre of expertise on climate change, providing a research, advice and analysis service to Scottish Government policy teams and associated public agencies. In 2016 CXC published their **Climate Change Adaptation indicators** which aim to support Scottish Government policy. The indicators are linked to the risks

<sup>17</sup> <http://www.legislation.gov.uk/ukpga/2008/27/part/4>

<sup>18</sup> [http://randd.defra.gov.uk/Document.aspx?Document=10067\\_CCRAEvidenceReport16July2012.pdf](http://randd.defra.gov.uk/Document.aspx?Document=10067_CCRAEvidenceReport16July2012.pdf)

<sup>19</sup> <http://randd.defra.gov.uk/Document.aspx?Document=CCRAforScotland.pdf>

<sup>20</sup> <https://www.theccc.org.uk/uk-climate-change-risk-assessment-2017/>

<sup>21</sup> <https://www.theccc.org.uk/uk-climate-change-risk-assessment-2017/national-summaries/scotland/>

<sup>22</sup> [http://www.legislation.gov.uk/asp/2009/12/pdfs/asp\\_20090012\\_en.pdf](http://www.legislation.gov.uk/asp/2009/12/pdfs/asp_20090012_en.pdf)

<sup>23</sup> <http://www.gov.scot/Publications/2009/12/08130513/0>

<sup>24</sup> <http://www.gov.scot/Publications/2014/05/4669>

<sup>25</sup> <http://www.keepsotlandbeautiful.org/sustainability-climate-change/sustainable-scotland-network/major-players-and-climate-change-reports/>

<sup>26</sup> The list of public sector major players involved includes: Local Authorities, Further and Higher Education, National Health Service and others (including transport partnerships, police and emergency services, National Parks, Scottish Water, SEPA and a range of other non-departmental public bodies)

<sup>27</sup> <http://www.climateexchange.org.uk/>

identified in the CCRA which are being addressed by the policies and proposals set out in the SCCAP and monitor aspects of risk (or opportunity), realised impact and adaptation action. They are presented alongside over-arching narratives that give the context for why these indicators have been chosen, and analysis regarding what conclusions can be drawn when reading across related indicators. The CXC indicators are intended to be updated and developed to maintain relevance to the most recent iterations of the CCRA and SCCAP.

In addition to the annual SCCAP progress reports, an **independent assessment** of the SCCAP is required to occur within two years of publication and the Adaptation Sub-Committee of the UK Committee on Climate Change (ASC)<sup>28</sup> was identified as being the advisory body to take that role. The ASC's assessment of the SCCAP was published at the end of 2016 and combines evidence from several sources:

- the CXC indicators;
- the latest SCCAP progress report;
- the Public Bodies reporting; and
- the ASC's own analysis and datasets collated in preparing the second CCRA.

### International context

The UNFCC Paris Agreement established a global goal on adaptation: 'enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change, with a view to contributing to sustainable development and ensuring an adequate adaptation response in the context of the temperature goal' (UNFCC, 2015). By the start of 2016, 188 out of 196 Parties had established their Intended Nationally Determined Contributions (INDCs) which lay out their plans for post-2020 climate action, with most of the INDCs covering both mitigation and adaptation.

However, adaptation policy is a relatively new area and there is considerable variation in the commitment and scope of existing policy. The Global Climate Legislation Study (2016 update) (GRICCE, 2016) identified 65 countries that had a legislation framework in place which addressed adaptation to climate change impacts<sup>29</sup>. However, the approach that had been taken also varied considerably across these countries and only a small number have adaptation plans which have gone beyond their international reporting requirements to the UNFCCC.<sup>30</sup>

Climate change adaptation is therefore at a relatively early stage in most countries and decision-makers across those countries have chosen very different approaches. However, it is essential that national governments, local authorities and delivery agencies can begin to understand what adaptation policy and actions are working (or not) and why. Monitoring and evaluation of adaptation enables the tracking of progress in implementing policy and management strategies. Furthermore, governments need to be able to decide whether their interventions are effectively reducing vulnerability to climate change, efficiently ensuring that benefits outweigh costs and equitably distributing those costs and reducing the climate impacts: 'by learning lessons about the process of planning, implementing and measuring adaptation, future adaptation interventions can be more effective, efficient and equitable' (EEA, 2014).

