
# Study to support the evaluation of the EU Adaptation Strategy

Final Report

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**Appendices**

# Table of acronyms and abbreviations

| | |
|---|---|
| AFD | Agence Française de Développement |
| AGRI | Directorate General for Agriculture and Rural Development |
| BASE | Bottom-up Climate Adaptation Strategies towards a Sustainable Europe |
| BUDGET | Directorate General for Budget |
| C40 | C40 Cities Climate Leadership Network |
| CAP | Common Agricultural Policy |
| CC | Climate Change |
| CCA | Climate Change Adaptation |
| CEB | Council of Europe Development Bank |
| CEN | European Committee for Standardization |
| CENELEC | European Committee for Electrotechnical Standardization |
| CEPS | Centre for European Policy Studies |
| CF | Cohesion Fund |
| CFP | Common Fisheries Policy |
| CIRCE | Climate Change and Impact Research: the Mediterranean Environment |
| CLIMA | Directorate General for Climate Action |
| Climate-ADAPT | The European Climate Adaptation Platform |
| CLIMRUN | Climate Local Information in the Mediterranean Region responding to User Needs |
| CMU | The Capital Markets Union |
| $CO_2$ | Carbon Dioxide |
| COM | Commission |
| COP21 | 21st Conference of the Parties |
| CORDEX | Coordinate Regional Downscaling Experiment |
| CPR | Common Provisions Regulation |
| CRD | Capital Requirements Directive |
| CRR | Capital Requirements Regulation |
| CoM | Covenant of Mayors for Climate and Energy |
| CoR | Committee of the Regions |
| DEVCO | Directorate General for International Cooperation and Development |
| DG | Directorate General |
| DGT | Directorate General of Training |
| DRR | Disaster Risk Reduction |

| | |
|---|---|
| EAFRD | European Agriculture Fund for Rural Development |
| EAGF | European Agriculture Guarantee Fund |
| EASME | Executive Agency for Small and Medium-sized Enterprises |
| EC | European Commission |
| ECA | European Court of Auditors |
| ECHO | Directorate General for European Civil Protection and Humanitarian Aid Operations |
| ECRAN | Environment and Climate Regional Accession Network |
| EEA | European Environment Agency |
| EEAS | European External Action Services |
| EESC | European Economic and Social Committee |
| EIA | Environmental Impact Assessment |
| EIB | European Investment Bank |
| EMFF | European Maritime and Fisheries Fund |
| EN | English |
| ENER | Directorate General for Energy |
| ENV | Directorate General for Environment |
| ERA4CS | European Research Area for Climate Services |
| ERDF | European Regional Development Fund |
| ESF | European Social Fund |
| ESIF | European Structural and Investment Funds |
| ESOs | European standardisation organisations |
| ETC/CCA | European Topic Centre on Climate Change Adaptation |
| EU | European Union |
| EUFIWACC | EU Financial Institutions Working Group on Adaptation to Climate Change |
| EUPORIAS | European Provision Of Regional Impacts Assessments on Seasonal and Decadal Timescales |
| EUR | Euros |
| FC | Framework Contract |
| FERMA | Federation of European Risk Management Associations |
| FISMA | Directorate-General for Financial Stability, Financial Services and Capital Markets Union |
| FP7 | Seventh Framework Programme |
| FTE | Full-time equivalent |
| GDP | Gross Domestic Product |

| | |
|---|---|
| GHG | Greenhouse gas |
| GI | Green Infrastructure |
| GMES | Copernicus climate services, previously known as Global Monitoring for Environment and Security |
| GROW | Directorate General for Internal Market, Industry, Entrepreneurship and SMEs |
| H2020 | Horizon 2020 |
| HLEG | High Level Expert Group |
| IA | Impact Assessment |
| ICLEI | Local Governments for Sustainability |
| ICT | Information and communications technology |
| IEC | International Electrotechnical Commission |
| IEEP | Institute for European Environmental Policy |
| IFIs | International Financial Institutions |
| IPCC | Intergovernmental Panel on Climate Change |
| ISG | Inter-Service Group |
| ISO | International Organisation for Standardisation |
| IT | Information Technology |
| JASPERS | Joint Assistance to Support Projects in European Regions |
| JPI | Joint Programme Initiative |
| JRC | Joint Research Centre |
| KfW | KfW Development Bank |
| LIFE | L'Instrument Financier pour l'Environnement / Programme for the Environment and Climate Action |
| LULUCF | land use, land use change and forestry |
| MAWP | Multi-Annual Work Programme |
| MFF | Multiannual Financial Framework |
| MOVE | Directorate General for Mobility and Transport |
| MS | Member States |
| MTE | mid-term evaluation |
| NAP | national adaptation plan |
| NAS | national adaptation strategy |
| NCCF | Natural Capital Financing Facility |
| NDCs | Nationally Determined Contributions |
| NEAR | Directorate-General for Neighbourhood and Enlargement Negotiations |
| NGOs | Non-Governmental Organisation |

| | |
|---|---|
| NIB | Nordic Investment Bank |
| NatCatSERVICE | Munich Re's NatCatSERVICE is one of the world's most comprehensive databases for analysing and evaluating natural catastrophes. |
| ONERC | L'Observatoire national sur les effets du réchauffement climatique |
| OPs | Operational Programmes |
| PAs | Partnership Agreements |
| PESETA | Projection of Economic impacts of climate change in Sectors of the European Union based on bottom-up Analysis |
| PLACARD | PLAtform for Climate Adaptation and Risk reDuction |
| PPP | Public Private Partnerships |
| RDPs | Rural Development Programmes |
| REGI | European Parliament Regional Development Committee |
| REGIO | Directorate General for Regional and Urban Policy |
| RTD | Directorate General for Research & Innovation |
| SDGs | Sustainable Development Goals |
| SEA | Strategic Environmental Assessment |
| SEAP | Sustainable Energy Action Plan |
| SECAP | Sustainable Energy and Climate Action Plan |
| SIR | Second Interim Report |
| SME | Small and Medium Enterprise |
| SRES | Special Report on Emissions Scenarios |
| SWD | Staff Working Document |
| TA | Technical Assistance |
| TEN-E | Trans-European Network Energy |
| TEN-T | Trans-European Transport network |
| TFEU | Treaty on the Functioning of the European Union |
| TURAS | http://www.turas-cities.org/ |
| UK | United Kingdom |
| UN | United Nations |
| UNFCCC | United Nations Framework Convention on Climate Change |
| USA | United States of America |

# Executive Summary

The current EU Adaptation Strategy was published in April 2013. As indicated in the Strategy, in 2017 "the European Commission will report to the European Parliament and the Council on the state of implementation of the EU Adaptation Strategy, and propose its review, if needed". Hence, to assess and measure progress made since 2013 and to assess if revision of the Strategy is necessary, an evaluation is needed. This study supports the evaluation, examining the Strategy's actual implementation and performance. Drawing on available evidence, the study looks at the experience gained, the lessons learnt and assesses whether what has happened, in practice, meets the expectations of the Strategy when it was launched. The study analyses the extent to which the implementation of each of the Strategy's has advanced.

The study has been carried out in compliance with the requirements of the Better Regulation Guidelines[1]. The evaluation covers the period from the launch of the Strategy in 2013 to mid-2017. The approach reflects the relatively recent implementation of the Strategy and considers if its objectives and actions respond to the current needs and priorities in different policy sectors at local, national and transnational level. The evaluation builds on the work of other organisations, particularly recent assessments of the LIFE and Covenant of Mayors programmes and an ongoing evaluation of the Climate-ADAPT initiative. The evaluation covers all of the EU's Member States.

The evaluation was undertaken between December 2016 and March 2018. A set of evaluation questions were addressed under the five primary evaluation criteria: Relevance, Effectiveness, Efficiency, Coherence, and EU Added Value. The report draws upon the Impact Assessment for the Strategy to identify: a baseline situation in 2013 before the Strategy was launched; planned inputs, outputs and activities of the Strategy; expected results; and operational objectives for the Strategy. However, the Impact Assessment did not estimate what the future situation would be in the absence of the Strategy. The method used to address the evaluation questions is, therefore, a theory-based approach. This compares the current state of play with points of comparison given by the expected results and operational objectives from the Impact Assessment. No comparison could be made with the expected situation in the absence of the Strategy, as this is unavailable.

The overall aim of the Strategy is "to contribute to a more climate resilient Europe". To meet this aim, the Strategy defines three objectives, which it commits to delivering through the implementation of eight actions (see table below).

| Objectives | Actions |
|---|---|
| Promoting action by Member States | 1. Encourage all Member States to adopt comprehensive adaptation strategies<br>2. Provide LIFE funding to support capacity building and step up adaptation action in Europe.<br>3. Introduce adaptation in the Covenant of Mayors framework |
| Better informed decision-making | 4. Bridge the knowledge gap<br>5. Further develop Climate-ADAPT as the 'one-stop shop' for adaptation information in Europe |
| Climate-proofing EU action: promoting adaptation in key vulnerable sectors | 6. Facilitate the climate-proofing of the Common Agricultural Policy, the Cohesion Policy and the Common Fisheries Policy<br>7. Ensuring more resilient infrastructure<br>8. Promote insurance and other financial products for resilient investment and business decisions |

[1] Better Regulation Guidelines: https://ec.europa.eu/info/better-regulation-guidelines-and-toolbox_en

Evidence for this report was gathered through literature review, targeted stakeholder survey, stakeholder interviews, stakeholder workshops, open public consultation (available on the DG CLIMA website from 7 December 2017 to 1 March 2018) and the development of case studies.

The Strategy was designed to respond to an overarching need to increase the resilience of EU Member States, and thereby limit the economic, environmental and social costs of unavoidable climate impacts in Europe. There is strong evidence from the literature that economic, social and environmental costs of those impacts in Europe are significant and that there is a need for adaptation action. The general objective of the Strategy, to contribute effectively to a more climate resilient Europe, also remains relevant as a result of international policy developments since 2013.

Since the adoption of the Strategy in 2013, a range of outcomes have been delivered that relate to the Strategy's objectives and actions, for example, ten Members States have adopted national adaptation strategies, bringing the total to 25, with the remaining three in the process of developing their strategies. However, it is difficult to evaluate the extent to which the Strategy can take credit for these outcomes, not least because other policy drivers, most notably the Paris Agreement, and many other factors (particularly experience of extreme weather events) may have promoted their delivery regardless of the Strategy's existence. Nevertheless, taking these uncertainties into account, evidence suggests that the Strategy has played an important role and been effective in progressing delivery of its objectives and associated actions. The only exception may be with regard to Action 8 where evidence is equivocal as to whether the Strategy has been effective in promoting insurance and other financial products for resilient investment and business decisions[2].

In relation to efficiency, administrative costs resulting from the Strategy are very low and mostly limited to the Commission. No significant administrative burdens resulting from the Strategy were identified. Voluntary costs (which the Commission does not consider are an administrative burden) could vary per stakeholder, e.g. Member States without a strategy or relatively low adaptation capacity would require more resources to (voluntarily) develop a strategy.

In general, there is a strong level of coherence among EU policies included in the Strategy, particularly in relation to the mainstreaming of adaptation in the EU budget (by nature, a cross-cutting activity). In other respects, there are limits to the extent to which the Commission can influence coherence at national and sub-national level through voluntary measures. The Strategy is focused on EU domestic adaptation activity and does not address broader international climate adaptation issues. While the focus on domestic adaptation is a valid choice, it risks failing to identify and address: areas where there is potential for cooperation between the EU and other economies; and EU vulnerability to climate impacts elsewhere in the global economy (migration risks, risks to global value chains, security risks). Finally, evidence suggests that there is strong internal coherence between some specific actions of the Strategy, particularly between Action 1 and 6, and Action 5 and 3 and 4.

Most of the elements of the Strategy appear to be adding value, compared with horizontal and vertical actions at Member State level. Only in relation to Action 8 is the evidence not strong enough to confirm whether the Strategy is adding value. This may reflect a relatively low level of activity regarding this action.

Our overall assessment of the Strategy is that it delivered its individual objectives, with progress recorded against each individual action. The nature of a strategy based on voluntary action makes it difficult to point to a counterfactual case of what would have happened in its absence. However, evidence from the targeted stakeholder survey and interviews with representatives of national governmental organisations suggest it is likely

[2] The importance mainstreaming climate risks in the financial sector was reaffirmed in the recent Commission Communication on Financing Sustainable Growth. COM (2018) 97 final

that the Strategy enhanced the political focus on adaptation issues, and increased awareness among a broad range of EU, Member State, and sub-national policymakers of the need for action.

The largely voluntary approach underpinning the Strategy appears to have been an appropriate response to the early stage of understanding of adaptation action, to the wide range of Member State situations and priorities, and to the need for policy experimentation. A wide range of stakeholders, including from EU institutions (European Commission, European Parliament, etc) and national governmental organisations, now see a need for a step change in the urgency of adaptation action; international developments point to the need for greater collective action on resilience; and there is further evidence of risks from the direct and indirect impacts of high-end climate change. This suggests the need for an intensification and extension of the scope of action.

Evidence gathered during the evaluation of the Strategy can inform recommendations for future activities under the Strategy, which are also included in a final section of the report.

# 1 Introduction

## 1.1 Purpose and scope of the evaluation

The current EU Adaptation Strategy (European Commission, 2013a) was published in April 2013. As indicated in the Strategy, in 2017 "the European Commission will report to the European Parliament and the Council on the state of implementation of the EU Adaptation Strategy, and propose its review, if needed". Hence, to assess and measure the progress made since 2013 and to assess if a revision of the Strategy is necessary, an evaluation is needed. This study provides support to the evaluation of the Strategy, examining its actual implementation and performance.

Drawing on available evidence, the study looks at the experience gained, the lessons learnt and assesses whether what has happened, in practice, meets the expectations of the Strategy when it was launched. The study analyses in which sectors the actions derived from the Strategy have shown good progress and the extent to which the implementation of each of the eight actions under the Strategy has advanced.

The study has been carried out in compliance with the requirements of the Better Regulation Guidelines (European Commission, 2017a). Under this evaluation, the relevance, effectiveness, efficiency, coherence and EU added value of the EU Adaptation Strategy have been assessed. The evaluation covers the period from the launch of the Strategy in 2013 to early-2018. The approach reflects the relatively recent implementation of the Strategy and considers if its objectives and actions respond to the current needs and priorities in different policy sectors at local, national and transnational level. The evaluation builds on the work of other organisations, particularly recent assessments of the LIFE and Covenant of Mayors programmes and an ongoing evaluation of the Climate-ADAPT initiative (European Environment Agency, 2018, Forthcoming). The evaluation covers all of the European Union's Member States.

# 2 Background to the Strategy

## 2.1 The EU Adaptation Strategy

In April 2013, the European Commission (hereinafter 'the Commission') adopted the Communication: 'An EU Strategy on Adaptation to Climate Change' (European Commission, 2013a). "The overall aim of the EU Adaptation Strategy is to contribute to a more climate-resilient Europe. This means enhancing the preparedness and capacity to respond to the impacts of climate change at local, regional, national and EU levels, developing a coherent approach and improving coordination."

Alongside the Communication, a package of supporting documents was published. These provide further information on certain elements of the Strategy and respond to some specific commitments made in the Strategy, e.g. to prepare guidelines on developing adaptation strategies. The supporting documents are:

- Impact Assessment of the EU Strategy on Adaptation to Climate Change (European Commission, 2013b)
- Climate change adaptation, coastal and marine issues (European Commission, 2013c)
- Adaptation to climate change impacts on human, animal and plant health (European Commission, 2013d)
- Adapting infrastructure to climate change (European Commission, 2013e)
- Climate change, environmental degradation, and migration (European Commission, 2013f)
- Technical guidance on integrating climate change adaptation in programmes and investments of Cohesion Policy (European Commission, 2013g)
- Principles and recommendations for integrating climate change adaptation considerations under the 2014-2020 rural development programmes (European Commission, 2013h)
- Guidelines on developing adaptation strategies (European Commission, 2013i).

In addition, a Green Paper on the insurance of natural and man-made disasters (European Commission, 2013j) was launched in parallel with the Strategy. The Green Paper sets out the potential for the European Union to facilitate and support the development of markets for disaster risk insurance.

The EU Adaptation Strategy package also included the 'Non-paper Guidelines for Project Managers: Making vulnerable investments climate resilient' (European Commission, 2013k).

## 2.2 Intervention logic for the Strategy

Starting with the need for policy action, the intervention logic describes the key causal linkages between the objectives that the Strategy was designed to meet and the anticipated actions and impacts of the Strategy. The relevant elements of the intervention logic are summarised below, and are shown diagrammatically in Figure 2-1 and Figure 2-2.

### 2.2.1 Need for action

The main drivers for action were the economic, environmental and social costs of unavoidable climate impacts in Europe. Specifically, the expectation at the time of the formulation of the Strategy was that the impact of climate change would increase in the coming decades because of the delayed impacts of past and current greenhouse gas emissions. The minimum cost of not adapting to climate change was estimated to range from €100 billion a year in 2020 to €250 billion a year in 2050 for the EU as a whole. Therefore, a need was identifed for further policy intervention to support the take-up of additional adaptation measures, so that these costs could be limited. The Strategy also outlined a need to take adaptation actions early, as prioritising coherent, flexible and

participatory approaches would lead to planned adaptation actions that would be cheaper than the price of not adapting. Finally, in view of the specific and wide-ranging nature of climate change impacts on the EU territory, the need was identified for adaptation measures to be taken at local, regional and national levels.

### 2.2.2 Objectives

As described in the Communication and accompanying impact assessment, the overall aim of the Strategy is "to contribute to a more climate resilient Europe". To meet this aim, the impact assessment defines three specific objectives each with operational objectives and performance indicators[3] to measure progress[4], as follows:

1. **Increasing the resilience of the EU territory**[5]: The Strategy should promote adaptation action at sub-EU level, and support and facilitate exchange and coordination. In doing so, the Strategy should address cross-border climate impacts and adaptation measures

- Operational Objective 1a: by 2017, all Member States have adopted adaptation strategies, complemented by regional or local adaptation strategies, where appropriate
  - Number of national adaptation strategies and action plans and national climate change risk assessments
  - Number and amount of Life grants used for experience transfer[6]
- Operational Objective 1b: by 2020, cities of more than 150,000 inhabitants have adopted an adaptation strategy
  - Number and amount of Life grants used for lighthouse projects[7] on adaptation[8]
  - Covenant of Mayors: number of cities pledging to develop an adaptation strategy
  - Number of cities of more than 150,000 inhabitants in vulnerable areas with an adaptation strategy

2. **Better informed decision making**: The Strategy should further the understanding of adaptation, improve and widen the knowledge base where knowledge gaps have been identified and enhance dissemination of adaptation-related information

- Operational Objective 2a: by 2020, priority knowledge gaps[9] identified in 2013 have been closed
  - List of knowledge gaps now, in 2017, and in 2020
  - Number of Horizon 2020 and JRC research projects dealing with adaptation and associated budget allocated
- Operational Objective 2b: by 2020, communication tools allow for available information on climate change adaptation to be more easily accessible for decision-makers, including Member States, local authorities and firms
  - Number of visitors to Climate-ADAPT, pages most visited, number of registered users, assessment of the content, databases and metadata
  - Number of conferences, workshops, adaptation events registered in Climate-ADAPT

[3] The EU Adaptation Strategy did not commit to achieving the operational objectives and performance indicators identified in the Impact Assessment. Nevertheless, the operational objectives and indicators can still provide a useful reference point for the evaluation and have been renumbered in line with the Strategy's specific objectives.
[4] The relationship between the operational objectives and performance indicators is not direct, and some of them cannot determine the direct achievement of the operational objectives but provide an indication of progress.
[5] This objective is labelled in the Communication as "Promoting action by Member States" but is essentially the same objective.
[6] These are projects that share experience and foster capacity building in relation to the development of national and regional adaptation strategies.
[7] These are projects that develop, test and demonstrate policy or management approaches, best practices, and solutions, for climate change adaptation. This may include cross-sectoral and cross-border projects.
[8] This indicator is not solely concerned with action at city level, and is also relevant to Objective 1a.
[9] The key knowledge gaps that were identified are: information on damage and adaptation costs and benefits; regional and local-level analyses and risk assessments; frameworks, models and tools to support decision-making and to assess how effective the various adaptation measures are; and, means of monitoring and evaluating past adaptation efforts.

3. **Increasing the resilience of key vulnerable sectors**[10]: The Strategy should develop initiatives to consistently and comprehensively integrate climate change adaptation considerations into sectors at EU level through common policies

- Operational Objective 3a: by 2020, adaptation considerations have been mainstreamed in a consistent and comprehensive way in key EU policies
  - List of policies and legal acts where adaptation has been mainstreamed
  - Adaptation activities by private organisations as reported in the Carbon Disclosure Project surveys
- Operational Objective 3b: by 2020, new major infrastructure investments are climate-proofed
  - Amount of adaptation infrastructure investments (co-) financed by EU funds and/or public financial institutions
  - Progress on the mapping exercise by CEN-CENELEC[11].