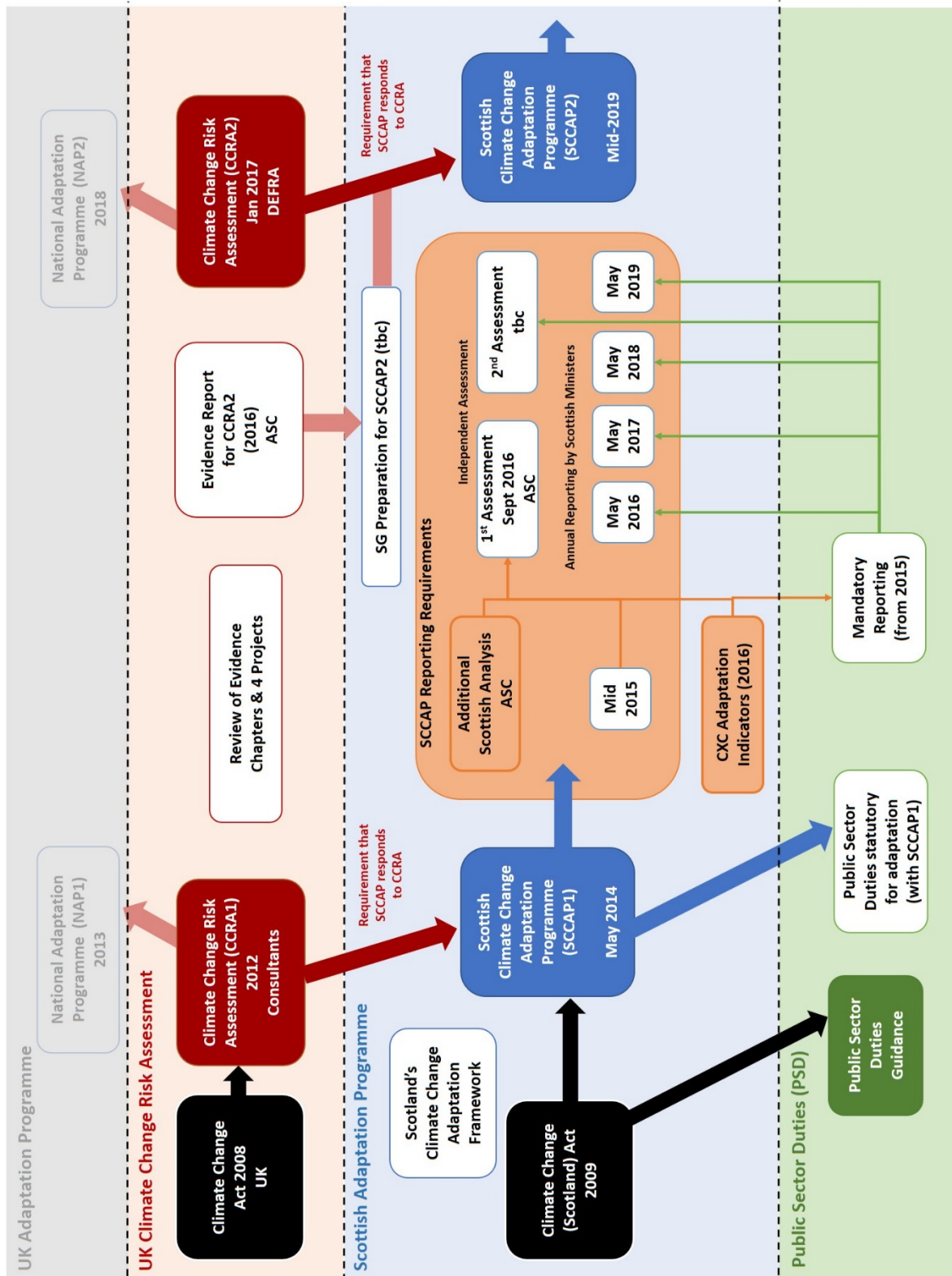
<sup>28</sup> <https://www.theccc.org.uk/about/structure-and-governance/asc-members/>

<sup>29</sup> Seven countries have a separate adaptation framework, 58 countries have a combined adaptation and mitigation framework

<sup>30</sup> [https://unfccc.int/national\\_reports/items/1408.php](https://unfccc.int/national_reports/items/1408.php)



Figure A1 Timeline summary of climate change adaptation policy and M&E process in Scotland.



## Annex 2: International case studies

### Norway- an emphasis on 'learning'

Instead of having a formal M&E process, the emphasis in Norway's adaptation strategy (as outlined in the 2013 document 'Climate change adaptation in Norway') is on adaptation as a continuous learning process- to learn what is working, why and thereby maintain the relevance of policy decisions. This involves a relatively informal 'learning-by-doing' system of municipal level surveys, project-based learning and stakeholder engagement. Much of the emphasis is on building adaptive capacity, particularly at the county and municipality level, with adaptation progress measured in terms of the acquisition and application of knowledge on how to adapt. The adaptation learning system is not structured (or restricted) by an overarching framework, but instead emphasises the need to take advantage of opportunities for dialogue and cooperation when possible and capture the resulting lessons learnt to inform the national assessment process.



Further information:

- [http://www.adaptationcommunity.net/?wpfb\\_dl=228](http://www.adaptationcommunity.net/?wpfb_dl=228)
- [https://www.regjeringen.no/en/dokumenter/meld.-st.-33-20122013/id725930/sec1?q=adaptation#match\\_0](https://www.regjeringen.no/en/dokumenter/meld.-st.-33-20122013/id725930/sec1?q=adaptation#match_0)

### Germany- an intrinsic link between adaptation and M&E at the outset

The principal intention for the use of M&E (and specifically a comprehensive set of indicators) to aid the adaptation process was set out in Germany's 2008 Adaptation Strategy document:

*'An integrated cross-sectoral approach to the development of indicator systems is recommended and should be pursued in close cooperation between departments at federal, Länder and local level.'*

This involved the creation of new monitoring/ indicator systems such as those to capture the process of implementing the Adaptation Strategy; also, additional indicators to complement existing systems such as those for climate impact monitoring which were suggested by the Länder to complement their technical measuring networks.

From the start of the process the Strategy detailed how a comprehensive nation-wide indicator system should be established which also provided links to subordinate state (Länder) level, as well as to the superordinate EU level to comply with international adaptation and reporting requirements.



Further information:

- <http://www.umweltbundesamt.de/sites/default/files/medien/461/publikationen/4031.pdf>
- [http://www.umweltbundesamt.de/sites/default/files/medien/376/publikationen/monitoringbericht\\_2015\\_zur\\_deutschen\\_anpassungsstrategie\\_an\\_den\\_klimawandel.pdf](http://www.umweltbundesamt.de/sites/default/files/medien/376/publikationen/monitoringbericht_2015_zur_deutschen_anpassungsstrategie_an_den_klimawandel.pdf)

### Germany- extensive stakeholder engagement

Extensive stakeholder engagement was undertaken over approximately two years as an intrinsic part of the process of designing the M&E system in Germany. This involved:

- Small expert groups, intensive consultations and workshops



- All the federal ministries and Länder were invited to comment on the detailed proposals
- Every indicator was agreed at both the scientific and political level.

Although this was time and resource intensive, it was critical to ensure support for the emergent M&E system and to secure ownership of the ongoing process. By involving subject experts, policy-makers and stakeholders from federal and state levels, science-policy linkages were fostered, existing data was identified and an indicator framework was established which met both scientific and political requirements.



Further information:

- [https://www.umweltbundesamt.de/sites/default/files/medien/461/publikationen/climate\\_change\\_12\\_2013\\_stakeholder\\_participation\\_in\\_a\\_daptation\\_to\\_climate\\_change\\_bf\\_0.pdf](https://www.umweltbundesamt.de/sites/default/files/medien/461/publikationen/climate_change_12_2013_stakeholder_participation_in_a_daptation_to_climate_change_bf_0.pdf)
- [http://www.adaptationcommunity.net/?wpfb\\_dl=223](http://www.adaptationcommunity.net/?wpfb_dl=223)

## Netherlands- flexible adaptation management

The Delta Programme in the Netherlands was developed to ensure that flood risk management and the supply of freshwater is sustainable by 2050, and that the country develops in a manner that enables it to remain resilient to climate extremes. *Adaptive Delta Management* has been used as the main approach in order to address uncertainties in a transparent way and to choose cost-effective measures at the right time. A 'monitoring, analysing, acting' system, is seen as being the 'engine' of the management approach. This involves:

- **monitoring** what is being done and how effective it is,
- **analysing** new insights gained,
- **acting** on this knowledge as appropriate

The Delta Programme reports annually and will review whether any new developments call for adjustment of the strategies and the Delta Plans. In addition to this annual cycle, the framework of 'system learning' includes a six-yearly assessment of whether these adjustments have been adequate and timely.