The Strategy commits to delivering its three specific objectives, through the implementation of eight actions. The alignment of the actions with each of the objectives is summarised in Table 2-1(below) with further details on the specific actions provided in subsequent sections. Note that the Communication labelled the specific objectives slightly differently than the Impact Assessment but their substance is still the same. The equivalent label from the Impact Assessment is shown in brackets in Table 2-1 to ease comparison.

**Table 2-1 Alignment of the Strategy's actions with each of the objectives**

| Objectives | Actions |
|---|---|
| Promoting action by Member States<br>*(Increasing the resilience of the EU territory)* | 1. Encourage all Member States to adopt comprehensive adaptation strategies<br>2. Provide LIFE funding to support capacity building and step up adaptation action in Europe.<br>3. Introduce adaptation in the Covenant of Mayors framework |
| Better informed decision-making<br>*(Better informed decision-making)* | 4. Bridge the knowledge gap<br>5. Further develop Climate-ADAPT as the 'one-stop shop' for adaptation information in Europe |
| Climate-proofing EU action: promoting adaptation in key vulnerable sectors<br>*(Increasing the resilience of key vulnerable sectors)* | 6. Facilitate the climate-proofing of the Common Agricultural Policy (CAP), the Cohesion Policy and the Common Fisheries Policy (CFP)<br>7. Ensuring more resilient infrastructure<br>8. Promote insurance and other financial products for resilient investment and business decisions[12] |

### 2.2.3 Inputs, activities and outputs

Eight actions were identified in the Strategy to deliver its overall aim and objectives. The inputs and activities associated with each of these actions and the expected outputs are described below.

[10] This objective is labelled in the Commission Communication as "Climate-proofing EU action: promoting adaptation in key vulnerable sectors" but is essentially the same objective.
[11] The European Committee for Standardization (CEN) and the European Committee for Electrotechnical Standardization (CENELEC).
[12] The promoting of insurance was included as an action in the Strategy but there was no associated operational objective, or performance indicator, in the IA.

#### 2.2.3.1 Action 1: Encourage all Member States to adopt comprehensive adaptation strategies

This action is concerned with encouraging all Member States to adopt comprehensive adaptation strategies. Encouragement has been provided through the following activities, and associated outputs, which the Commission committed to as part of the Strategy:

- Provision of guidelines to help Member States formulate adaptation strategies, which were published alongside the Communication
- Development of an 'adaptation preparedness scoreboard', which identifies key indicators for measuring Member States' level of readiness.

A commitment was also made that, in 2017, the Commission would assess action being taken in the Member States and if progress is deemed insufficient, the Commission would consider proposing a legally-binding instrument. This report assesses the progress that has been made by Member States. The evidence presented in the report can be used to inform whether such an instrument may be warranted.

It was expected, when the Strategy was prepared, that the encouragement provided by the Commission in relation to Action 1 would contribute towards all Member States adopting an adaptation strategy, complemented by regional and local adaptation strategies, by 2017. This was captured in Operational Objective 1a (Section 2.2.2).

#### 2.2.3.2 Action 2: Provide LIFE funding to support capacity building and step up adaptation action in Europe (2013-2020).

Action 2 concerns the creation of the Climate Action sub-programme under the 2014-2020 LIFE funding programme for the environment. This action contributes to the delivery of Operational Objective 1a and Operational Objective 1b (Section 2.2.2). The sub-programme covers climate change mitigation, climate change adaptation, and climate governance and information. Through the creation of the Climate Action sub-programme, the aim was to substantially increase the LIFE funds available to combat climate change.

It was expected when the Strategy was prepared that additional funding would be directed towards climate adaptation projects in comparison to the situation without the Strategy. It was also expected that this funding would lead to better informed decision-making via the identification and implementation of relevant cross-sectoral and cross-border lighthouse projects. Other expected outcomes included the strengthening of existing networks and collaborations between Member States and associated countries and other third countries.

#### 2.2.3.3 Action 3: Introduce adaptation in the Covenant of Mayors framework

Action 3 focuses on cities and urban areas, as they have an important role in low-carbon and climate-resilient development across Europe. The action concerns the support provided by the Commission to the launch of Mayors Adapt (the Covenant of Mayors Initiative on Adaptation to Climate Change), through which local authorities can make a voluntary commitment to adopt local adaptation strategies and awareness-raising activities. The initiative was launched by the Commission in March 2014.

It was expected, at the time the Strategy was prepared, that the encouragement provided by the Commission in relation to this action would contribute towards all cities of more than 150,000 inhabitants adopting an adaptation strategy, by 2020. This was captured in Operational Objective 1b (Section 2.2.2).

#### 2.2.3.4 Action 4: Bridge the knowledge gap

Action 4 concerns two activities to be undertaken by the Commission:

- To work further with Member States and stakeholders to refine the adaptation knowledge gaps identified in the Strategy and identify relevant tools and methodologies to address them. The findings were to be fed into the programming of Horizon 2020 (H2020), the EU's 2014-2020 framework programme for research and

innovation, and were to address the need for better interfaces between science, policy making and business
- To promote EU-wide vulnerability assessments considering, inter alia, the cross-sectoral EU overview of natural and manmade risks that the Commission was to produce in 2013. The Commission was, in particular, to support the Joint Research Centre (JRC) to undertake a comprehensive review of what global climate change will mean for the EU.

It was expected, at the time that the Strategy was prepared, that the activities led by the Commission in relation to this action would contribute towards filling the priority knowledge gaps identified in 2013 by 2020. This was captured in Operational Objective 2a (Section 2.2.2).

#### 2.2.3.5 Action 5: Climate-ADAPT website

Action 5 concerns activities by the Commission and European Environment Agency (EEA) to further develop Climate-ADAPT as the 'one-stop shop' for adaptation information in Europe. This includes improving access to information and developing interaction between Climate-ADAPT and other relevant platforms, such as national and local adaptation portals (2013/2014).

Climate-ADAPT started as a Clearinghouse[13] in 2012. It aimed to facilitate collection and dissemination of information on climate change impacts, vulnerability and adaptation to assist effective uptake by decision makers and to contribute to more coordination between sectoral policies and between institutional levels. Climate-ADAPT has since evolved into an information portal to support Europe in adapting to climate change, co-managed by the EEA and DG CLIMA. It provides information on climate change impacts and vulnerability, adaptation strategies and actions, adaptation options, case studies and specifically-designed tools that support adaptation planning and decision making.

As part of the further development of Climate-ADAPT, the Strategy describes how special attention will be given to cost-benefit assessments of different policy experiences and to innovative funding, through closer interaction with regional and local authorities and financial institutions. The Strategy also indicates that work on the inclusion of the future Copernicus Climate Change Service – C3S (previously known as GMES – Global Monitoring for Environment and Security) will start in 2014[14].

It was expected, at the time the Strategy was prepared, that the further development of Climate-ADAPT would allow available information on climate change adaptation to be more easily accessible for decision-makers, by 2020. This was captured in Operational Objective 2b (Section 2.2.2). It was expected that the further development of Climate-ADAPT, linking in with other relevant platforms and developing associated guidance, would result in avoided costs for both the EEA and other database managers for data integration into Climate-ADAPT. This was also expected to reduce costs for end-users to compile and process data (the 'one-stop-shop' principle). Another expectation was that the inclusion of the Copernicus Climate Service in Climate-ADAPT would allow a better assessment of local and sectoral vulnerabilities and, therefore, provide additional data for proper climate risk assessments. Furthermore, it was expected that by supporting the exchange of information between science and policy, Climate-ADAPT would encourage and stimulate new research and development, as well as innovation, in the field of climate change adaptation across a broad spectrum of sectors in the EU as well internationally.

[13] The Climate-ADAPT concept was during the development phase initially known as the EU Climate Change Adaptation Clearinghouse, although this term was not used anymore in the final version that was launched in 2012.
[14] The Copernicus climate change service, managed by ECMWF, started formally end of 2014. Products and services started to become operational end of 2015/early 2016 (see also: https://www.ecmwf.int/en/about/media-centre/news/2014/copernicus-climate-change-and-atmosphere-monitoring-services and https://climate.copernicus.eu/)

#### 2.2.3.6 Action 6: Facilitate the climate-proofing of the Common Agricultural Policy, the Cohesion Policy and the Common Fisheries Policy

Action 6 focuses on key EU financial instruments and policy areas, which cover: the Common Agricultural Policy (CAP)[15]; Cohesion Policy, which is delivered through the European Regional Development Fund (ERDF), the European Social Fund (ESF) and the Cohesion Fund (CF); and the Common Fisheries Policy (CFP). These instruments are jointly managed[16] by the Commission with the Member States. They involve significant additional financial contributions from national budgets and an important role for Member States in spending the funds on the ground once the framework is decided with the Commission.

The Strategy commits the Commission to provide guidance on how to further integrate adaptation into the CAP, Cohesion Policy and the CFP. This guidance was published alongside the Commission's Communication on the Strategy. The guidance was designed for managing authorities and other stakeholders involved in programme design, development and implementation during the 2014-2020 budget period.

This action was to be led by the Commission with the aim of contributing towards the comprehensive and consistent mainstreaming of adaptation in EU policies by 2020. This was captured in Operational Objective 3a (Section 2.2.2).

#### 2.2.3.7 Action 7: Ensuring more resilient infrastructure

Action 7 concerns a three-pronged approach to ensure the development of more climate resilient infrastructure and commits the Commission to the following activities:

- To launch a mandate for European standardisation organisations to start mapping industry-relevant standards in the area of energy, transport and buildings and to identify standards that need to be revised to achieve better inclusion of adaptation considerations.
- To provide guidelines to help project developers working on infrastructure and physical assets to climate-proof vulnerable investments. These guidelines were launched alongside the Strategy (European Commission, 2013e).
- To explore the need for additional guidance on ecosystem-based adaptation for authorities and decision makers, civil society, private business and conservation practitioners.

It was expected when the Strategy was prepared that that the activities led by the Commission in relation to Action 7 would help to ensure that major infrastructure investments are climate-proofed by 2020. This was captured in Operational Objective 3b (Section 2.2.2).

#### 2.2.3.8 Action 8: Promote insurance and other financial products for resilient investment and business decisions

This action concerns the activities to be undertaken by the Commission, as part of the Strategy, to promote insurance and other financial products for resilient investments and business decisions.

In relation to insurance, the Commission's 'Green Paper on the Insurance of Natural and Man-made Disasters', adopted as part of the Strategy's package, was a first step towards encouraging insurers to improve how they help to manage climate change risks.

In relation to other financial products, the Strategy envisaged further engagement with commercial banks on adaptation financing and exploring market-based approaches, such as payments for ecosystem services.

No clear expectations were stated when the Strategy was prepared, as to how the market for insurance and other financial products for resilient investment would develop as a result

[15] This refers to Pillar II actions under Member State Rural Development Programmes (RDP)
[16] Referred to as "shared management"

of the above activities. However, it is implicit that these activities would enhance the development of the market.

### 2.2.4 Expected impacts of the Strategy

The expected impacts of the Strategy are related directly to its objectives and follow from the activities and outputs described above. More specifically, by promoting adaptation action at sub-EU level, the Strategy was expected to increase the resilience of the EU. In particular, it was expected to enhance the preparedness and capacity of Member States and local authorities to respond to the impacts of climate change at local, regional, national and EU level. The Strategy was also expected to address cross-border climate impacts and adaptation measures.

Relevant stakeholders' knowledge and access to adaptation-related information were expected to be improved through: furthering understanding of adaptation, improving and widening the knowledge base where gaps were identified, and enhancing dissemination of adaptation-related information in the EU. This would then allow better-informed decisions to be made in relation to climate change related opportunities and risks in Europe.

Finally, the Strategy was expected to increase the resilience of key vulnerable sectors by developing initiatives to mainstream adaptation considerations in a consistent and comprehensive way in key EU policies, as well as to climate proof new major infrastructure investments. Likewise, the actions taken to promote insurance and other financial products for resilient investment were expected to lead to their greater use by business and other decision makers.

### 2.2.5 External factors

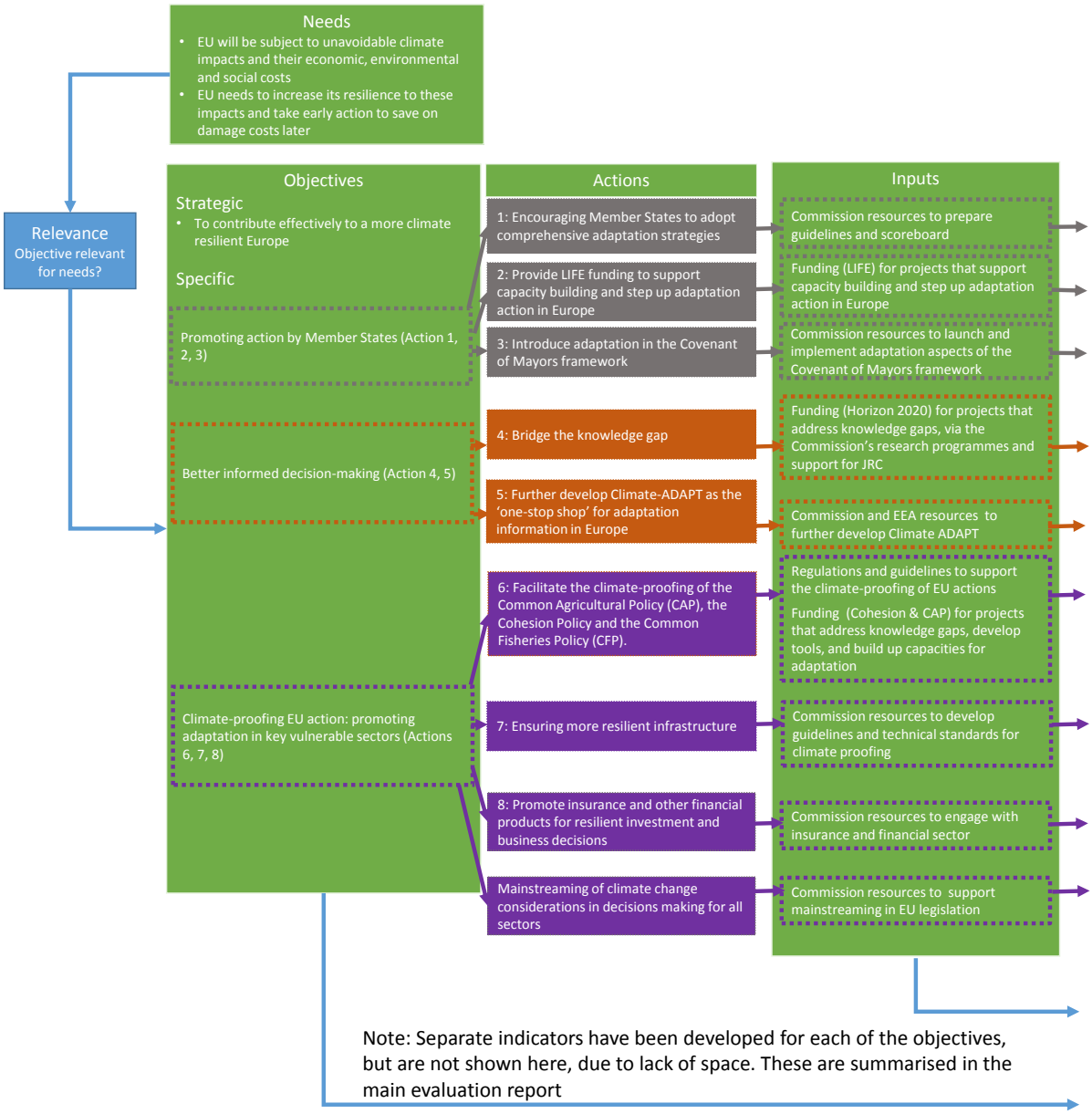
A number of external factors are relevant in relation to the intervention logic, i.e. factors outside of the influence of the intervention, which may still influence the delivery of the stated objectives.

One important external factor concerns the overall scope and scale of climate-related impacts in Europe. The Strategy was underpinned by an assessment of the costs of these impacts and the benefits of adaptation action[17]. It acknowledged that these costs and benefits were an important driver of adaptation action at local and regional levels. Changes in the costs from those assumed by the Strategy, which might result for example from an increase in the frequency and intensity of extreme weather events, would alter the case for adaptation action and, therefore, the extent to which actions would have been taken.

Another important external factor was the Paris Agreement (UNFCCC, 2015), which established the global adaptation goal to enhance adaptive capacity, strengthen resilience, reduce vulnerability to climate change and, thereby, contribute to sustainable development. Furthermore, it identified that Parties to the Agreement should strengthen their cooperation to enhance adaptation action. The high profile of the Paris Agreement raised awareness of climate change adaptation at a political level, providing a further stimulus for adaptation actions in EU Member States.

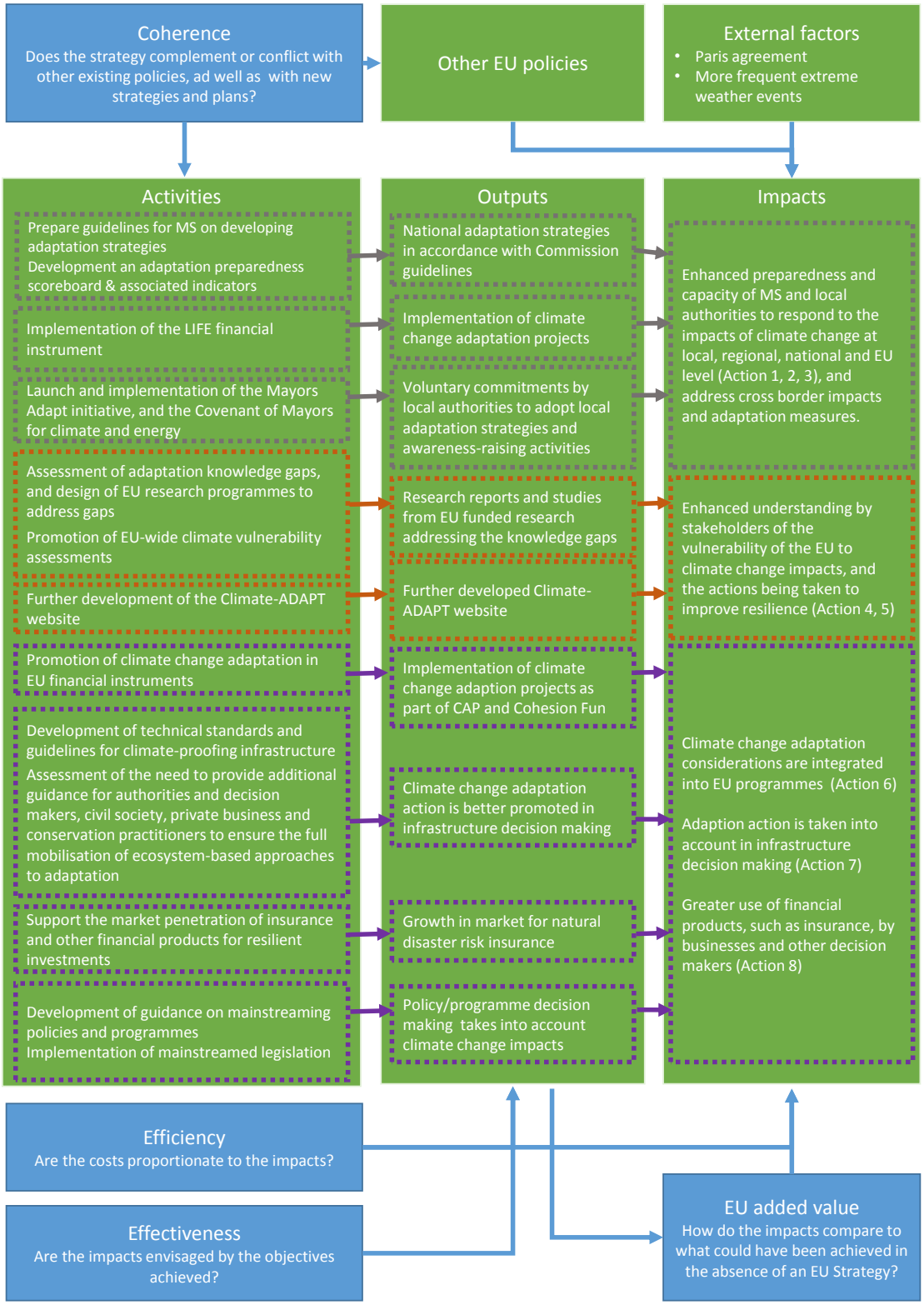
[17] The Strategy (European Commission, 2013a) stated the minimum cost of not adapting to climate change is estimated to range from € 100 billion a year in 2020 to € 250 billion in 2050 for the EU as a whole.

**Figure 2-1 Intervention logic for the EU Adaptation Strategy (Part 1)**




Note: Separate indicators have been developed for each of the objectives, but are not shown here, due to lack of space. These are summarised in the main evaluation report

**Figure 2-2 Intervention logic for the EU Adaptation Strategy (Part 2)**




## 2.3 Baseline

This section describes what was expected in terms of adaptation actions at EU level prior to implementation of the Strategy. The baseline represents a point of comparison against which to assess the current situation with the Strategy in place. The baseline can be described in two ways:

- The actual situation prior to the Strategy's launch
- The future situation (i.e. now in 2018) expected when the Strategy was launched if it had not been adopted.

This study has gathered evidence on both points of comparison. For example, information on the actual and/or expected future situation can be taken from the impact assessment and other reference documents that were prepared alongside the Strategy (see Section 2.1).

### 2.3.1 Data limitations and uncertainties

This baseline has drawn upon analysis carried out for the Impact Assessment when the Strategy was proposed. It should be recognised that, as with any forecast of the future, the assumptions used in the analysis are subject to uncertainties. For further details about those assumptions, please see the references listed in the sections below. Notably, Action 8 was not addressed by the original Impact Assessment, so more limited information is available.

### 2.3.2 Objective 1: Promoting action by Member States

This objective concerns promotion of adaptation action, including the facilitation and coordination of actions, at sub-EU levels, i.e. at national and local levels.

#### National adaptation strategies

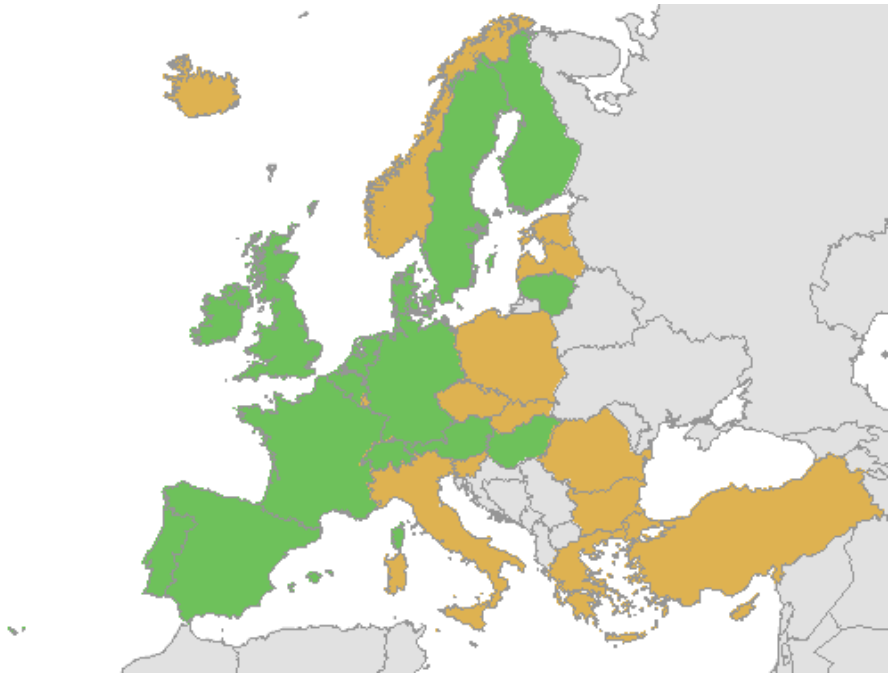
According to the Strategy's Impact Assessment, by January 2013, 15 Member States had adopted an adaptation strategy and/or plan[18]. The relevant Member States are shown in Figure 2-3 below. The level of detail of these adaptation strategies or plans differed widely among Member States and there were important gaps. In particular:

- Almost none of the adaptation strategies in place dealt with transboundary issues, or employment or social issues
- The funding of adaptation options remained vague in many cases
- Only a third of Member States had assessed impacts, vulnerabilities and adaptation options to support policy, and
- Only two Member States had made substantial progress in developing indicators and monitoring methodologies.

For those Member States with no national adaptation strategy at that time, analysis supporting the Impact Assessment (McCallum, et al., 2013) found that most were in the process of developing one, although Southern and Central European countries were furthest behind with the process (Figure 2-3).

[18] Different terms are used by different Member States, but these documents essentially capture similar elements. In general. adaptation plans typically include more specific details on actions to be taken.

**Figure 2-3 Member States with (in green) and without (in orange) an adopted national adaptation strategy as of March 2013**



*Source: Impact Assessment – Part 1, pg. 13, Figure 4. Original Source: climate-adapt*

Without an EU intervention in the form of an adaptation strategy, the Impact Assessment anticipated limited change in the situation within Member States. The expectation was a continuation of the current situation, such that adaptation strategies would likely vary in terms of scope, level of ambition and agreed financing of adaptation measures. The expectation was that without additional action, the barriers preventing national, regional or local authorities from developing ambitious adaptation strategies were likely to remain, be it in terms of human or financial resources. The lack of an adaptation strategy would have meant that no EU resources would have been allocated for climate change adaptation, which could have prevented the necessary groundwork from being undertaken. Furthermore, the Impact Assessment anticipated that without EU-level action, national strategies would not address trans-boundary issues.

### Local adaptation strategies

Research cited in the Impact Assessment indicated that around a quarter (24%) of the 100 cities or so surveyed reported that an adaptation strategy had already been adopted in their city[19]. It further suggested that few cities believed they were well prepared and other cities needed more support and guidance to adapt effectively. Just under half of the cities surveyed believed that they were still in the very early stages of work on adaptation. The background report to the Impact Assessment also reported that cities within several Member States had formed their own networks, as a result of either national or international initiatives, but no EU-level network existed for adaptation (McCallum, et al., 2013). Local adaption action is not restricted to cities, and the background report also cited action being taken at other sub-national levels. For example, it was reported that in Finland several municipalities and regions have climate strategies that cover mainly mitigation but also address adaptation to some extent. The expectation was that without additional actions, regional and local adaptation strategies would continue to develop as previously.

[19] The survey captured a range of cities, of variable size, including cities in 21 of the EU Member States. The survey found that 8% of the cities surveyed had no work planned or begun on climate adaptation, and 22% had work planned. Of the 70% that had begun work on adaptation: 1% believed that their climate adaptation programme is far advanced, 6% are moving ahead of the field, 16% are well on the way, and 47% are still in the very early stages of work on adaptation.

#### LIFE funding

There was no LIFE sub-programme specifically allocated to climate action prior to the Strategy. However, some previous LIFE-funded projects did address climate change adaptation, for example, including development of Malta's national adaptation strategy and some cross-border projects (McCallum, et al., 2013). A LIFE publication from 2015 (Camarsa, Toland, Eldridge, & et al, 2015) reported that the LIFE programme had co-funded nearly 150 projects since 2000 that focus either fully or partly on climate change adaptation. These projects have mobilised around €307 million for climate change adaptation (with an EU contribution of €152 million). Between 2000 and 2015, LIFE has been most active in mainstreaming climate adaptation in:

- Water policy (43 projects), including a strong focus on water scarcity and floods
- Agriculture (25 projects[20])
- Creating resilient urban and peri-urban areas (22 projects) (Camarsa, Toland, Eldridge, & et al, 2015).

The Impact Assessment did not describe the expected situation in relation to support for adaptation strategies and lighthouse projects in the absence of the Strategy.

### 2.3.3 Objective 2: Better informed decision-making

This objective concerns enhancing understanding of adaptation to improve decision-making in relation to adaptation-related activities. This includes enhancing the knowledge base where gaps have been identified and enhancing dissemination of adaptation-related information.

#### 2.3.3.1 Knowledge gaps

The Impact Assessment reported that prior to the launch of the Strategy progress had been made to address relevant knowledge gaps, as a vast number of research studies had been published at national, EU and global levels. However, the Impact Assessment highlighted the following key topics where knowledge gaps persisted:

- Information on projected costs and benefits of impacts and adaptation
- Regional and local-level analyses and risk assessments
- Frameworks, models and tools to support decision making within uncertainty and to assess the effectiveness of adaptation measures
- Monitoring and evaluation of past adaptation efforts
- Socio-economic trends that inter-relate with climate change[21].

Without additional efforts to identify knowledge gaps and coordinate research efforts among European and national institutions, the Impact Assessment expected some overlaps in research projects and knowledge gaps would not be addressed in the most effective way. The Impact Assessment did not identify specifically what might happen in terms of vulnerability assessments at the EU-level without the Strategy in place.

#### 2.3.3.2 Knowledge sharing

Prior to the Strategy, Climate-ADAPT was already established as a web portal to provide information on adaptation actions in the EU. According to the Impact Assessment, the Climate-ADAPT website experienced very high use immediately after its launch, as compared with other EEA products. However, the Impact Assessment identified that users needed more encouragement to upload relevant information and to collect data and information from local and regional levels, including private sector initiatives.

The Impact Assessment stated that comprehensive national adaptation portals existed in six Member States (Austria, Germany, Denmark, Finland, Sweden and the UK) and that there were more limited adaptation portals in eight more Member States. However, it

[20] This may include elements which also address water management, so projects may overlap with the group above, and vice versa
[21] The Strategy itself did not include this knowledge gap, only the preceding four.

noted a need to facilitate information transfer between national and local levels. In relation to coordination of information between national and EU levels prior to the Strategy, the background report to the Impact Assessment noted that Climate-ADAPT already provided links to these national portals. However, it also identified that there were language barriers in accessing and sharing information as most portals were only available in the national language and not in English (McCallum, et al., 2013).

The Impact Assessment expected that funding for Climate-ADAPT would continue regardless of the Strategy. However, it stated that without additional action, it was not expected that the coverage of Climate-ADAPT would change fundamentally. It noted that this would lead to significant gaps, particularly on local or regional issues. The Impact Assessment also expected that without the Strategy there could be some additional costs associated with reporting of climate change adaptation-related findings from EU-funded research projects, as additional effort for quality assurance and quality control would be required. Finally, it expected that while existing science-policy interfaces[22] would continue addressing climate change adaptation on an ad hoc basis, the mainstreaming of adaptation in sectoral science-policy interfaces would remain limited. The Impact Assessment noted that this presented a potential risk of any progress on adaptation research becoming inaccessible to decision makers, particularly in those sectors where no science-policy interface was identified, such as energy or transport.

### 2.3.4 Objective 3: Promoting adaptation in key vulnerable sectors

This objective concerns activities to consistently and comprehensively integrate climate change adaptation considerations into sectors and policies at EU level.

#### 2.3.4.1 EU policies

Prior to the launch of the Strategy the EU had already mainstreamed adaptation into legislation in several sectors, including marine waters[23], forestry[24], and transport[25], as well as in important policy instruments relating to inland water[26], biodiversity[27] and migration and mobility[28]. Furthermore, the Commission had also tabled legal proposals on integrating adaptation in agriculture and forestry (European Comission, 2017), maritime spatial planning and integrated coastal management (European Commission, 2013q), energy (European Commission, 2011b), disaster risk prevention and management (European Commission, 2011c), transport (European Commission, 2011d), research, health, and the environment (European Commission, 2012b).

The Impact Assessment outlined areas where the Commission had forthcoming policy initiatives that were expected to consider adaptation, including invasive alien species (2013), green infrastructure (2013), land as a resource (2014-15), and a new EU Forest Strategy (2013). It also noted that guidelines on adaptation and coastal zone management were being formulated (2014), and guidelines on adaptation and the Natura 2000 network were shortly to be issued (2013), while European policies helped address some of the transboundary issues associated with climate change[29].

Despite the progress highlighted above, the Impact Assessment concluded that while the Commission had made significant achievements, there was still more effort required to ensure adaptation was sufficiently mainstreamed and recognised in policies dealing with

[22] Science-policy interfaces (SPIs) aim to bridge relations between scientists and other actors in the policy process, which allow for exchanges, co-evolution, and joint construction of knowledge with the aim of enriching decision-making.
[23] Council Directive 2008/56/EC 'Marine Strategy Framework Directive' and EU Regulation No 1255/2011 'establishing a Programme to support the further development of an Integrated Maritime Policy'
[24] Regulation (EC) 2152/2003 'concerning monitoring of forests and environmental interactions in the Community (Forest Focus)'
[25] Decision 661/2010/EC 'on Union guidelines for the development of the trans-European transport network'
[26] COM (2012)673 final 'A Blueprint to Safeguard Europe's Water Resources'
[27] COM(2011)244 final 'Our life insurance, our natural capital: an EU biodiversity strategy to 2020'
[28] COM(2011) 743 final 'The Global Approach to Migration and Mobility'
[29] For example: the Floods Directive and the Water Framework Directive promote transboundary cooperation in the water sector; European and pan-European early warning and detection systems for weather-driven natural disasters exist, such as the European Flood Awareness System, the European Forest Fire Information System and the European Drought Observatory.

social and education policies, tourism, fisheries, insurance and trade, and that further work was needed in the areas of energy, transport, disaster risk reduction and health.

The background report to the Impact Assessment assumed that in the absence of the Strategy, mainstreaming activities would continue on an ad hoc basis, sectors would not be prioritised and no mainstreaming legislation would be proposed (McCallum, et al., 2013).

#### 2.3.4.2 Sector guidelines and standards

The Impact Assessment highlighted that, prior to the Strategy being implemented, there was no general requirement across sectors to consider climate change when identifying costs and benefits of projects, or in defining technical characteristics of projects. More specifically, the Impact Assessment identified a lack of a common methodology or guidance to assess the climate vulnerability of infrastructure projects and increase their climate resilience. Furthermore, the Impact Assessment emphasised that work on design standards was uneven because of the resources required to incorporate consideration of climate change adaptation in the thousands of design-standards potentially affected. As such, it was expected that without further EU action, only vague consideration would be given to climate change by new infrastructural investments. The Impact Assessment also identified potential for variability in capacity to implement adaptation actions between actors. It suggested that many small and medium-sized enterprises would be unable to take necessary adaptation measures and become increasingly vulnerable to the effects of unavoidable climate change.

#### 2.3.4.3 Insurance and other financial products

The Impact Assessment highlighted the low market penetration rate of disaster insurance in Member States. It concluded that this could result not only in a negative impact on the sector itself but also on the economic value of the insured and non-insured assets and, therefore, on the competitiveness of European firms. This was because disaster risk insurance could mitigate the impact of future losses of economic assets and income. The low penetration of insurance would, therefore, leave these firms (and the relevant sectors) more vulnerable. It was implied that without further policy intervention, the market penetration rate of disaster risk insurance in Member States would remain low.

# 3 State of play of the Strategy's implementation by Action

## 3.1 Objective 1: Promoting action by Member States

The Strategy commits to delivering Objective 1 through Actions 1 – 3 and their state of play is described below. The Strategy's objectives are presented in Section 2.2.2 and intended inputs, actions and outputs are described in Section 2.2.3.

### 3.1.1 Action 1: Encourage all Member States to adopt comprehensive adaptation strategies

The objective set out in the Impact Assessment was that "by 2017, all Member States [would] have adopted adaptation strategies, complemented by regional or local adaptation strategies, where appropriate". The Strategy was endorsed by the Council (i.e. by implication all Member States by consensus) in its conclusions of 18 June 2013 (Council of the European Union, 2013). These acknowledged "that one of the greatest challenges for cost-effective adaptation measures is to achieve coordination and coherence at the various levels of planning and management and that national adaptation strategies, including risk and vulnerability assessments, are key instruments designed to inform and prioritise action and investment". The conclusions also called upon all Member States to "continue to develop, implement and review their adaptation policies in the light of guidelines prepared by the Commission addressing issues such as cross-border aspects and coherence with national disaster risk management plans".

The European Parliament does not appear to have adopted a specific resolution on the Strategy, although it implicitly endorsed it in subsequent resolutions on related subjects. The European Economic and Social Committee (EESC) endorsed the Strategy (European Economic and Social Committee, 2013), and called "on those Member States which have yet to do so to act swiftly to draw up and rigorously apply national adaptation strategies". The EESC also encouraged the Commission to "make use of its powers under the TFEU", implicitly recommending a binding legislative approach.

Guidance for Member States on preparing national adaptation strategies was published alongside the Strategy in a Commission staff working document (European Commission, 2013i). The guidance includes detailed advice on methods for preparing an adaptation strategy, accompanied by practical examples (based on several Member States' experience), checklists, and detailed information on the range of support available at European level. The guidance is integrated in the Climate-ADAPT adaptation tool.

Literature on the preparation of national strategies is relatively limited. The EEA published a report in 2014 on 'National adaptation policy processes in European countries' (European Environment Agency (EEA), 2014), which noted that "21 [of 33] European countries have adopted a national adaptation strategy (NAS) and 12 have developed a national adaptation plan (NAP)." A report produced in reviewing the French national adaptation strategy innovatively assessed adaptation strategies in other countries, as a source of inspiration (ONERC, 2016). The report noted examples of strategies from Finland (2005, revised in 2013), Spain (2006, revised in 2014), the Netherlands (2008, reviewed annually), the UK (2008, followed by adaptation plans for its devolved administrations), and Germany (2008). These strategies were developed prior to publication of the European Adaptation Strategy in 2013, although some have been reviewed subsequently.

Discussions with Member States on the proposed 'adaptation preparedness scoreboard' began in 2013 and led to the development of a detailed scoreboard largely based on the process and approaches recommended in the staff working document. In an effort to fine-tune the scoreboard, it was piloted by the Commission in order to produce a first assessment of each Member State in 2015, which was not published, but was discussed

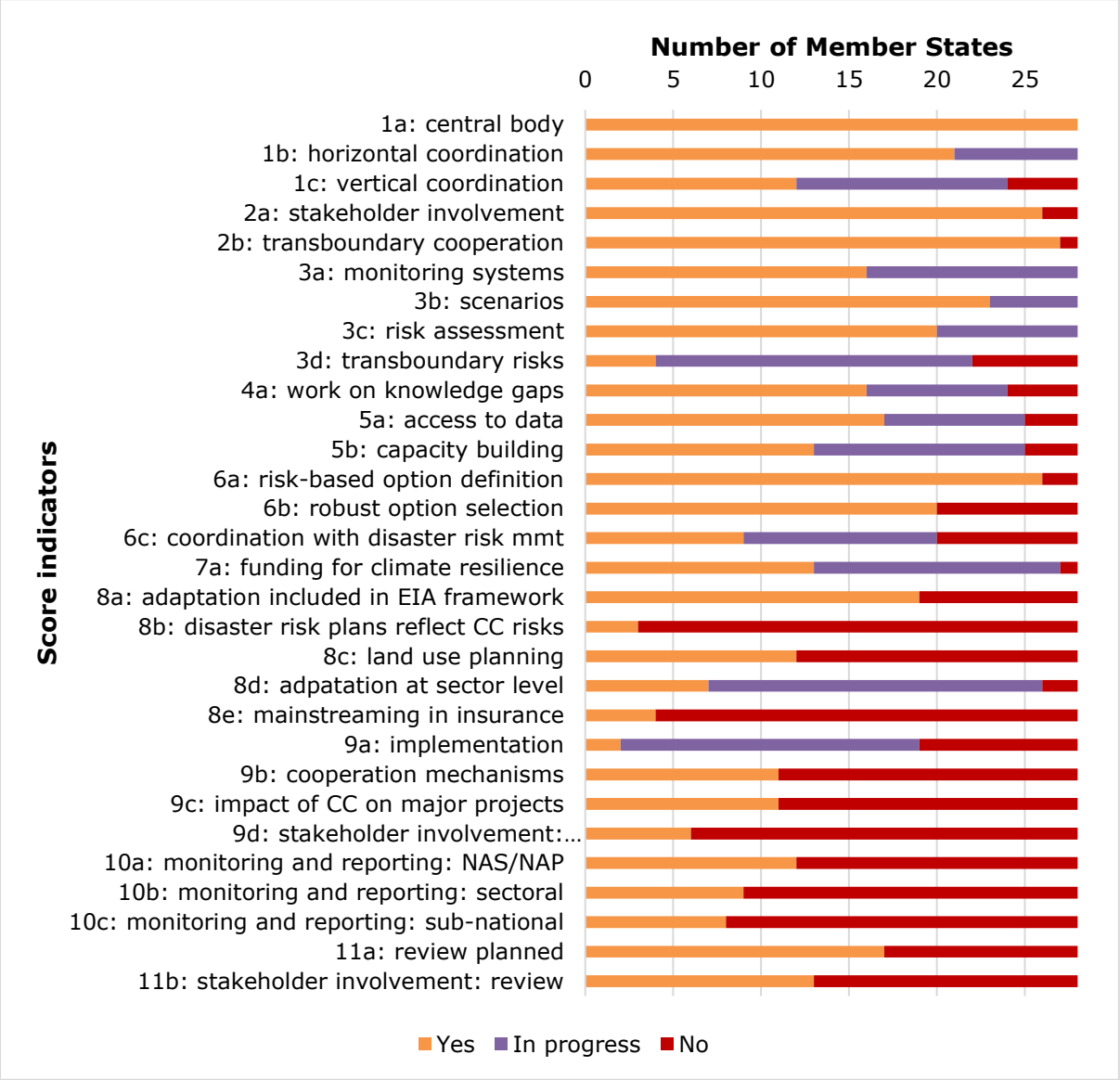
with the Member States. A second assessment using a modified version of the scoreboard was undertaken during this evaluation. Draft versions of the Member State fiches were published as background documents for the public consultation. The Commission's intention is to publish final versions of the Member State fiches later in 2018. The scoreboard indicates progress in the delivery of Action 1, and fulfils the commitment in the Strategy to "assess whether action being taken in the Member States is sufficient". Table 3-1 below shows the aggregate assessment from the published draft country fiches against each of the criteria in the scoreboard. Member States have been assessed as either already meeting the criterion or (when appropriate) currently implementing measures that should enable them to meet the criterion, or not meeting the criterion.