Further information:

- [http://deltaproof.stowa.nl/pdf/Delta\\_scenarios\\_and\\_Adaptive\\_Delta\\_Management?rld=80](http://deltaproof.stowa.nl/pdf/Delta_scenarios_and_Adaptive_Delta_Management?rld=80)

## France- a largely process-based system

France's 2011 National Adaptation Plan (NAP) provided the first national level, multi-ministerial roadmap to prioritisation of adaptation actions, ensuring policy coherence and preventing maladaptation. M&E of the NAP aimed to assess the resilience of the country to climate change by monitoring progress in implementing the 84 adaptation actions and 230 measures set out in the Plan. The assumption being that implementing the NAP should reduce the country's vulnerability to climate change.

Annual follow-up of progress was conducted by the National Observatory on the Effects of Global Warming (ONERC), based on information from the designated coordinators of the actions and measures. The assessment team examined

the degree to which the actions and measures listed in the plan had been carried out, the procedures involved in performing and monitoring them, the financial resources committed, and the ways and level to which stakeholders were involved.

	Number	Completed	In progress	Delayed	Abandoned
1- Cross-cutting actions	5	1		4	
2- Health	5		4	1	
3- Water resources	5	3	1	1	
	4				

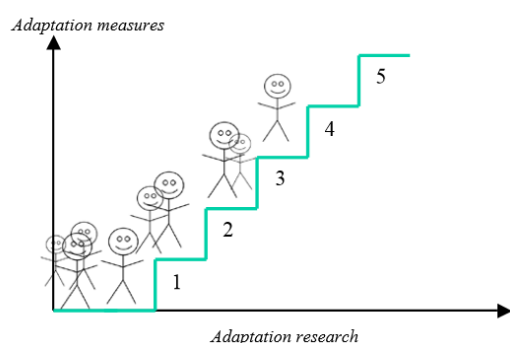
Further information:

- [http://www.developpement-durable.gouv.fr/sites/default/files/ONERC\\_Rapport\\_2016\\_EvaluationNap\\_EN.pdf](http://www.developpement-durable.gouv.fr/sites/default/files/ONERC_Rapport_2016_EvaluationNap_EN.pdf)
- [http://www.adaptationcommunity.net/?wpfb\\_dl=222](http://www.adaptationcommunity.net/?wpfb_dl=222)

### Finland- self-assessment to provide qualitative data

An important part of the M&E system for Finland's National Adaptation Strategy is the self-assessment by sector representatives in the National Coordination Group for Adaptation to assess the status of the implementation of adaptation measures in their sector. The assumption is that sectoral practitioners are best placed to provide practical insights into what has enabled or prevented adaptation. This was supplemented with a survey which evaluated the success of implementation, overall progress of sector adaptation, and areas for additional measures and tools to support adaptation. In some sectors, this evaluation drew on the views of sectoral experts, but most sectors collected multiple perspectives from different stakeholder groups. As well as providing insight which quantitative indicators are unlikely to provide, it is a cost-efficient method and enhances learning among those who participate.

This process results in each sector's level of adaptation being described as a position on a five-step scale of adaptation. This qualitative indicator combines multiple elements relating to the implementation of the NAS (e.g. recognition of the need for adaptation, availability of knowledge, implementation of adaptation measures, cross-sectoral cooperation and mainstreaming)



Further information:

- <http://www.eea.europa.eu/publications/national-monitoring-reporting-and-evaluation>
- [http://mmm.fi/documents/1410837/1721034/Adaptation\\_Strategy\\_evaluation.pdf/043c0964-58c5-4fce-8924-cc47748cf766](http://mmm.fi/documents/1410837/1721034/Adaptation_Strategy_evaluation.pdf/043c0964-58c5-4fce-8924-cc47748cf766)

### Finland- inter-ministerial working group

Finland has set up an inter-ministerial group to coordinate the implementation of the National Climate Change Adaptation Plan. The group is tasked with promoting cooperation on adaptation across government and sectors, identifying research needs, and maintaining direction and progress on adaptation. The group also has a mandate to monitor and report on the implementation of the adaptation plan and evaluate the effectiveness of its measures.

The group supports horizontal coordination, the exchange of information and best practice, and by including M&E in the role of the same group coordinating and implementing adaptation policy it promotes the development and effective use of M&E in policy making.

Composition of the monitoring group has varied over the years but in nature it has a broad base, with representatives from ministries, regional and municipal representatives, and research institutes and funding bodies. The group meets quarterly and the current term is until the end of 2018.



Further information:

- <http://mmm.fi/en/monitoring-group-on-climate-change-adaptation>  
<http://www.eea.europa.eu/publications/national-monitoring-reporting-and-evaluation>