The operational objective proposed in the Impact Assessment for the Strategy (European Commission, 2013b) was that "by 2017, all Member States have adopted (an) Adaptation Strateg(y)ies, complemented by regional or local adaptation strategies when appropriate". A total of 25 of the 28 Member States had adopted national adaptation strategies by the end of 2017. Strategies are being developed in the remaining three Member States (Latvia, Bulgaria and Croatia) but have not yet been adopted. Information on regional and local strategies is less readily available. Assessment of the objective requires a judgement of where it is "appropriate" for national strategies to be complemented at regional level. Some Member States, notably Sweden, have taken a highly decentralised approach to implementing adaptation strategies. The scoreboard analysis in relation to Action 3 (Covenant of Mayors) summarises the extent to which national strategies integrate action at a local level (Criterion 1c) and suggests patchy progress, as only six Member States have met this criterion.

In terms of broader awareness of climate adaptation activity, it is noteworthy that respondents to the open public consultation survey were more likely to be aware of national adaptation strategies (84%) than of strategies at regional (44%) or municipality (32%) level. However, given that the respondents have an interest in climate adaptation, it is also striking that 16% were unaware of the relevant national strategy[30].

[30] Although note that 9 out of 385 respondents were from Member States that have not yet adopted strategies.

**Figure 3-1 Overview of adaptation scoreboard indicator assessments**




*Source: Analysis of draft scoreboards published in conjunction with the open public consultation on evaluation of the EU Adaptation Strategy, December 2017[31]. Abbreviations are listed on page iii.*

### 3.1.2 Action 2: Provide LIFE funding to support capacity building and step up adaptation action in Europe (2014-2020)

As stated in Section 2.3.2, it was expected that under the Strategy, LIFE would provide additional funding to develop adaptation projects that would support the development and strengthening of national climate change strategies and plans. A separate mid-term evaluation (MTE)[32] of the LIFE Programme on environment and climate has recently been completed (Ecorys, 2017). The results of the report, together with other supporting literature and findings from the stakeholder interviews, provide a basis for our evaluation of Action 2.

[31] Available at: https://ec.europa.eu/clima/consultations/evaluation-eus-strategy-adaptation-climate-change_en (Accessed 5 March 2018)

[32] In line with the requirements of Article 27 § 2 of the LIFE Regulation, the Commission has decided to carry out an external and independent mid-term evaluation mainly assessing the LIFE programme, its types of interventions, its implementation and its impacts so far in order to facilitate evidence-based decision-making.

The current LIFE programme is operating under the new LIFE Regulation 2014-2020 and the Multiannual Work Programme 2014-2017. The LIFE budget is split between the Environment and Climate Action sub-programmes. The Regulation foresees that 25% (i.e. €864 million) of the LIFE budget would be assigned to Climate Action and there is a fairly even split between adaptation and mitigation in terms of EU contribution. This equates to a tripling of the budget for climate action compared to the LIFE+ Programme in 2007-2013. The MTE reports that the dedicated sub-programme for Climate Action reflects the importance of acting on the impacts of climate change within the EU by providing "co-financing between 2014 and 2020 to develop and implement innovative ways to respond to climate challenges".

Since 2014, four calls for proposals have been launched (2014, 2015, 2016 and 2017) and the projects from the last call will start in the summer of 2018.

(below) highlights the planned allocation of financial resources for climate change adaptation as reported by the MTE.

**Table 3-1 Planned allocation of resources for Climate Change Adaptation under LIFE MAWP 2014 - 2017 (Ecorys, 2017)**

| Types of funding (in million EUR) for the LIFE 2014-2017 MAWP | Climate Change Adaptation |
|---|---|
| Action grants: | |
| - Traditional projects | €91 million |
| - Integrated projects[33] | €30 million |
| - TA projects | €0.1 million |
| - Preparatory projects[34] | 0 |
| - Capacity-building projects[35] | 0 |
| Financial instruments**: | |
| - Natural Capital Financing Facility[36] | €30 million |
| Operating (NGO) grants | |
| Procurement | €26.4 million |
| **Subtotal** | **€190.1 million** |

The total investment and EU contributions for the first three calls (2014, 2015 and 2016) are summarised in Table 3-2 and reported in the MTE. These calls have invested a total of €123.78 million in climate change adaptation-related projects, with a total EU contribution of €64.51 million (European Commission, 2015) (European Commission, 2016a). Subsequent communications report a slightly different state of play. Earlier in 2017, the

[33] Integrated Projects implement environmental legislation and goals on a wider scale and to increase the impact of the LIFE programme. They provide funding for plans, programmes and strategies developed on the regional, multi-regional or national level. Building on LIFE's existing strengths, water, waste and air are three of the thematic areas targeted, along with nature and mitigation and adaptation to climate change. See more: http://ec.europa.eu/environment/life/projects/ip.htm

[34] Preparatory projects are funded by the sub-programme for Environment. Projects address specific needs for developing and implementing EU environmental or climate policy and legislation. Areas are identified by the Commission in cooperation with Member States on an annual basis.

[35] Capacity Building projects provide financial support for activities that increase the capacity of Member States, including LIFE national or regional contact points, to participate more effectively in the LIFE programme.

[36] The key objective of the NCFF is to address market gaps and barriers for revenue-generating or cost-saving projects. Therefore, the instrument is currently one of the few financial instruments available in the EU for addressing market gaps and barriers to finance for natural capital projects.

Commission reported that the first two years of the Climate Action sub-programme (2014 and 2015) saw €38.6m spent on climate change adaptation-focused projects, with an average amount of €1.48 million[37] requested per project. An interview for this study from EASME/LIFE suggested that, since 2014, EU funding (through traditional projects only) for adaptation projects has been around €25m per year. They noted that is expected to increase in coming years and that, given a 60% funding rate, eligible project costs per year have been between €30 – €45 million (totalling between €100 – €125m since 2014), which aligns to the total project investment summarised in Table 3-2.

**Table 3-2 Total number of projects selected, invested and EU contribution under MAWP 2014 - 2017 (European Commission, 2016a) (European Commission, 2015)**

| Year | Number of projects selected (for Climate Change Adaptation under sub-programme on Climate Action) | Total investment (in EUR millions) | Total EU Contribution |
|---|---|---|---|
| 2014 | 10 action grants | €36.6 million | €17.5 million |
| 2015 | 16 action grants and one integrated project | €44.58 million | €26.41 million |
| 2016 | 12 action grants and one integrated project | €42.6 million | €20.6 million |
| Total | 38 action grant projects (including 2 integrated projects) | €123.78 million | €64.51 million |

The new LIFE programme includes 'integrated projects' within the action grants, which are designed to operate at a large geographic scale and "function as multi-purpose delivery mechanisms (e.g. creating environmental benefits and capacity-building) and are expected to exploit synergies and ensure consistency between various funding sources of the EU" (Ecorys, 2017). Climate change adaptation is one of the targeted themes for integrated projects, which are intended as a vehicle for implementation of adaptation strategies and action plans. To date, four integrated projects have been funded in relation to climate action, two are adaptation-related:

- C2C CC – a project that aims to create climate-resilient cities in a climate-resilient region by drawing up with local stakeholders a common, long-term strategy[38]. The project is led by the Central Denmark Region and supported by around 30 other beneficiaries. It was funded under the second call in 2015 and has a total project value of around €11.7 million, including a LIFE programme contribution of around €7 million.
- NADAPTA-CC – a project that aims to increase resilience to climate change in the Spanish region of Navarre[39]. It was funded under the 2016 call and has a total project value of around €15.7 million, including a LIFE programme contribution of around €9.3 million

A new innovative financial instrument, the Natural Capital Financing Facility (NCFF) was introduced to the LIFE programme in 2015 (MAWP 2014 – 2017) and is implemented by the European Investment Bank (EIB). Interviewees from the EIB confirmed that the NCFF contributes to meeting the objectives set out by LIFE, in particular "nature and biodiversity" and "climate change adaptation" by providing financial solutions to bankable projects promoting the conservation, restoration, management and enhancement of natural capital for biodiversity and climate adaptation benefits[40]. Three of the five projects that have been under appraisal are adaptation-related: the Irish Sustainable Forest Fund,

[37] PowerPoint presentation, Joelle Noirfalisse, Laura Giappichelli, EASME B.3 LIFE and CIP Eco-Innovation (2017)
[38] EU LIFE IP C2C CC (LIFE15 IPC/DK/000006)
[39] EU LIFE IP NADAPTA-CC - Towards an integrated, coherent and inclusive implementation of Climate Change Adaptation policy in a region: Navarre (LIFE16 IPC/ES/000001)
[40] This includes ecosystem-based solutions to challenges related to land, soil, forestry, agriculture, water and waste. The NCFF benefits from a Support Facility that is funded by the EU Commission and is managed by the EIB. It provides technical assistance to the promoter for the successful implementation of the project.

Alzette River Renaturalisation, and the Croatian Development Bank (HBOR) Natural Capital Multi-Beneficiary Intermediated Loan (MBIL). The first project supported by the NCFF, signed in April 2017, was a €6 million loan to Rewilding Europe Capital, a funding facility that provides financial loans to new and existing business that support rewilding in Europe. While focused on nature and biodiversity the project also has adaptation-related benefits.

The Impact Assessment for the Strategy identified two performance measure relating to Action 2:

- Number and amount of LIFE grants used for experience transfer
- Number and amount of LIFE grants used for lighthouse projects on adaptation.

All LIFE projects involve experience transfer. There are at least 59 ongoing adaptation-related LIFE projects targeting implementation across a combined area of more than 35 million hectares. Although some participants in the public consultation meeting for this evaluation expressed concern that geographical coverage of LIFE projects was uneven, the LIFE MTE notes that adaptation-related projects have wide geographical coverage: Spain, Italy, Greece, Belgium, France, Germany, Netherlands, Poland, Portugal, Slovakia and Estonia. A total of 40 of these projects under the LIFE Climate Action sub-programme are categorised to climate change adaptation in the LIFE projects database[41]. In addition, there are two adaptation-related integrated projects. Summary details of these 42 projects are provided in Table 3-3 below. The LIFE MTE notes that another 17 adaptation-related projects are from other programme strands, such as nature, however, these cannot readily be identified from the LIFE projects database.

**Table 3-3 LIFE Climate Action sub-programme projects categorised to climate change adaptation in the LIFE projects database and adaptation-related integrated projects**

| Sector | No. of projects | Total project costs (EUR) | EC contribution (EUR) |
|---|---|---|---|
| Agriculture/forestry/tourism | 9 | 17,389,495 | 10,316,485 |
| Ecosystem based approaches | 2 | 8,009,461 | 4,762,118 |
| Health and wellbeing | 1 | 3,337,611 | 1,938,969 |
| Industry | 1 | 1,658,680 | 993,607 |
| Mountain/Island areas adaptation | 2 | 4,670,923 | 2,679,507 |
| Urban adaptation/planning | 14 | 52,086,603 | 24,624,925 |
| Vulnerability assessments/adaptation strategies | 7 | 20,593,430 | 11,404,046 |
| Water (incl. flood management, coastal areas, desertification) | 4 | 14,653,297 | 5,683,171 |
| **Integrated projects** | 2 | 27,248,148 | 16,348,948 |
| **Total** | **42** | **149,647,648** | **78,751,776** |

On the basis that LIFE's lighthouse projects comprise pilot, demonstration, best-case and integrated projects, the number and amount of relevant LIFE grants are the same as reported in relation to experience transfer, as according to the LIFE Regulation and the MAWP, all traditional projects should be either pilot or demonstration projects.

[41] http://ec.europa.eu/environment/life/project/Projects/index.cfm

### 3.1.3 Action 3: Introduce adaptation in the Covenant of Mayors framework (2013/2014)

As a result of the Strategy, Mayors Adapt (the Covenant of Mayors Initiative on Adaptation to Climate Change)[42] was launched by the Commission in March 2014, as a flagship programme to promote and facilitate urban adaptation planning. Mayors Adapt drew on experience and expertise developed under the 2012-2013 'EU Cities Adapt' pilot project (Ricardo-AEA, 2013). From 2014 to early 2017, Mayors Adapt grew into a community of over 660[43] cities and local authorities from across Europe. During this time, the initiative conducted numerous capacity building events that were attended by signatory cities. A wealth of adaptation information has been exchanged amongst signatories and beyond through social media, newsletters, brochures, and city profiles.

In October 2015, Mayors Adapt and the Covenant of Mayors initiatives were merged, and the Covenant of Mayors for Climate and Energy (CoM) was officially launched. The Covenant of Mayors' integrated approach, which broadly follows the IPCC guidelines (Bertoldi, Bornas Cavuela, Monni, & Piers De Raveschoot, 2010), is in line with a number of EU priorities concerning mitigation and adaptation. It also embraces a robust transparency framework for implementation of the Paris Agreement. The Covenant of Mayors offers towns and cities the opportunity to make a voluntary commitment to building more sustainable and resilient cities. It brings together thousands of local and regional authorities voluntarily committed to implementing EU climate and energy objectives in their locality. Since November 2015, new signatories pledge to:

- Reduce carbon dioxide (and greenhouse gas) emissions by at least 40% by 2030
- Adopt an integrated approach to tackling mitigation and adaptation to climate change
- Monitor results on a regular basis to track and report progress towards their targets.

Continuing with the emphasis established under Mayors Adapt, the Covenant of Mayors helps to strengthen local authorities' capacity to adapt to the unavoidable impacts of climate change. The Commission has implemented and funded the Covenant of Mayors Office, which assists Covenant signatories with any questions via a Helpdesk and promotes their local actions via the Covenant's communication channels. The Office also co-ordinates work with third parties and negotiates the support of relevant stakeholders. The Commission's Joint Research Centre cooperates with the Office to provide comprehensive technical guidelines and templates in order to assist signatories with delivery of their Covenant of Mayors commitments as well as to monitor implementation and results of signatories' action plans. The Commission has committed to mobilising financial and political support for signatories at EU level. Outputs produced by the initiative and shared by signatories are disseminated more widely via the Covenant of Mayors website and the Climate-ADAPT platform.

Operational Objective 1b of the Strategy's Impact Assessment was that, by 2020, cities of more than 150,000 inhabitants would have adopted an adaptation strategy and identified performance indicators as: the number of cities pledging to develop an adaptation strategy; and the number of cities of more than 150,000 inhabitants in vulnerable areas with an adaptation strategy. A breakdown is not available for cities of more than 150,000 inhabitants but by 14 March 2017:

- 7,755 signatories (local authorities) from 53 countries, covering 252 million inhabitants, had committed to the Covenant of Mayors.

[42] https://www.covenantofmayors.eu/en/
[43] Total of MA and Covenant of Mayors signatories of urban adaptation-committed Local Authorities in the European territory as of 15.02.2017.

- 1,078 signatories had committed to conduct vulnerability and risk assessments, and develop, implement and report on adaptation plans, of which 295 (27%) had submitted an adaptation action plan.

At the start of 2017, in consultation with city signatories, the Covenant of Mayors office developed an updated and integrated monitoring and reporting framework, which includes mitigation and adaptation reporting requirements[44]. This is a new development that signatories are only just starting to use[45].

The Covenant of Mayors is the first initiative of its kind to deliver a successful bottom-up approach to supporting energy and climate action. In doing so, it has exceeded its expectations[46], thus, enabling supporters to push ahead with establishing a Global Covenant of Mayors that also requires signatories to make commitments in relation to mitigation and adaptation. The latter builds on the Covenant of Mayors' key success factors: bottom-up governance, multi-level cooperation model and context-driven framework for action. It offers a worldwide multi-stakeholder movement through several regional offices that deliver technological and methodological support[47].

In February 2017, the CoR stated in an opinion piece that it "supports EU initiatives such as the Covenant of Mayors for Climate & Energy …that foster the emergence of coordinated multi-level governance schemes and cooperation platforms. They should be considered to play a role in reflecting on cities' and regions' needs and improve collaboration" (Committee of the Regions, 2017b). Furthermore, the stakeholder interview for this study with the Covenant of Mayors Office highlighted that the opinion summarised some of the most immediate and pressing needs:

- Support in raising awareness of policy-makers and citizens
- Need to get political buy in – engagement and awareness of cities
- Methodology-related needs regarding:
  - Development of risk and vulnerability assessments and development of local and sub-national adaptation plans
  - Development of a comprehensive analysis of socio-economic benefits of adaptation (to raise awareness, as it serves as good argument to engage Mayors and other politicians by demonstrating how adaptation can add value)
  - Monitoring and reporting local adaptation action. The Covenant of Mayors Office has tried to provide further support, e.g. by developing the Covenant of Mayors reporting and monitoring framework (Covenant of Mayors & Mayors Adapt Offices, 2016) to also address adaptation.

Other needs have been identified through a survey recently conducted by the Covenant of Mayors Office in early 2017 that consulted municipalities, provinces, regions and national ministries (Covenant of Mayors & Mayors Adapt Offices, 2017) The biggest barriers to undertaking adaptation action highlighted by most respondents were:

- Local authorities lack of financial resources to implement projects and design adaptation plans. This was highlighted by municipalities of all sizes and by Covenant of Mayors coordinators, with the smallest cities highlighting the need for greater collaboration with peers in order to pool resources. The lack of financial resources seemingly inhibits action even when local authorities have long-term planning documents. Local authorities also highlighted the need for more capacity-building activities in their countries, as budget restrictions often prevent them from attending events organised by the Covenant of Mayors Office elsewhere.
- A lack of in-house technical expertise, which prevents local authorities from undertaking long-term adaptation action. This may be due to lack of financial resources

[44] For the content/structure see here: excel file.
[45] Confirmed through verbal communication in stakeholder interview, Covenant of Mayors Office, September 2017.
[46] As reported on the CoM website here: https://www.covenantofmayors.eu/about/covenant-initiative/origins-and-development.html
[47] As reported on the CoM website here: https://www.covenantofmayors.eu/about/covenant-initiative/origins-and-development.html https://www.covenantofmayors.eu/about/support-the-community/office.html

but may also result from use of external consultants. The greatest capacity-building needs were identified as being in relation to implementing adaptation options, designing and prioritising actions, and designing an integrated approach for mitigation and adaptation. Adaptation sectors where respondents from cities indicated most need of support were buildings, energy, water and waste, and land-use planning.

- Many national governments focus on cost savings, sometimes divergent policy priorities (e.g. a focus on competitiveness) and lack of ambition of national legislation on adaptation, which may all inhibit public investments.
- Politicians pointing to a perceived lack of public awareness.
- Difficulties faced by many local authorities when needing to coordinate across departments (which may be different for mitigation and adaptation) within the municipality or with different stakeholders, particularly the private sector.

The European Parliament's resolution on the role of EU regions and cities in implementing the COP 21 Paris Agreement on Climate Change, adopted on 13 March 2018, welcomes initiatives such as the Global Covenant of Mayors for Climate and Energy. The resolution encourages all EU and non-EU cities to join the Covenant of Mayors, and calls on the Commission to provide increased support for cities and regions[48]. In addition, work under the EU Urban Agenda is growing following the adoption of the Pact of Amsterdam[49]. The overall objective of this work is to include and better recognise the urban dimension in policies through, for example, involving cities in the design and delivery of policies. Climate adaptation is one of the priority themes under the EU Urban Agenda and has been mainstreamed into its key elements, such as the EU One Stop Shop for Cities, the Urban Data Platform, Urban Innovative Actions, and Urban Investments and Advisory Platform (URBIS). A Climate Adaptation Partnership, coordinated by the city of Genoa, was launched in July 2017[50] and is currently preparing an action plan by the end of 2018. The Partnership offers an opportunity for local and regional authorities, city networks, Member States, European Environment Agency, Joint Research Centre of the Commission, and various European Commission services (DG CLIMA, DG REGIO, DG ENV, DG RTD) to work together to deliver improvements for adaptation on the ground (defined actions will aim for better regulation, better funding and better knowledge). Synergies with other Urban Agenda Partnerships are sought, including those on: Sustainable Use of Land and Nature-Based solutions; Circular Economy; Air Quality; and Energy Transition.

## 3.2 Objective 2: Better informed decision making

The Strategy commits to delivering Objective 2 through Actions 4 and 5, and their state of play is described below. The Strategy's objectives are presented in Section 2.2.2 and intended inputs, actions and outputs are described in Section 2.2.3.

### 3.2.1 Action 4: Bridge the knowledge gap

#### 3.2.1.1 Introduction

Four priority knowledge gaps were identified in the Strategy (European Commission, 2013a)[51]:

- Information on projected costs and benefits of impacts and adaptation
- Regional and local-level analyses and risk assessments
- Frameworks, models and tools to support decision making within uncertainty and to assess the effectiveness of adaptation measures
- Monitoring and evaluation of past adaptation efforts

[48] http://www.europarl.europa.eu/oeil/popups/ficheprocedure.do?lang=en&reference=2017/2006(INI)
[49] The Pact of Amsterdam establishes an overarching Urban Agenda for the EU and was agreed by EU Ministers responsible for Urban Matters on 30 May 2016. Climate adaptation, including green infrastructure solutions, are one of its Priority Themes. More information here: http://ec.europa.eu/regional_policy/sources/policy/themes/urban-development/agenda/pact-of-amsterdam.pdf
[50] https://ec.europa.eu/futurium/en/climate-adaptation
[51] The Impact Assessment preceding the EU Strategy suggested one more knowledge gap ('Socio-economic trends that are interrelated with climatic changes' EC SWD(2013) 132 final, p14

These four knowledge gaps are broad domains in which knowledge development is encouraged. If a gap is formulated in such an open-ended way (and not as a focused question) it is difficult to assess if the gap has been bridged. A total of 120 projects, reports and articles were identified that address adaptation to climate change in Europe and sometimes beyond Europe. This amounts to thousands of pages of interesting research results that cannot be summarised here but the EEA report on 'Climate change, impacts and vulnerability in Europe 2016' (European Environment Agency, 2017) provides an overview as well as a valuable analysis of remaining knowledge gaps, which have been mapped against the knowledge gaps identified in the Strategy (Table 3-4). This analysis and overview (European Environment Agency, 2017) was based on a range of sources (including IPCC, JPI, and EU projects), but was not fully comprehensive. Further analysis of the knowledge gaps is needed, for example, including those presented and discussed at the three ECCA conferences held respectively in 2013, 2015 and 2017.

**Table 3-4 Remaining knowledge gaps identified by EEA (European Environment Agency, 2017)**

| Key knowledge gaps identified in the Strategy 2013 | Remaining knowledge gaps identified by EEA 2017 |
|---|---|
| Information on projected costs and benefits of impacts and adaptation | ***Knowledge on effective adaptation***. An enlarged pool of adaptation case studies is needed to transfer knowledge on topics such as the identification of adaptation options and criteria for their selection, decision-making frameworks and the integration of adaptation within routine planning, cost-efficient combinations of measures, and governance and opportune implementation timing. The potential of ecosystem-based options as effective solutions needs to be further assessed. |
| Regional and local-level analyses and risk assessments | ***Regional- and local-level adaptation***. As part of the general need to enlarge the pool of case studies, the EU needs to identify common challenges, such as how to address limitations in data and resolution, cross-sectoral and cross-border interdependencies, spill overs and the governance of adaptation. Vulnerable European regions and systems need enhanced approaches, including topics such as mountains and their influence regions; the Mediterranean region, a climate change hotspot in all existing evaluations; European coastal areas; international rivers and their catchment areas; urban areas, including their wider metropolitan belts; rural areas and their societies; and islands and outermost regions.<br><br>***Robust, integrated (across sectors and geographical and governance scales) impact, vulnerability and adaptation assessments***. Fundamental gaps persist in the identification of the expected impacts to and vulnerability of sectors and in framing this knowledge into decision-making systems, which involves careful matching of, for example, spatial and temporal scales to those of planning and/or management. These assessments are essential both for sectoral adaptation and as the basis for evaluations informing adaptation plans (e.g. integrated assessments, economic analyses). |

| Key knowledge gaps identified in the Strategy 2013 | Remaining knowledge gaps identified by EEA 2017 |
|---|---|
| Frameworks, models and tools to support decision making within uncertainty and to assess the effectiveness of adaptation measures | ***Adaptation and climate services***. Providing the best available climate data and other information to different users is needed to support adaptation. Needs range from general services providing tailor-made information (climate data, scenarios, sectoral climate-dependent variables, etc.) to tools to support adaptation policy and decision-making, to facilitate knowledge transfer and to build capacity (adaptation services).<br><br>***Decision-making and policymaking support tools and assessments, including on the costs and benefits of impacts and adaptation.*** There is a need to develop tools and decision frameworks that can effectively inform and support adaptation policies and strategies, particularly at the relevant scales and at aggregated levels (municipal, national, European). The integration of reliable short- and long-term economic indicators therein is needed to help shape decision-making, as current uncertainty is limiting adaptation action. In addition, more insights into the adaptation capacity of sectors, systems and society across the EU need further integration into impact, vulnerability and adaptation assessment frameworks.<br><br>***Ecosystem-based adaptation measures***. An evaluation of such measures and an assessment of how these can be integrated with other measures is required, with the aim of achieving multiple societal and environmental benefits. |
| Monitoring and evaluation of past adaptation efforts | ***Monitoring systems and tools***. These are required both for impacts and vulnerability and for adaptation to climate change.<br><br>***Enhanced communication, shared learning and co-creation of knowledge***. This is relevant, for example, between climate service providers and users, but also between various governmental agencies and communities of practice (e.g. sectoral) within and across countries. |
| Other gaps (unrelated to the four identified in the Strategy | ***Interdependencies, synergies and trade-offs with other relevant goals***. This emergent area requires research and knowledge generation, particularly addressing interactions between mitigation and adaptation, linkages between adaptation and disaster risk reduction, and integration of adaptation with other sustainable development goals. In addition, further knowledge is needed on geographical interactions and spill-over effects of impacts and adaptation at regional and global levels. |

Table 3-4 above compares the original knowledge gaps with the effort as found in the literature study, and the remaining gaps. The table shows that there continues to be a desire for more knowledge in relation to all knowledge gaps identified in the Strategy. However, during an ECCA workshop on knowledge gaps it was concluded that "Actors cannot keep track of the relevant information and tools; there is no need for lots of new tools but rather aggregated overviews (meta data bases) and bundle these on a key

platform" (ECCA, 2017[52]). Table 3-4 also shows that several new gaps have emerged, including:

- Interdependencies, synergies and trade-offs with other relevant goals
- Ecosystem-based adaptation measures and, more specifically, their effectiveness
- Enhanced communication, shared learning and co-creation of knowledge.

For the evaluation, we assessed how much effort was put into each broad knowledge domain and where possible, how much financial input was invested in it. To assess which sectors of society were assisted with knowledge production, all research items were ascribed to sectors (e.g. water, nature, health etc.). From several studies on remaining knowledge gaps, we then inferred if the effort for each domain, so far, is perceived as sufficient, and if new knowledge domains have emerged for society to be able to move towards adaptation action.

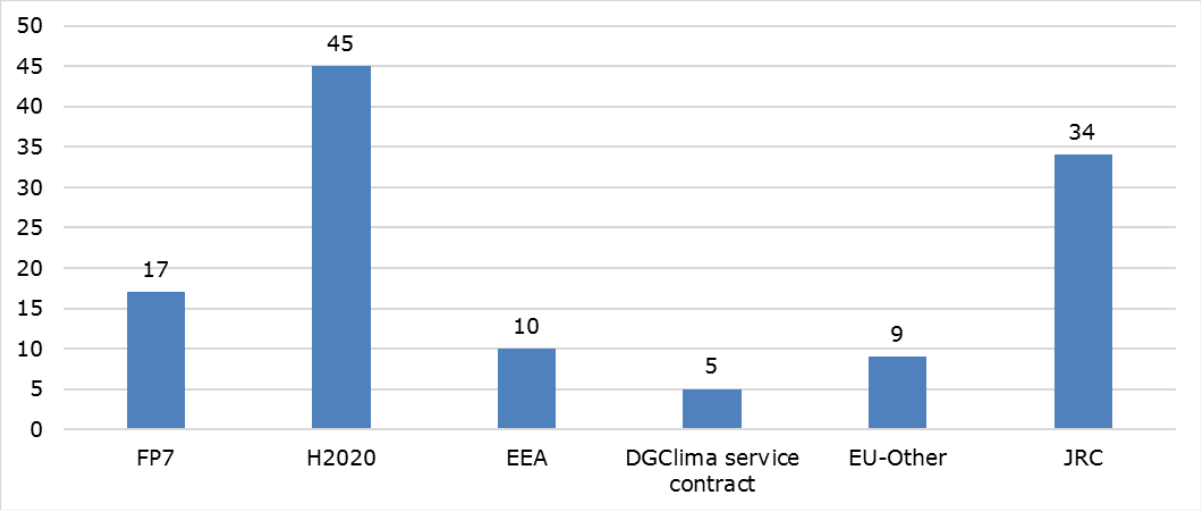
As means for addressing the knowledge gaps, the Strategy indicated Horizon 2020 (H2020) and the Joint Research Centre (JRC), the latter especially, would provide a comprehensive EU-wide vulnerability assessment. The 'Horizon 2020 Work Programme 2014-15' was adopted in December 2013 to promote EU-wide vulnerability assessments, considering, inter alia, the cross-sectoral EU overview of natural and manmade risks that the Commission produced in 2013. The H2020 work programmes 2014-2015 and 2015-2016 explicitly mention the Strategy. The mission of the JRC is to support EU policies with independent evidence throughout the policy cycle.

EEA provides independent information on the environment for those involved in developing, adopting, implementing and evaluating environmental policy, and also the general public. In close collaboration with the European Environmental Information and Observation Network (Eionet) and its 33 member countries, the EEA gathers data and produces assessments on a range of topics related to the environment[53]. More specifically, EEA supports and informs policy development and implementation in the area of climate change impacts, vulnerability, and adaptation by means of data, information/indicators, and assessments[54]. In these activities EEA is supported by the European Topic Centre on Climate Change Adaptation (ETC/CCA), funded by EEA[55].

Based on documents provided by the research team, DG CLIMA, the JRC website, the CORDIS website for EU projects from DG RTD, and the EEA website, 120 research items (defined as research reports, projects and programmes) have been identified that were published in 2013 or later, and are focused on adaptation to climate change. Figure 3-2 provides a breakdown of the 120 research items by source[56]. The ERA4CS programme supporting the Copernicus Climate Change Serves (C3S) represents a significant investment by the Commission (DG GROW) of €78 million, which explains the large number assigned to the 'other' category in Figure 3-4. No reports from service contracts of other Commission Directorates-General, such as AGRI, ENV, MOVE, ENER, GROW and RTD, have been identified during the interviews and targeted stakeholder survey for this study.

[52] ECCA, 2017. Session report – Capturing and sharing knowledge on adaptation across Europe: how to support decision makers in the EU (Session 5.4). ECCA 2017, Glasgow
[53] https://www.eea.europa.eu/ and https://www.eea.europa.eu/about-us
[54] https://www.eea.europa.eu/themes/climate-change-adaptation and the multi-annual and annual work programmes
[55] http://cca.eionet.europa.eu/
[56] Three programmes are not included in the graphs to avoid double counting of financial resources (two H2020 programmes and ETC/CCC work programme) and two items from Placard were included only once.

**Figure 3-2 Number of adaptation-focused projects and reports since 2013[57]**




*Source: Own analysis*

Expenditure on adaptation-related research includes:

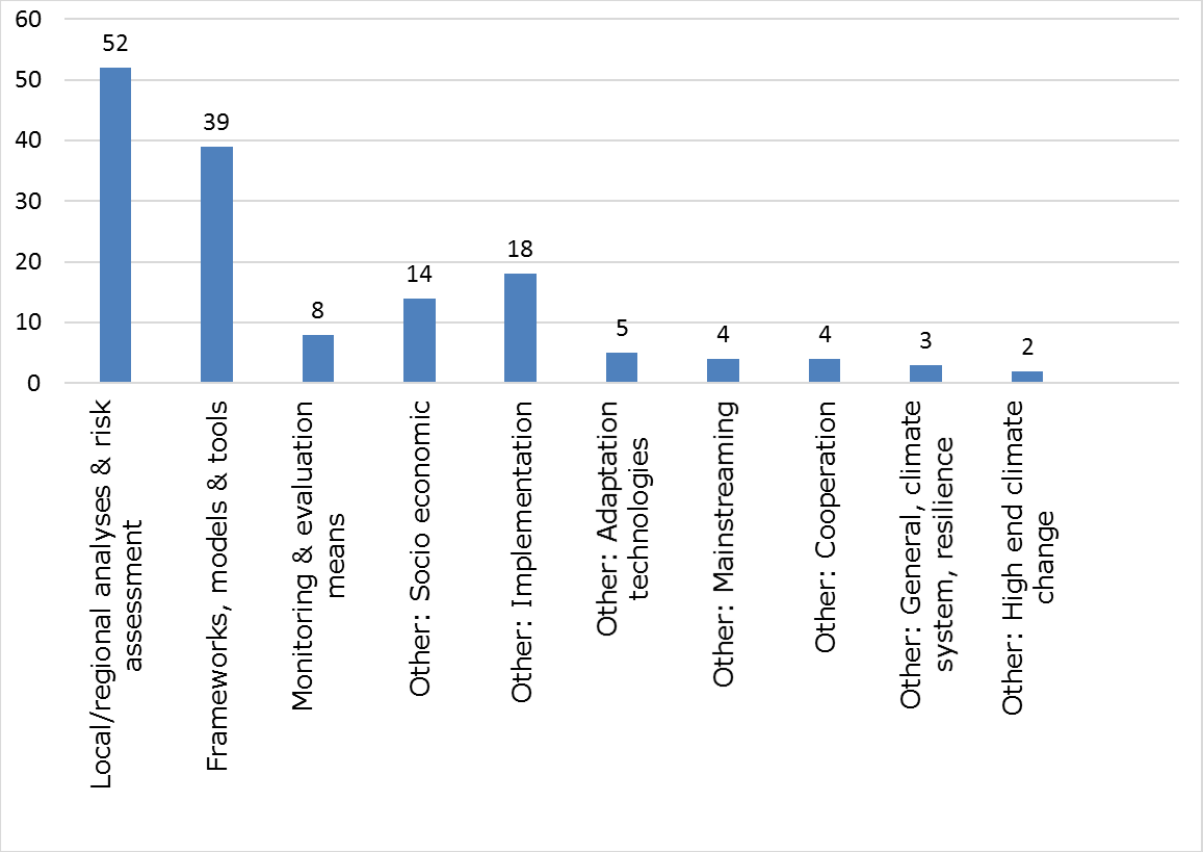
- The seventeen FP7 projects identified that addressed adaptation to climate change had a total budget of €106 million.
- A total of €423 million has been committed to H2020 adaptation research projects: €275 million for projects starting between 2014 and 2017 (generally ending 3-5 years later) and a further €148 million for 2018-2020. This amounts to 0.6% of the total H2020 budget 2014–2020, which is €70.2 billion (European Commission, 2013n). The amount of funding for climate mitigation is unknown, so the total amount of funding spent on climate change cannot be assessed. Notably, a large amount of funding is spent on mitigation and adaptation projects outside of Europe, for example, €20.2 billion by EU and Member States in 2016[58].
- An interviewee for this study from Commission Services dealing with research estimated that €10 million was spent by JRC on adaptation since 2013, which equates to about 0.8% of the total JRC budget for this period. The interviewee did not think it would be possible to identify the exact proportion of JRC's total budget made available for adaptation-related research over the period 2013 – 2016, as it cuts across several different parts of JRC and there is no specific budget head.

The EEA prepares assessments based on climate adaptation research. EEA also funds the European Topic Centre on Climate Change Adaptation (ETC/CCA). Expenditure by EEA on all work on climate change impacts, vulnerability and adaptation is not available. Based on EEA information, an estimate of expenditure by EEA and DG CLIMA on Climate-ADAPT of €2.7 million for the period 2013-2016 has been calculated (see Section 5.3.1, Table 5-1).

Figure 3-3 shows the 120 research items categorised according to the knowledge gaps identified in the Strategy that they address (sometimes more than one gap). A total of 50 items are related to newly emergent knowledge gaps: mainstreaming; cooperation; adaptation technologies; and a more generic category, including issues relating to the climate system and resilience. Although they are not strictly within the pre-formulated knowledge gaps of Action 4, they are related to other actions in the Strategy, so it seems reasonable to assume that they result from the Strategy.

[57] EEA does not do research as such, but prepares assessments
[58] http://www.consilium.europa.eu/en/press/press-releases/2017/10/17/climate-finance-eu/

**Figure 3-3 Research projects and reports addressing the four knowledge gaps or other emerging knowledge gaps**

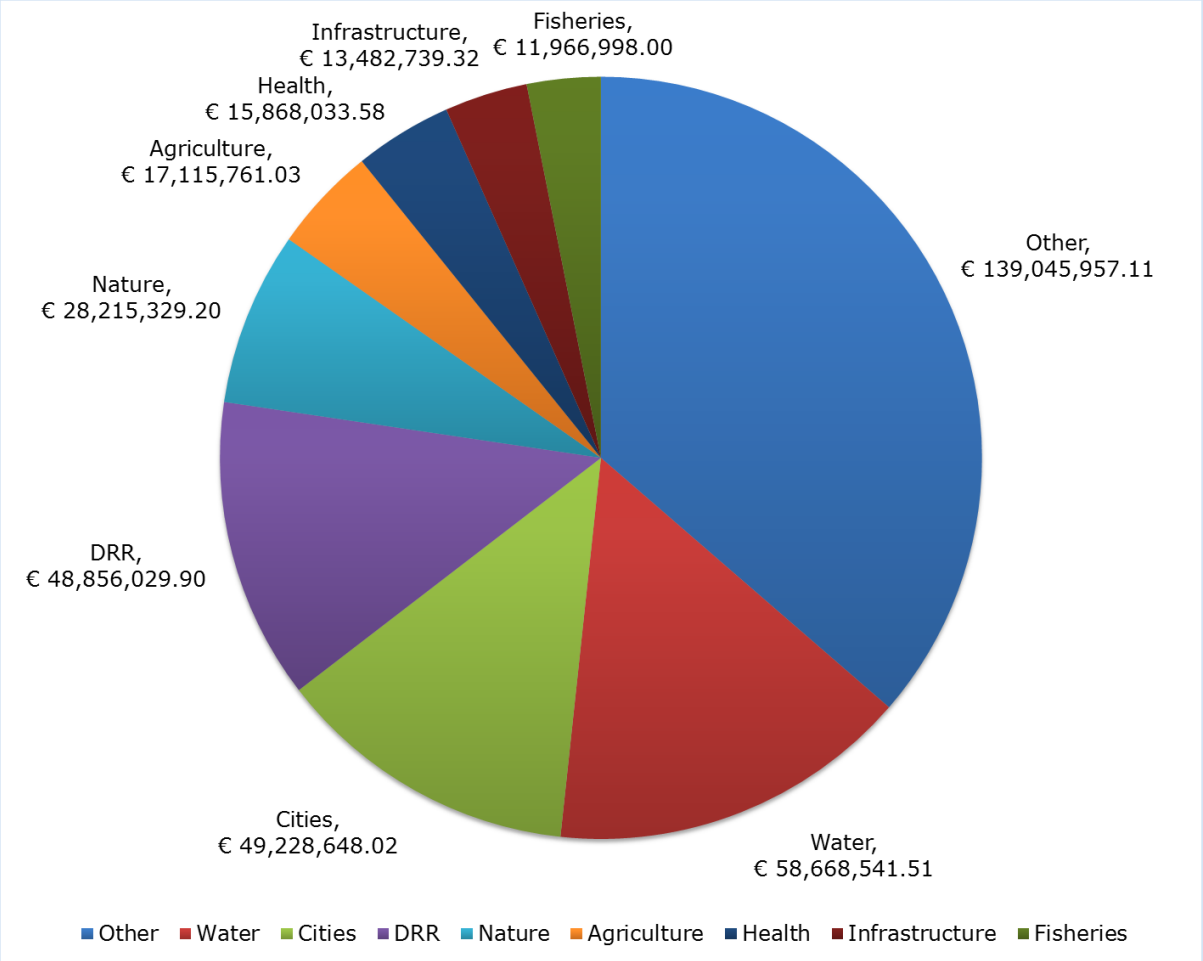



*Source: Own analysis*

Each of the 120 research items have been ascribed to the sector to which they primarily relate: cities, water, infrastructure, agriculture, nature, fisheries, health, disaster risk reduction, or 'other' (broad projects or programmes, encompassing many sectors). The most frequently addressed sectors were water (27 items), nature (25 items), and agriculture (24 items). A total of 30 items were categorised as 'other'.

Taking costs identified in H2020 grants as a proxy for spending per domain, most was spent on water, cities, and disaster risk reduction (DRR) (see Figure 3-4). Other research funding is spent by JRC, other EU directorates, Member States, and so on for which detailed data on expenditure was not found.

**Figure 3-4 Total expenditure per domain**




*Source: Own analysis*

Operational Objective 2a included in the Impact Assessment for the Strategy was that "by 2020, priority knowledge gaps identified in 2013 have been closed". In summary, we conclude that, although the knowledge base has increased substantially, none of the priority knowledge gaps have been closed. Regarding the associated performance measure 'List of knowledge gaps now, in 2017, and in 2020', we conclude that a comprehensive assessment of the large body of new literature on adaptation in Europe is needed to provide a balanced list of remaining knowledge gaps for 2017; the list provided in Table 3-4 is a well-documented proxy of such a list. Regarding the other performance measure associated with Objective 2a ('Number of Horizon 2020 and JRC research projects dealing with adaptation and associated budget allocated'), we conclude that 45 H2020 projects and 34 JRC reports have been identified and a total of €423 million has been committed to adaptation-related projects 2014-2020. The budget for the JRC reports could not be retrieved, as JRC does not monitor this amount separately, however, an interviewee for this study from Commission Services dealing with research estimated that €10 million was spent by JRC on adaptation since 2013.

### 3.2.2 Action 5: Further develop Climate-ADAPT as the 'one-stop shop' for adaptation information in Europe

Action 5 aims to contribute to the objective of better informed decision making by providing access to information on climate impacts, vulnerability and adaptation via the

European Climate Adaptation Platform (Climate-ADAPT)[59]. The European Commission and the EEA launched Climate-ADAPT in 2012 to provide a common European knowledge base to support governmental organisations developing and implementing climate change adaptation strategies and actions, complementary to adaptation platforms at other levels of governance. Climate-ADAPT's objectives are to: facilitate the collection, sharing and use of information on climate change impacts, vulnerability and adaptation, and build a consistent and updated knowledge base; assist an effective uptake of the relevant knowledge by decision-makers; and contribute to a greater level of coordination among sectors and institutional levels. EEA has undertaken an evaluation of the fulfilment of Climate-ADAPT's objectives (European Environment Agency, 2018, Forthcoming).EEA used an approach combining internal assessment and external feedback tools, including a user/provider survey, analysis of web statistics and collection of use cases for various governance levels. The analysis presented here is based on the EEA evaluation, unless explicitly mentioned otherwise.

EEA and DG CLIMA have common ownership of Climate-ADAPT, with different roles and tasks. DG CLIMA provides financial support for developing the functionalities of the platform and new content based on DG CLIMA funded projects. EEA provides human and financial resources, supported by the ETC/CCA, to ensure the maintenance and regular update of the platform. Moreover, Climate-ADAPT has an advisory group, which provides advice on the strategic direction of the development of the platform. Members of the advisory group include representatives of various Commission services. Furthermore, EEA presents and discusses regularly with representatives from its 33 member countries its activities on Climate-ADAPT, for example, at the annual 'Eionet' workshop with national reference centres on climate change adaptation, and with other stakeholders (and countries) through webinars.

DG CLIMA and EEA monitor the implementation of Climate-ADAPT. The EEA's annual work programme defines how work on Climate-ADAPT is progressed. The EEA funds the European Topic Centre on Impacts, Vulnerability and Adaptation (ETC CCA) and its annual action plan provides more details. In addition, EEA's multi-annual work plan for Climate-ADAPT has been discussed and agreed with EEA member countries. The interviewees from EEA noted that EEA has many bilateral meetings with DG CLIMA and there has also been an advisory group since 2016 involving other Directorate-Generals. EEA also informs its member countries regularly on Climate-ADAPT's progress, e.g. at the annual Eionet workshop and through webinars on specific topics, as well as through a specific section in the European Climate Adaptation Newsletter.

The heart of the Climate-ADAPT website is the knowledge database that currently includes more than 2,400 items. The information on the Climate–ADAPT portal is collected by EEA and the ETC/CCA from a range of information sources, including EU-funded research projects, Interreg, LIFE, national policy pages, and reports from NGOs and sector networks. These documents are submitted monthly to the database and subjected to a strict quality control process carried out by the EEA and the ETC/CCA. Currently, a total of 76 case studies describe implementation of adaptation actions. These have been collated by EEA and the ETC/CCA from various sources and described and approved in close collaboration with those who have been responsible for their implementation, by the relevant 'case owner' (e.g. a city authority). Information on 40 adaptation options has also been gathered by EEA and ETC/CCA from various sources (e.g. EU projects) and described in close collaboration with those who have been responsible for their implementation. European policy pages are updated by EEA and the ETC/CCA, in consultation with the Commission (DG CLIMA and other Directorates-General). Country pages present the information on the state of play on adaptation in each Member State, which was reported under the EU monitoring mechanism in 2015 and was updated on a voluntary basis in 2016-2017. A total of 84 city profiles have been included, provided by the EU Mayors Adapt project, each based on information collected from and checked by the respective

[59] http://climate-adapt.eea.europa.eu/

city. However, the latter will be removed by the end of 2018, when the Covenant of Mayors is expected to have a process in place for monitoring and reporting of urban adaptation of cities that have committed to action under the covenant. The information in the knowledge database is evaluated by the EEA and ETC/CCA every two years in order to assess and help to overcome information gaps.

Climate-ADAPT has several functionalities that help visitors to access the large amount of information. These include: a search function for the database; information on national adaptation strategies and actions; pages with adaptation options and a range of examples of implemented adaption actions ('case studies'); a map viewer; and a national and urban adaptation support tool. Member States report on national adaptation actions to the European Commission every four years (e.g. 2015, 2019), as required under the EU Greenhouse Gas and Climate Change Monitoring Mechanism Regulation, with voluntary updates in-between. EEA collects this information and presents it on Climate-ADAPT's country pages. Climate-ADAPT collates information on news and events about climate adaptation, which has been disseminated by bi-monthly newsletter since January 2015. A total of 18 issues of the newsletter have been published. It is currently sent to about 5,000 recipients. In order to enhance interactive learning about adaptation, Climate-ADAPT promotes conferences and other events on adaptation. In total 107 conferences, workshops, and adaptation events were announced on Climate-ADAPT between 29 April 2014 and 31 March 2018.

Climate-ADAPT has been visited by over 267,300 visitors between 1 March 2013 and 30 April 2017. The intended target audiences are governmental organisations and those who support them, such as research institutes, that develop and/or implement climate change adaptation strategies and actions. The Climate-ADAPT evaluation identified that the majority of the actual users are indeed from this intended target groups. The evaluation also showed that the platform is used across all governance levels in Europe from city/local level to sub-national, national, transnational to the European level. However, some specific user groups make less use of the platform, e.g. sectoral experts at EU level and across Europe, users from Eastern and Central European countries, as well as users with less experience of adaptation.

The database, adaptation support tools, case studies, EU policy pages (on the EU adaptation strategy and mainstreaming of adaptation in other policy areas) and country pages, and the European Adaptation Strategy pages are the most visited and used 'core content' of Climate-ADAPT. The country pages are used particularly because of the information about: the legal and policy framework on adaptation; the sectors and actions; the assessments; and the involvement of stakeholders in the adaptation process at national level. Member States provide content for the country pages, which disseminate their state of play on climate adaptation. The structured format of the country pages means that Climate-ADAPT visitors can easily compare climate adaptation policies between Member States. Visitors consult country pages to stay up-to-date with the development of adaptation in Europe. The Climate-ADAPT portal, as a whole, is used as *the* reference point for users from many different governance levels to: identify adaptation's "state of the art"; build upon adaptation approaches that are widely accepted in Europe; and learn from front-runners' experiences.

Operational Objective 2b included in the Impact Assessment for the Strategy was that "by 2020, communication tools allow for available information on climate change adaptation to be more easily accessible for decision-makers, including Member States, local authorities and firms". In summary, we conclude that with the Climate-ADAPT platform, such a communication tool has been provided, although it is more used by national and local governments than by other organisations. Regarding performance indicators associated with Objective 2b:

- Number of visitors to Climate-ADAPT: 267,300 visitors between 1 March 2013 and 30 April 2017
- Pages most visited: database, adaptation support tools, case studies, EU policy pages and the country pages

- Number of registered users: about 5,000
- Assessment of the content, databases and metadata: Provided by EEA's evaluation of Climate-ADAPT (European Environment Agency, 2018, forthcoming)
- Number of conferences, workshops, adaptation events registered on Climate-ADAPT: 107 such events were announced on Climate-ADAPT between 29 April 2014 and 31 March 2018.

## 3.3 Objective 3: Climate-proofing EU action: promoting adaptation in key vulnerable sectors

The Strategy commits to delivering Objective 3 through Actions 6, 7 and 8. The Strategy's objectives are presented in Section 2.2.2, intended inputs, actions and outputs are described in Section 2.2.3, and their state of play is described below.

While the actions under Objective 3 focus on specific areas of policy (CAP, CFP and Cohesion Policy in Action 6; infrastructure in Action 7; and insurance in Action 8), the objective applies more broadly to the full range of relevant EU policy activity. Operational Objective 3a included in the Impact Assessment for the Strategy was that "by 2020, adaptation considerations have been mainstreamed in a consistent and comprehensive way in key EU policies". This would be assessed by means of a "List of policies and legal acts where adaptation has been mainstreamed". The evaluation has prepared a list of policy initiatives mentioned in the Strategy where adaptation has been mainstreamed, or was considered for mainstreaming (Appendix 5). In addition, the appendix suggests additional areas where adaptation mainstreaming could be further pursued. It is clear that significant progress has been made in increasing awareness and explicit consideration of adaptation issues. However, there is still some way to go before adaptation mainstreaming can be described as "consistent and comprehensive". One point raised in the first stakeholder workshop and in interviews is that, while the Commission and the EU has pursued adaptation priorities internationally, particularly through its development cooperation and aid activity, there has been limited integration of that activity into a broader climate strategy. It was further noted that there are potentially areas of the EU's international engagement (e.g. trade, security) where climate adaptation considerations and risk assessments should be more systematically considered.

Operational Objective 3a, mentioned above was also to be assessed by reference to adaptation activities by private organisations, as reported in the Carbon Disclosure Project surveys. This private sector indicator is more problematic than the indicator relating to policies and legal acts, since it is more loosely linked to the climate-proofing of EU action. A baseline for the assessment is available in a 2014 report from the Carbon Disclosure Project[60]. The report was produced too soon after the Strategy to reflect impact from its actions, and the assessment has not yet been repeated. It reveals that 1,365 EU companies were reporting climate data. However, while the report provides valuable information on the sectors concerned and the nature of the risks identified (e.g. 32% of respondents were concerned by risks of reduction/disruption to production capacity), it does not provide detailed information on climate action taken in response to risk assessment. It would, therefore, be valuable for the Commission to discuss with the Carbon Disclosure Project, or other possible sources of relevant data, what survey activity or other data gathering would be most valuable to the development of a more targeted indicator of relevant progress in the delivery of this objective.

Operational Objective 3b included in the Impact Assessment for the Strategy was that "by 2020, new major infrastructure investments are climate-proofed". The corresponding performance measure was "Amount of adaptation infrastructure investments (co-) financed by EU funds and/or public financial institutions". It should be noted that this indicator is not directly related to climate-proofing. Investments in adaptation infrastructure itself are by their nature already to a large extent climate-proofed, and do

[60] Carbon Disclosure Project, 2014: "Climate Change Resilience in Europe: A Snapshot of the Private Sector"

not provide much information on the level of climate-proofing achieved in other infrastructure investments (e.g. roads, rail, energy infrastructure, telecommunications infrastructure). In addition, the indicator does not set a target level.

The latest Commission reporting on climate mainstreaming in the EU budget is provided in the Statement of Estimates for the Financial Year 2018[61] (A more comprehensive presentation of climate expenditure is included in the staff working document accompanying the mid-term review of the 2014-2020 Multiannual Financial Framework[62], but does not distinguish between adaptation and mitigation expenditure). The key expenditure programmes likely to fund infrastructure are the European Regional Development Fund (ERDF) and the Cohesion Fund (CF). These funds record budget allocations (compared with total budget) to Thematic Objective 5 (Promoting climate change adaptation, risk prevention and management) as detailed in Table 3-5 below.

**Table 3-5 Budget allocations for Thematic Objective 5 (TO5) compared with total budget**

| Fund | TO5, 2017 (€m) | Total, 2017 (€m) | TO5, 2018 (€m) | Total, 2018 (€m) |
|---|---|---|---|---|
| **ERDF** | 430.2 | 5387.3 | 445.7 | 5581.5 |
| **CF** | 342.7 | 2503.0 | 355.4 | 2596.5 |

However, it should be noted that some relevant climate adaptation infrastructure may be funded under other Thematic Objectives, particularly Thematic Objectives 4 (Low-carbon economy), 6 (Preserving and protecting the environment and promoting resource efficiency) and 7 (Promoting sustainable transport), and that not all investments recorded under Thematic Objective 5 will be relevant to climate adaptation.

Expenditure under other programmes particularly relevant to climate adaptation is less likely to focus on infrastructure investment, e.g., climate expenditure under the European Agricultural Fund for Rural Development (EAFRD) primarily includes support to farming in areas of natural constraint, support for agri-environment-climate commitments, or support for organic farming; LIFE programme expenditure on adaptation includes significant investment in best practice and knowledge sharing, and so on. LIFE specifically records a contribution to adaptation of €51.7m out of a total budget of €228.9m in 2017, and €38m out of a total budget of €247.2m in 2018.

The European Investment Bank reports[63] that in 2015, out of total climate action finance of €20.7bn, €0.9bn was spent on climate adaptation. It also reports that a total of €4.5bn was spent on adaptation over the five years 2011-2015. This suggests a steady level of financing for adaptation, rather than an increasing profile following the publication of the EU Adaptation Strategy in 2013. However, the long lead time for project finance would suggest that an immediate impact would not be visible so soon.

[61] COM(2017) 400 'DRAFT General Budget of the European Union for the financial year 2018 - General Introduction, - General statement of revenue, - General statement of revenue and expenditure by section', and SEC(2017)250 - May 2017 'Statement of estimates of the Commission for 2018 (Preparation of the 2018 Draft Budget) Document I, Policy highlights'
[62] SWD(2016) 299 final, 'Commission Staff Working Document accompanying the document: Communication from the Commission to the European Parliament and the Council, Mid-term review/revision of the multiannual financial framework 2014-2020, An EU budget focused on results' Annex 2
[63] See the publication "Finance for Climate Action" at http://www.eib.org/attachments/thematic/climate_action_en.pdf

### 3.3.1 Action 6: Facilitate the climate-proofing of the Common Agricultural Policy (CAP), the Cohesion Policy and the Common Fisheries Policy (CFP)

A large share (around 70 per cent) of the EU's total budget in the 2014-2020 programming period (European Commission, 2016d) supports the policy areas identified in Action 6 through the following funds: the European Agriculture Fund for Rural Development (EAFRD) and the European Agriculture Guarantee Fund (EAGF) for the CAP; the European Regional Development Fund (ERDF); the Cohesion Fund (CF) and the European Social Fund (ESF) for Cohesion Policy; and the European Maritime and Fisheries Fund (EMFF) for the CFP[64]. Stakeholder awareness of action under these programmes was tested by the open public consultation, with 49% and 48% respectively indicating awareness of adaptation action under the CAP and under the "regional funds of the EU", but only 24% aware of adaptation action under the CFP.

#### 3.3.1.1 Guidance provided by the Commission

Alongside the Strategy three key technical guidance documents were published by the Commission to help managing authorities and other national stakeholders within Member States to consider climate change adaptation effectively within the programming cycle of the CAP (European Commission, 2013h), the Cohesion Policy (European Commission, 2013g) and the CFP (European Commission, 2013p). The three technical documents provided step-by-step guidance to integrate climate change adaptation at the various stages of the cycle. Furthermore, a set of good examples of projects and approaches from the previous 2007-2013 programming period were provided. The documents were published in April 2013, and, as such, had potential to influence the development of the Member State Operational Programmes (OPs) and Rural Development Programmes (RDPs)[65]. They also provided valuable guidance for the later stages of programme management and in respect of programme amendments.

While the development of the three guidance documents fulfils Action 6, the usefulness of the three documents depends on how much use the Member States' managing authorities have made or will make of them. It is challenging to assess the impact of the documents on the ground without undertaking extensive interviews with the managing authorities, which is not feasible within the resources available for this evaluation. Our assessment, based on a limited sample of 10-15 operational programmes, is that managing authorities have not referred explicitly to the guidance documents and do not appear to have relied on them significantly in the drafting of their programmes. We also note that a potential constraint on use of the documents is that they were only made available in English. This might have limited the extent to which they have been used by sub-national administrations.

In addition to the adaptation-specific technical documents, an extensive set of guidance documents was also produced by the Commission on climate mainstreaming in the ESI (European Structural and Investment) Funds, including both mitigation and adaptation (European Commission, 2015b). There are two sets of factsheets for each ESI Fund[66], (i) 'Potential for Climate Action – Examples of how to mainstream climate action and the potential for doing so' (e.g. (European Commission, 2015c), and (ii) 'Assessment of climate action – How to assess the mainstreaming of climate action potential in Operational Programmes', e.g. (European Commission, 2015d). These factsheets complement the specific adaptation guidance documents, as they also provide information on potential adaptation actions, including a set of project examples. An interviewee for this study from the Commission confirmed that an internal thematic guidance document on climate change

[64] Five out of six of these funds – excluding the EAGF - are also referred as the European Structural and Investment Funds (ESIF).
[65] Most of the OPs/RDPs were agreed with the Commission after 2014 (i.e. the start of the new programming period). This was due to delays with the regulatory framework of the 2014-2020 Multi-annual Financial Framework (MFF). It had had an impact on the timely agreement on the Partnership Agreements (see below).
[66] Including for the European Territorial Cooperation.

adaptation, risk prevention and management was also developed for the Cohesion Policy, which refers to the step-by-step technical guidance. It was used by the Commission services during the assessment of draft operational programmes. This internal guidance was made publicly available in early 2014 on the website of DG REGIO enabling managing authorities to make use of it.

Furthermore, climate change requirements were incorporated in the legal basis of ESIF (see below). The Commission provided extensive climate-related comments on all of the ESIF Partnership Agreements (one per Member State) and a high proportion of the fund-specific programmes. This process of dialogue has helped Member States and regions to better integrate climate action. Contractors supporting DG CLIMA in this regard have prepared final reports on the mainstreaming of climate action into ESIF (see (COWI, 2016)) and a special report on mainstreaming adaptation into these funds (see (COWI, 2017)).

Finally, the Commission produced a guidance document for managing authorities and project developers to support the mainstreaming of climate objectives into major projects supported by the ERDF and CF (European Commission, 2016b). Investments in major projects, which are defined as having a total eligible cost exceeding €50 million (or €75 million for investments under Thematic Objective 7[67]) are subject to the approval of the Commission. Project developers of major projects are required to provide detailed project information to the Commission, including on climate change adaptation (e.g. a description of how climate change related risks, adaptation considerations and disaster resilience have been taken into consideration).[68] The guidance document provides detailed information on specific climate requirements, including on the need to conduct a vulnerability and risk assessment for all major projects. Project developers are required to conduct a sensitivity and exposure analysis for the vulnerability assessment and a likelihood and impact analysis for the risk assessment. Building on the results, they should identify and appraise various adaptation options. The Commission is also cooperating with the European Investment Bank (EIB) and the Joint Assistance to Support Projects in European Regions (JASPERS) on the climate proofing of major projects.

These guidance documents are, in our judgement, well-structured and provide practical guidance and information. Thus, in principle, they have the potential to provide effective support for managing authorities. Nevertheless, based on the programme documentation that we have studied, our assessment is that managing authorities have not relied on the guidance documents significantly in the preparation of their programmes. Nevertheless, it is possible that managing authorities may have used the guidance documents without citing them as a source of inspiration. One of the points raised during the second stakeholder workshop was that the wider social and environmental benefits of spending on adaptation actions were under-appreciated. This was, however, an area specifically addressed by the Commission guidance documents.

#### 3.3.1.2 Legal provisions on climate change

There are a number of others guidance documents, in addition to those referred to above, that have supported the mainstreaming of adaptation objectives into the CAP, Cohesion Policy and the CFP. Climate change action, both of mitigation and adaptation, was clearly identified as a priority and horizontally mainstreamed in the ESI Funds legal framework for the 2014-2020 period. It is difficult to judge the extent to which this was due to the Strategy itself. While the legislation was adopted after its publication, the proposals (including the provisions for mainstreaming climate action) were published some time in advance. However, it should be noted that significant improvements to the focus on climate change objectives, including adaptation, have been made compared to the previous funding periods. These include the following:

[67] In the 2014-2020 programming period, the European Structural and Investment Funds support 11 investment priorities, also known as thematic objectives. Thematic objective 7 call for the promotion of sustainable transport and removing bottlenecks in key network infrastructures.
[68] See Commission Implementing Regulation (EU) 2015/207 for more details.

- The establishment of the 20% climate mainstreaming target
- The tracking of climate-relevant expenditure in the EU Multiannual Financial Framework (MFF) 2014-2020
- New rules in the Common Provisions Regulation, applying to all ESIF. These include:
    - The mainstreaming of sustainable development (Article 8)
    - The development of Partnership Agreements
    - The establishment of Thematic Objectives (TOs), particularly TO5 "Promoting climate change adaptation, risk prevention and management"
    - Ex-ante conditionalities, and
    - Common output indicators.

#### 3.3.1.3 Results of climate-proofing

The Commission's climate-tracking methodology offers only quantitative, aggregate data on how climate change considerations have been mainstreamed into ESIF. A COWI study (COWI, 2016) attempted to provide estimates on ESIF building on the assessment of 28 Partnership Agreements and more than 500 programmes prepared by Member States. The study suggests that 1.6% of the ERDF, 4.7% of the CF and 7.6% of the EAFRD were allocated directly to climate change adaptation actions. Furthermore, it notes that a large share (44%) of EAFRD actions have the potential to indirectly contribute to adaptation objectives. As such, the overall share of contributions to adaptation actions, including indirect contributions, is likely to be significantly higher than the direct allocations. A more recent study by COWI (COWI, 2017) provides an overall estimate of all ESIF allocations to climate adaptation at €62.1 billion. It estimates that allocations to TO5 ("Promoting climate change adaptation, risk prevention and management") are €6.3 billion and €1.1 billion from the ERDF/CF and the EAFRD, respectively. It also estimates allocations to adaptation actions through other Thematic Objectives amount to €4.9 billion for the ERDF and the CF and €49.8 billion for the EAFRD.

A sound framework with multiple components (see Appendix 5) seems to be in place enabling the climate-proofing of ESIF. However, it should be highlighted that the uptake of adaptation actions largely depends on the extent to which adaptation is embedded in Member State programmes. Furthermore, given the nature of ESIF, there is also a significant time lag effect in this policy area. This means that the results and impacts cannot be fully seen yet. Specific observations about the funds and the status of the climate-proofing exercise are presented below.

**Climate-proofing the CAP**

According to COWI (COWI, 2016) the EAFRD is the only ESIF where there seems to be a greater focus on adaptation, as compared to mitigation, objectives. While this seems to enhance the status of Action 6 of the Strategy, there are two important caveats. Firstly, while adaptation seems to be well integrated into RDPs, it is not explicitly mentioned as an objective of the specific measures in most cases (COWI, 2016) but captured in focal areas considered relevant for adaptation. An interview with the Commission also confirmed that adaptation is considered by virtually all RDPs. Adaptation is more to the fore in those regions that are already being affected by extreme weather events. While many measures (e.g. targeting biodiversity, soil, and water use) have the potential to support climate adaptation, their impact would need to be assessed by an ex-post evaluation of programmes. Secondly, the tracking methodology developed for the EAFRD raises concerns about over-estimations. The European Court of Auditors has suggested an alternative and more conservative use of the Commission's climate markers. It concluded that this could reduce the overall climate allocations under the EAFRD by 42% (European Court of Auditors, 2016). The Commission stated in its reply to the Court of Auditors (published alongside the report referred to) that its "tracking methodology for EAFRD tries to strike a balance between providing a reasonably reliable estimate for climate related expenditure and minimising the administrative burden and costs". The Commission's reply also noted that all measures under Union Priority 4 ("Restoring, Preserving and Enhancing Ecosystems") should be attributed a 100% marker both because of their climate

contribution and to avoid making the tracking system "burdensome and difficult for Member States". A report carried out for the Commission in 2017 (Ricardo Energy & Environment, IEEP, Trinomics, 2017), nevertheless, recommended that the Commission should "revisit the allocation of markers to measures on the basis of evidence on climate impacts and on the underlying rationale for the measures".

More broadly, climate mainstreaming is supported under the EAFRD by the requirement for RDPs to spend at least 30% on a range of climate and environmental measures.[69] However, this minimum requirement represents a rather low level and includes measures that do not appear to have a significant impact on the achievement of climate objectives (Ricardo Energy & Environment, IEEP, Trinomics, 2017). It is also notable that while rural development measures provide scope to fund adaptation that directly benefits farm businesses (e.g. access to improved irrigation) and delivers wider public benefits (e.g. land management practices that reduce flood risks), programmes appear to focus on the measures that contribute less to climate resilience.

The EAGF, which funds CAP direct payments, is not part of ESIF. Climate considerations are included via the greening component (30% of total direct payments) and cross-compliance (basic requirements to access direct payments). According to the Commission's calculations around 20% of direct payments can be considered climate relevant. The European Court of Auditors (2016) suggests that assumptions used for this estimate lack sound justification, particularly for measuring the climate relevance of non-greening components (European Court of Auditors, 2016). With the application of more conservative estimates, they identify that the total contribution can be reduced by €9 billion from €47.1 billion to €38 billion[70]. The Commission's response to the report states that "the method it uses has been prepared in a transparent and coordinated manner; it has been communicated to the European Parliament and the Council and it does not lead to overestimation". The principal climate relevant impact of the greening measures is carbon sequestration represented by the permanent grassland measure. While the Ecological Focus Areas requirement and the crop diversification requirement are given lower climate tracking coefficients of 40% and 0% respectively in the Commission's methodology, they can provide some adaptation benefits in terms of improved soil management. Adaptation benefits are also present in certain elements of the "cross-compliance" requirements to maintain land in Good Agricultural and Environmental Condition (GAEC), notably those related to soil and water management. An interview with the Commission for this study highlighted that cross-compliance has helped to encourage adaptation actions but that it is challenging to assess to what degree. There is an ongoing evaluation[71] by the Commission of the impact of the CAP on climate change and greenhouse gas emissions, which is expected to provide evidence on adaptation action in the CAP.

**Climate-proofing the Cohesion Policy**

Both the ERDF and the CF provide contributions to the climate adaptation objectives under the adaptation TO5; while the ESF does not target TO5[72]. The climate tracking system applied under the Cohesion Policy, particularly to the ERDF and the CF, is the most sophisticated. The climate markers are applied to a thematic list of 123 intervention codes[73] at the point when expenditure is committed by the managing authorities. For the

[69] Article 59.6 of Regulation (EU) No 1305/2013 on support for rural development by the EAFRD
[70] For more details of the calculations, see European Court of Auditors (2016), p.30.
[71] See more at: https://ec.europa.eu/info/law/better-regulation/initiatives/ares-2017-2886183_en
[72] As the ESF supports social and employment objectives climate change is not considered to be a primary objective. Thus, it does not cover TO5. Nevertheless, in order to better capture the potential contribution of the ESF to climate objectives (e.g. through investment in low-carbon skills), a secondary theme (01: "low-carbon, resource efficient economy") was established. At the same time, its relevance seems to be greater for mitigation actions rather than for adaptation.
[73] Commission Implementing Regulation (EU) No 215/2014 of 7 March 2014 laying down rules for implementing Regulation (EU) No 1303/2013 of the European Parliament and of the Council laying down common provisions on the European Regional Development Fund, the European Social Fund, the Cohesion Fund, the European Agricultural Fund for Rural Development and the European Maritime and Fisheries Fund and laying down general provisions on the European Regional Development Fund, the European Social Fund, the Cohesion Fund and the European Maritime and Fisheries Fund with regard to methodologies for climate change support, the determination of milestones and targets in the performance framework and the nomenclature of categories of intervention for ESIF.

2014-2020 programming period, the intervention codes have been revised. A code specifically focusing on adaptation actions (code 087: "Adaptation to climate change measures and prevention and management of climate related risks, e.g. erosion, fires, flooding, storms and drought, including awareness raising, civil protection and disaster management systems and infrastructures") was introduced, to which a 100% climate marker was applied. Furthermore, a separate code (100: "Outermost regions: support to compensate additional costs due to climate conditions and relief difficulties") was put in place to track adaptation actions in outermost regions but only counts as 40%.

According to the COWI (COWI, 2017) estimates, which build on the amount of allocations for the relevant intervention codes, €6 billion has been allocated to adaptation objectives under the Cohesion Policy with €3 billion each for the ERDF and the CF. This accounts for 11.2% of the total ERDF and CF allocations (COWI, 2017). Furthermore, another €4 billion was estimated to provide indirect climate (mitigation and adaptation) benefits. The review of the operational programmes showed that nearly half of them addressed climate change adaptation at the high strategic level of the operational programmes, which then translate into specific objectives and actions. Most adaptation relevant allocations targeted flood protection measures. Other allocations include actions on drought and heatwaves and less frequently on specific sector-related actions (e.g. energy efficiency in buildings and making transport infrastructure climate-resilient).

More broadly, climate change objectives (both mitigation and adaptation) are further supported in Cohesion Policy by the legal provisions for the ESIF (e.g. ex ante conditionalities and common output indicators – see more in Appendix 5).

Adaptation objectives are also an important component of the European Territorial Cooperation (ETC) goal, which is supported by the ERDF. The ETC has been further strengthened in the 2014-2020 programming period through closer alignment with the macro-regional strategies and greater recognition and encouragement of Member States to cooperate at the macro-regional and sea-basin level. More than 20% or almost €2 billion of the ETC programmes expenditure is expected to contribute to climate change objectives (COWI, 2017). Adaptation is emphasised in these programmes: with 75% of all cooperation programmes including adaptation as part of their strategy, and a particularly high level of support for adaptation in cross-border programmes (as opposed to transnational and interregional programmes). In addition to the cooperation programmes themselves, territorial cooperation is also being pursued by the EU macro-regional strategies (e.g. the EU Strategy for the Danube Region or the EU Strategy for the Alpine Region – see Case Study 3 in Appendix 8). In many cases, the macro-regional strategies have a targeted focus on adaptation actions (Nesbit, Paquel, & Illes, 2017).

While adaptation seems to play a less prominent role in the ERDF than in the CF, support from the CF can be only applied in a limited number of Member States.[74] Those Member States that cannot receive funds from the CF made a greater use of the EAFRD for their adaptation actions (COWI, 2016), although the actual adaptation impacts of these actions are not always clear (see comment above in section on climate-proofing the CAP). Another interesting aspect is the urban dimension of Cohesion Policy. This is primarily supported by the ERDF but also receives support through the CF and the ESF. To strengthen the role of the ERDF in sustainable urban development, a target of 5% was set as a minimum share of the ERDF that needs to be spent directly on integrated urban strategies by the cities. Furthermore, the emphasis on cities in ERDF investments have been increased, as about €15 billion from the ERDF is planned to be directly managed by cities (Nesbit, Paquel, & Illes, 2017). At the same time, the EEA has highlighted that "although climate change adaptation is not a major focus in this, the support for green infrastructure might be considerable, as a major emphasis is on urban rejuvenation and brown field regeneration" (European Environment Agency, 2016). While green infrastructure has the potential to deliver adaptation benefits, COWI (COWI, 2016) pointed out that in the ERDF

[74] Support from the Cohesion Fund can be only used by Member States whose Gross National Income (GNI) per inhabitant is less than 90 % of the EU average.

and the CF operational programmes most of the green infrastructure actions were described only in general terms, rather than in the more explicit terms used for other types of investment (e.g. investments to achieve water quality goals). Thus, implementation of these actions is uncertain (COWI, 2016).

In addition to the 5% ear-marking for integrated urban strategies, ERDF allocations to TO4 ("Supporting the shift towards a low-carbon economy in all sectors") should be at least 20% in more developed regions, 15% in transition regions, and 12% in less developed regions.75 A similar ear-marking is not in place for the adaptation objective (TO5). According to COWI (COWI, 2017), this thematic concentration might have resulted in a bias towards mitigation activates at the expense of adaptation objectives. Finally, climate considerations integrated into decisions on major projects supported by the ERDF and the CF, as a result of the legal provisions on assessment of such projects, are also expected to have a positive impact on climate adaptation and climate resilience, generating synergies between the Strategy's Action 6 and Action 7 (more resilient infrastructure).

**Climate-proofing the Common Fisheries Policy**

As mentioned above, the thematic objectives set in legislation for the ESIF include TO5, which explicitly addresses climate adaptation and risk management. However, the legislation for the European Maritime and Fisheries Fund (EMFF)[76] does not specifically address TO5, indicating a lesser focus on climate adaptation actions. Nevertheless, the COWI (2016) study found that some of the measures (e.g. the protection and restoration of marine biodiversity, and the adaptation of fishing gear to altering conditions) under the EMFF have the potential to deliver adaptation objectives. The Commission guidance document referred to above (European Commission, 2013p) provides suggestions for how programmes can address climate adaptation, including through awareness-raising, training, and eligibility criteria testing whether applicants demonstrate understanding of potential climate impacts.

At the same time, the climate tracking methodology for EMFF is not developed in great detail. Furthermore, the European Court of Auditors notes that Member States were not required to report on climate expenditure until 2016 and, as such, the accuracy of EC estimates cannot be verified (European Court of Auditors, 2016). It states that the current legal framework shows that "direct and clear references to climate change objectives, both mitigation and adaptation, are still rare and, as a result, the fisheries fund had not widened the scope of its contribution to climate action". The recent COWI study (COWI, 2017) also notes that the indirect contribution of EMFF to climate adaptation objectives cannot be tracked given the lack of detailed tracking methodology.

### 3.3.2 Action 7: Ensuring more resilient infrastructure

Action 7 foresaw three types of activities aimed at promoting the development of more climate resilient infrastructure:

- Initiating work on the integration of adaptation considerations in infrastructure standards
- Development of guidelines for project developers on climate-proofing vulnerable investments, and
- Exploring the need for additional guidance on the mobilisation of ecosystem-based approaches to adaptation.

#### 3.3.2.1 Technical standards

In May 2014, the Commission gave the European standardisation organisations (ESOs) a mandate (European Commission, 2014) to undertake standardisation activities to support the implementation of the EU Adaptation Strategy. The ESOs were requested to:

[75] Article 4 of the ERDF Regulation (No 1301/2013)
[76] Regulation (EU) No 508/2014 'on the European Maritime and Fisheries Fund'

- Develop tools, i.e. guidance or other type of documents, that will ensure that adaptation to climate change can be considered in a systematic way in European standardisation
- Identify the existing European standards and European standardisation deliverables, including those under development, that are most relevant for adaptation to climate change in the three priority sectors[77] identified in the EU Adaptation Strategy, and
- Revise the identified European standards or European standardisation deliverables, and to draft new ones if deemed necessary, with a view to enhancing the resilience to climate change of the infrastructures to which they apply.

The first phase of the work under the mandate was completed at the end of 2016. This resulted in a shortlist of 13 standards that are to be revised under the second phase, which started at the beginning of 2017.

In addition, the 'Guide for addressing climate change adaptation in standards'[78] was adopted in April 2016 by CEN-CENELEC; the European Committee for Standardization (CEN) and the European Committee for Electrotechnical Standardization (CENELEC). The guide applies to product (including design), service, infrastructure and testing standards, and is intended to be applicable to both "climate-influenced products" (i.e. products whose fitness for purpose may be affected if climate change is ignored) and "climate resilience products" (i.e. products whose main aim is to reduce vulnerability to climate hazards). The guide is primarily intended for standard writers. It aims to enable them to identify relevant climate impacts and include climate change adaptation considerations in new or revised standardisation documents.

Progress on this mapping exercise by CEN-CENELEC is one of the performance indicators relevant to Objective 3b of the Strategy, namely to ensure new major infrastructure projects are climate proofed, supported by progress on a mapping exercise (of relevant EU standards) by CEN-CENELEC. In respect of this indicator, we can conclude that progress is being made through a completed first phase (mapping) in 2016, which is now being taken forward as a second phase for revision of the relevant standards.

#### 3.3.2.2 Guidelines for project developers

Based on the results of a service contract[79], the Commission issued 'Non-paper Guidelines for project managers: making vulnerable investment climate resilient' (European Comission, 2013a). The document consists of a methodology and step-by-step guide on how to systematically assess the climate resilience of infrastructure projects, as a complement to existing project appraisal and development procedures. The guidelines are intended to help project developers understand the steps they can take to make investment projects resilient to climate variability and change. It is proposed that they should complement existing project development processes not replace them[80]. The aim is to integrate climate resilience into the routine analyses performed by project developers.

The guidelines (or 'climate resilience toolkit') consist of seven modules designed to:

- Consider how a project is vulnerable to climate variability and change
- Assess current and future climate risks to the success of the project
- Identify and appraise relevant and cost-effective adaptation options to build climate resilience, and
- Integrate adaptation measures (resilience measures) into the project lifecycle.

[77] Energy, transport and buildings.
[78] https://www.cencenelec.eu/standards/Guides/Pages/default.aspx
[79] Service contract no. 071303/2011/610951/SER/CLIMA.C3, Guidelines for project managers: 'climate proofing' of vulnerable investments, delivered by Acclimatise and COWI.
[80] Such as project lifecycle appraisal, environmental impact assessment.

The Environmental Impact Assessment (EIA) Directive has been updated to include the impact of projects on climate and the vulnerability of the project to climate change among the aspects to be considered in impact assessments.[81] The associated 'Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment' (EIA)[82] was published by the Commission in 2013. The EIA guidance sets out several questions that should be asked to identify major climate change adaptation concerns. EIA practitioners are instructed to consider not only the historical data on climate but also climate change scenarios, and to outline extreme climatic situations to be considered as part of the environmental baseline analysis. They are also encouraged to review any existing adaptation strategies, risk management plans and other national or sub-regional studies on the effects of climate variability and climate change, as well as proposed responses and available information on expected climate-related effects relevant to the project. The document gives guidance on analysing the evolving baseline trends. It also gives examples of EIA alternatives and mitigation measures available to use in planning the adaptation of projects to climate change, and recommendations on how to assess significant effects (including references to existing support tools and information sources). In addition, in 2013, the Commission adopted 'Guidance on Integrating Climate Change and Biodiversity into Strategic Environmental Assessment' (SEA)[83], which follows a similar structure to the EIA guidance and similarly includes adaptation considerations.

As mentioned in Section 3.3.1, in the 2014-2020 programming period, approval of major projects[84] funded by the ESIF is also subject to "an analysis of the environmental impact, considering climate change adaptation and mitigation needs, and disaster resilience" (Article 101 of Regulation (EU) No 1303/2013). In 2016, the Commission published a brochure on the integration of climate change adaptation and mitigation considerations in the preparation and approval of major projects funded by the ERDF and the CF (European Commission, 2016). The document is primarily intended for those involved in the various development stages of major projects but the methodology presented can be usefully applied to a wider range of projects. Climate adaptation considerations have also been included in the guidance document on cost-benefit analysis of major projects. In particular, costs and benefits resulting from the integration of adaptation measures in the project's design are to be included in the appraisal of its financial and economic performance (European Commission, 2014a). In addition, training events have been organised by the Commission to explain the new requirements concerning major projects to managing authorities.

Seven organisations (including the Commission), working together under the umbrella of the European Financing Institutions Working Group on Adaptation to Climate Change (EUFIWACC),[85] have developed a guide designed to help practitioners assess climate change risks and vulnerabilities and better integrate adaptation measures into project planning, design and implementation (EUFIWACC, 2016)The overall aim of the guide is to help make projects and investments more resilient to climate change and to implement adaptation measures that reinforce the climate resilience of goods, people, economies and territories of the beneficiaries.

As regards sector-specific EU activities, for the energy sector, consideration of climate change impacts have been fed into the 2013 Regulation establishing guidelines for the Trans-European Network Energy (TEN-E).[86] In particular, in relation to the criteria for

[81] Directive 2014/52/EU 'on the assessment of the effects of certain public and private projects on the environment'
[82] http://ec.europa.eu/environment/eia/pdf/EIA%20Guidance.pdf
[83] http://ec.europa.eu/environment/eia/pdf/SEA%20Guidance.pdf
[84] A major project has a total eligible cost exceeding € 50 million (and € 75 million for transport projects).
[85] EUFIWACC consists of the Agence Française de Développement (AFD), the Council of Europe Development Bank (CEB), the European Bank for Reconstruction & Development (EBRD), the European Commission's Directorate-General for Climate Action (DG CLIMA), the European Investment Bank (EIB), KfW Development Bank (KFW), and the Nordic Investment Bank (NIB).
[86] Regulation(EU) No 347/2013

projects of common interest concerning electricity, "security of supply, interoperability and secure system operation shall be measured … taking into account expected changes in climate-related extreme weather events and their impact on infrastructure resilience." The "system resilience, including disaster and climate resilience, and system security, notably for European critical infrastructure as defined in Directive 2008/114/EC" is among the aspects to be considered for cost-benefit analyses of projects of common interest for electricity transmission and storage.

Similarly, the 2013 EU guidelines for the development of the trans-European transport network (TEN-T)[87] specify that "during infrastructure planning, Member States shall give due consideration to improving resilience to climate change and to environmental disasters" (Article 35). Several other provisions of the TEN-T regulation reflect climate change considerations. For example:

- Article 5 states that: "The trans-European transport network shall be planned, developed and operated in a resource-efficient way, through: (…) (g) adequate consideration of the vulnerability of transport infrastructure with regard to a changing climate as well as natural or man-made disasters, with a view to addressing those challenges"
- Measures that are necessary for "improving or maintaining the quality of infrastructure in terms of safety, security, efficiency, climate and, where appropriate, disaster resilience…" are mentioned among the areas that should be given general priority in the development of the network (Article 10)
- The work plans elaborated by European coordinators[88] for each core network corridor[89] shall include an analysis of, among others, "the possible impacts of climate change on the infrastructure and, where appropriate, proposed measures to enhance resilience to climate change" (Article 47).

#### 3.3.2.3 Green infrastructure

In May 2013, the Commission adopted a Green Infrastructure Strategy to promote the deployment of green infrastructure in the EU (European Commission, 2013e). This strategy aims to create an enabling framework to promote and facilitate green infrastructure projects within existing legal, policy and financial instruments.

The guidance on the mobilisation of ecosystem-based approaches to adaptation referred to in Action 7 of the Strategy has not yet been issued. However, DG ENV considered the need for such guidance and carried out preliminary work for its development. Several guidance documents or similar materials on ecosystem-based adaptation and/or closely related topics are already available (Naumann S. A., 2011) (Lo, 2016). For example, to support the implementation of the Green Infrastructure Strategy, a service contract was commissioned by DG ENV in 2014[90]. It included, among other tasks, the development and dissemination of information on green infrastructure to raise awareness among Member States and relevant stakeholders. This included the elaboration of a fact sheet on green infrastructure and climate change adaptation. It discusses costs and benefits of green infrastructure in relation to adaptation and presents good practice examples of how it has been used in adaptation.[91]

A review of the Green Infrastructure Strategy's implementation is underway. The Commission's report on the review was due to be published at the end of 2017 but no further information is currently available.

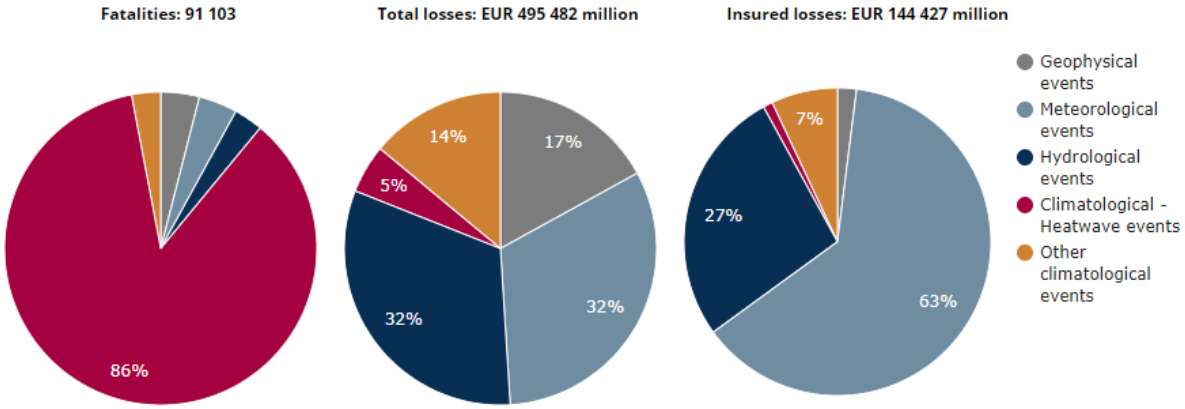
[87] Regulation (EU) No 1315/2013 'on Union guidelines for the development of the trans-European transport network'
[88] Experts designated to support the coordinated implementation of the core network corridor concerned, report on progress, make recommendations, etc.
[89] Core network corridors cover the most important long-distance flows in the core network and are intended, in particular, to improve cross-border links within the Union (Art. 43 of Regulation (EU) No 1315/2013).
[90] Service Contract ENV.B.2/SER/2014/0012, "Supporting the Implementation of Green Infrastructure"
[91] http://ec.europa.eu/environment/nature/ecosystems/pdf/Green%20Infrastructure/GI_climate_adaptation.pdf

## 3.3.3 Action 8: Promote insurance and other financial products for resilient investment and business decisions

### 3.3.3.1 Action 8: High economic costs of climate-induced natural disasters

Natural hazards in the EU-28 caused €495 billion (2016 Euro values) worth of damage between 1980-2016 (which equates to €411 billion when only including climate and weather-related events and excluding geophysical events), with around 29% of these total losses insured (€144 billion)(European Environment Agency, 2018b). Such hazards can be categorised as: geophysical (earthquakes, tsunamis and volcanic eruptions); meteorological (storms); hydrological (floods, mass movements); and climatological (cold waves, droughts, forest fires and heatwaves) (European Environment Agency, 2018b), with each type of event constituting a varying percentage of the overall losses within the EU-28. As depicted in Figure 3-5 below, meteorological events account for 32% of total economic losses, yet they caused 63% of all insured losses.

**Figure 3-5 Percentage distribution of natural hazard-related losses in the EU-28 (1980-2016)**




*Source: Economic losses from climate-related extremes* (European Environment Agency, 2018b)

Reported disaster losses often only reflect structural damage to tangible physical assets, neglecting the damage on health, integrity of ecosystems, and intangible cultural heritage. Hence, the reported losses should be understood as lower-bound estimates (European Commission, 2017). Projection of future losses is difficult because the observed loss data has high annual fluctuations and has been mainly driven by socio-economic factors, which are not constant. Current risk models that aim to project future natural disaster risk often focus on changes in exposure and on direct monetary losses (Bouwer, 2013). Forzieri et al. (Forzieri, et al., 2016) provide estimations regarding projected damages for the EU's critical infrastructure due to climate change-related disasters with damages that could triple by the 2020s and increase six-fold by 2050. Currently, river floods (44%) and windstorms (27%) are the hazards with the highest contribution to damages caused by climate change-related hazards. However, it is projected that droughts and heatwaves will likely become the most damaging hazards (European Commission, 2017).

Data services to identify and quantify the climate risk and impact are developing rapidly. Copernicus Climate Services is one such service, newly introduced that can provide valuable insights in this area to complement the insurance industry's longstanding expertise. In recent years, the insurance industry has also started to integrate geo-location and weather projections into their underwriting. Further information on climate risks and assessment of their impact is to be provided by the PESETA III research project, which may be published later in 2018.

### 3.3.3.2 Policy context: the nature of Action 8

Action 8 of the Strategy promotes the use of products and services by insurance and financial markets. This is also addressed in the adaptation preparedness scoreboard. It

states "adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention". While significant effort is placed at the national and European level on preventing damage caused by weather and climate related disasters, not all risks can be averted. This residual risk affects all areas of society and can be addressed in different ways, through self-insurance, public aid, voluntary insurance schemes or mandatory insurance required by law.[92] Insurance aimed towards natural and manmade disasters was addressed by the Commission in a Green Paper[93]. This focuses on a number of questions related to the adequacy and availability of appropriate disaster insurance. Its main objective is to raise awareness and to assess whether action at EU level could be appropriate or warranted to improve the market for disaster insurance in the EU.

#### 3.3.3.3 State-of-play on observed progress

**Insurance**

Insurance markets have been dealing with disaster risk and advising on prevention for many decades but the topic of insurance for promoting improved climate resilience is still at a rather early stage of development. While a good overview exists of the policy context and the needs to be fulfilled via improved insurance mechanisms, little evidence has been collected on progress so far. This is partly due to the difficulties surrounding data availability. At the European level, the recently finalised DG CLIMA study on 'Insurance of weather and climate related disaster risk: Inventory and analysis of mechanisms to support damage prevention in the EU' (European Commission, 2017) delivered important new insights and analysis to judge progress.

The DG CLIMA study highlighted that three broad insurance markets exist in Europe (voluntary, semi-voluntary and mandatory). Mandatory insurance markets result in a higher degree of public sector involvement or support. Each market depicts contrasting structural features due to the societal rationale towards the provision of extreme weather insurance. These features vary from the view of widespread coverage at a low premium to actors incentivised to manage their own risk. This variation of markets has resulted in contrasting penetration rates of the three broad insurance markets.

In addition, the DG CLIMA study noted that risk transfer should constitute an integral part of adaptation approaches. This could be achieved by utilising the insurance industry's risk pricing to allow efficient scoping in terms of where risk reduction is required to facilitate adaptation to climate change. Mainstreaming risk reduction into adaptation planning could be furthered by EU-level regulations encouraging insurance companies to invest in climate mitigation and adaptation. Indeed, the issue of providing information is delayed by the lack of guidelines of good practice, which could in turn encourage multi-faceted adaptation approaches. At the moment, most Member States apply contrasting systems of insurance, which further limits the possibility of a more unified risk transfer approach across Europe.

**Other financial products and services**

Financial services play a key role in Action 8 and the overall success of the Strategy, as they are the major source of investments made in new infrastructure, which should be climate resilient. For example, the insurance sector not only provides insurance to assist in recovery from damages, it also relies on investing the premiums it receives to generate

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[92] Tort law works in case some agent can be held accountable for the damage, and entitles individuals to receive a compensation from that specific agent; state/public aid involves a compensatory wealth transfer from the public sector splitting up losses among the entire society; finally, insurance involves a capitalization process that hedges individuals against residual risk.
*Source:* Insurance schemes in the agriculture sector to address climate change impacts. ICCG Reflection No. 46/March 2016

[93] http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52013DC0213

an income to cover future claims (risk transfer). As a result, the insurance sector is the largest institutional investor in infrastructure in Europe, with more than €10 trillion of assets under its management. Various actions have, therefore, been progressing to ensure regulation of and cooperation with the financial services sector, as it is crucial to improving the climate resilience of the EU's economy.

The Capital Markets Union (CMU)[94] seeks to create the enabling conditions for new forms of funding to be developed and strengthened for small firms, as well as for long-term and infrastructure investment. It aims to use financial innovations to bridge the information gap between investors and businesses. CMU also seeks to mobilise private capital to fund sustainable investment by identifying ways to create financial regulation that accelerates the shift of private capital toward environmentally and socially sustainable projects.

As part of the CMU efforts, the Commission also established and supported the work of a High-Level Expert Group on Sustainable Finance, which produced a final report in January 2018. The main findings of the Group were based around priority actions many of which were taken on board by the Commission, which in March 2018 announced that it is proposing an EU strategy on sustainable finance. The Group's report sets out a roadmap and action plan for further work and actions for all actors in the financial system. These include:

- Establishing a common language for sustainable finance, i.e. a unified EU classification system, or taxonomy
- Creating EU labels for green financial products to enable investors to identify investments easily that comply with green or low-carbon criteria
- Clarifying the duty of asset managers and institutional investors to take sustainability into account in the investment process and to enhance disclosure requirements
- Requiring insurance and investment firms to advise clients on the basis of their preferences on sustainability
- Incorporating sustainability in prudential requirements for banks and insurance companies, including looking at the feasibility of recalibrating capital requirements for banks (the so-called green supporting factor) for sustainable investments
- Enhancing transparency in corporate reporting; with a proposal to revise the guidelines on non-financial information to further align them with the recommendations of the Financial Stability Board's Task Force on Climate-related Financial Disclosures (TCFD)[95].

Regarding infrastructure investments, the Solvency II delegated act[96] was amended in September 2015. These amendments are aimed at making it cheaper for EU insurance companies to invest in qualifying infrastructure projects by establishing and calibrating investment risk categories for such projects. The Commission has also introduced measures to review risk calibrations for investment in infrastructure corporates[97]. In order to encourage private investment by banks in infrastructure, the November 2016 proposal to amend the Capital Requirements Regulation and Directive (CRR/CRD IV)[98] would create a more risk-sensitive regulatory environment to promote high-quality infrastructure projects and reduce risks for investors.

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[94] https://ec.europa.eu/info/business-economy-euro/growth-and-investment/capital-markets-union_en
[95] https://www.fsb-tcfd.org/
[96] The Solvency II Directive provides for coordination of prudential laws, regulations and markets for insurance and reinsurance across EU member states, with the purpose of reducing differences and supporting an internal EU market in these products. Prudential requirements primarily address the way financial institutions are governed and their liquidity and capital reserves.
[97] Infrastructure corporates are a new asset class created in EU rules which represent infrastructure businesses which are already operational (in contrast to infrastructure projects), for example airports, which may have additional investment requirements to expand or redevelop their infrastructure.
[98] These are the Capital Requirements Directive and Capital Requirements Regulation which set out regulations for the prudential requirements of the banking sector to ensure that it can better absorb economic shocks and continue to finance economic activity and growth. The rules were updated in 2013, the so called CRR/CRD IV package, with the amendments part of the response to the financial crisis.

Additionally, the reduction of policy risk has been identified as one of the major enablers to increase private climate finance. Since the Investment Plan for Europe (COM (2014) 903 final)[99] (also known as the Juncker Plan), and its corresponding European Fund for Strategic Investments[100], were launched in 2014, arguments for addressing policy risk have been on the EU's agenda. A previous study by Trinomics on 'Shifting private finance towards climate-friendly investments' (Triconomics, 2015) has analysed the option of such political risk guarantees in more detail and has also concluded that there is considerable potential for unlocking larger investments by institutional investors in mitigation and adaptation projects.

[99] http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52014DC0903&from=EN
[100] http://www.eib.org/efsi/

# 4 Method

## 4.1 Evaluation summary and questions

The evaluation was undertaken between December 2016 and March 2018. A set of evaluation questions were addressed under the five primary evaluation criteria. These are:

**Relevance**

1. To what extent do the objectives and actions of the Strategy (still) respond to needs within the EU and at international level?

2. How relevant is the Strategy for the different stakeholders (EU Member States, regional and local authorities and private sector and businesses) at local, regional, national and supra-national level?

**Effectiveness**

3. To what extent have the objectives been achieved during the period 2013-2016[101]?

4. To what extent has each of the eight actions of the Strategy contributed to these achievements? For each action explain the extent to which the effects achieved were expected or unexpected (i.e. not considered at the moment when the Strategy was adopted).

5. What drivers and barriers (expected or unexpected) contributed to or stood in the way of implementation of the EU Adaptation Strategy and how did they affect it?

6. What effects has the Strategy produced so far for different stakeholders, e.g. according to socio-economic background and vulnerability?

**Efficiency**

7. How adequate were the resources for the overall implementation of the EU Adaptation Strategy and how proportionate were those resources across its eight actions?

8. How do the different stakeholders view the monitoring of the implementation of the EU Adaptation Strategy? Which aspects are perceived as an unnecessary burden, if any, and to what extent?

**Coherence**

9. How well does the Adaptation Strategy fit together with other relevant EU legislation and policies, or similar initiatives at international, national or regional level? Are there any gaps or inconsistencies between policies? Are there components to be further developed or added to increase coherence of actions?

**EU Added Value**

10. What is the added value of addressing climate adaptation at EU level, in addition to the vertical and horizontal cooperation at national level?

These evaluation questions were broken into sub-questions and developed as operational questions appropriate for stakeholder responses. The questions of the targeted stakeholder survey were tailored for each of the action areas of the Strategy. The full evaluation matrix is in Appendix 4.

## 4.2 Evaluation method

The Impact Assessment for the Strategy (European Commission, 2013b) identifies a baseline position in 2013 before the Strategy was launched, as well as the expected future

[101] This is the wording in the terms of reference for this study. In practice the study has also considered evidence that became available until March 2018.

situation in the absence of the Strategy (Section 2.3). It also identifies planned inputs, outputs and activities of the Strategy (Section 2.2.3), expected impacts (Section 2.2.4) and operational objectives for the Strategy (Section 2.2.2).

The impacts of the Strategy are expected to arise as a result of voluntary actions being taken by multiple different actors. The influence of the Strategy is, therefore, more limited than, for example, a regulatory measure. Moreover, the Strategy does not operate in isolation, and other external factors (Section 2.2.5) were expected to also influence the actions taken. In combination, these circumstances make it difficult to evaluate to what extent the actual observed impacts can be attributed to the Strategy, and to what extent these impacts can be explained by other factors.

Faced with this complexity, in order to address the evaluation questions, it has been necessarily to take a theory-based approach. This has explored, for each of the objectives and associated actions, the theory of change described in the intervention logic. This includes a comparison of the current state of play (Section 3) with points of comparison given by the expected impacts and operational objectives from the Impact Assessment (Section 2.2.2). Where relevant, and when data was available, impacts are presented in quantitative terms. However, in all other cases a qualitative assessment was made. In drawing conclusions, data from multiple sources has been triangulated, and any inconsistencies identified and explained.

## 4.3 Methods for gathering evidence

Evidence for this report was gathered through:

- Literature review (see Appendix 7), complemented by reviews of
  - Adaptation scoreboards for EU Member States[102]
  - Review of Nationally Determined Contributions (NDCs) relating to adaptation for states that are not members of the EU (see Appendix 6)
  - A list of EU legislation and guidance documents and guidelines where climate adaptation is currently mainstreamed, or has potential to be mainstreamed (see Appendix 5)
- Targeted stakeholder survey (see Appendix 2B)
- Stakeholder interviews (see Appendix 2C)
- Stakeholder workshops and an exercise with members of the Climate Change Committee's Working Group 6 through which interaction on adaptation takes place between the European Commission and Member States (see Appendix 2D)
- Open public consultation, which was available on the DG CLIMA website from 7 December 2017 to 1 March 2018 (see Appendix 2E), and
- Case studies (see Appendix 8).

A summary of methods used for gathering evidence is provided in Appendix 3 and a synopsis of the consultation activities can be found in Appendix 2A. Consultation activities were undertaken in accordance with the original plans described in the stakeholder consultation strategy[103].

## 4.4 Summary of evidence

A qualitative summary of evidence available for assessment of each evaluation question is given in Table 4-1 below. Notes below the table explain the basis for the description of

[102] These were published along with the open public consultation on the evaluation of the EU's Strategy on Adaptation to Climate Change. See: https://ec.europa.eu/clima/consultations/evaluation-eus-strategy-adaptation-climate-change_en

[103] https://ec.europa.eu/clima/sites/clima/files/policies/adaptation/what/consultation_strategy-evaluation_adaptation_strategy_en.pdf

the extent of evidence as high, medium or low for each type of evidence. The extent seeks to summarise both the coverage of the evidence and its depth.

**Table 4-1 Extent of each type of evidence for assessment of each evaluation question, in approximate order of data gathering**

| | EQ1 | EQ2[i] | EQ3[j] | EQ4 | EQ5 | EQ6[k] | EQ7 | EQ8 | EQ9 | EQ10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Literature review[a] | H | L | H | H | L | L | M | L | H | M |
| First stakeholder workshop[b] | L | | M | M | L | | | L | | L |
| Targeted stakeholder survey[c] | M | L | H | H | L | L | 0 | 0 | M | L |
| Stakeholder interviews[d] | H | L | H | H | M | L | H | M | H | M |
| Second stakeholder workshop[e] | L | | H | H | H | H | | | M | L |
| Interactive exercise with Working Group 6[f] | | | | L | L | | | | | L |
| Case studies[g] | | | | H | H | | | | H | |
| Open public consultation[h] | H | H | M | M | L | H | H | 0 | H | H |

*Notes:*

a. *H, Coverage of 7 or more actions; M, coverage of 6 or more actions but limited information in literature examined; L, coverage of fewer than 6 actions*
b. *H, 20 or more questions; M, 10-20 questions; L, fewer than 10 questions; 0, no questions*
c. *Key: H, 20 or more questions; M, 10-20 questions; L, fewer than 10 questions*
d. *Key: M, addressed 2-4 actions; L, addressed 1 action.*
e. *A major focus of the second stakeholder workshop was on draft recommendations from the evaluation and a high level of evidence was collected on these. Key for evidence related to evaluation questions: H, over 10 inputs; M, 5-9 inputs; L, 1-4 inputs.*
f. *Key; This brief exercise had some implications for EQ 4, 5 and 10*
g. *Case studies relate to EQ4, EQ5 and EQ9*
h. *Key: H, 3 or more questions relate to the EQ; M, 2 questions; L, 1 question relates to EQ*
i. *Assessment of EQ2 was informed by the same inputs as EQ1.*
j. *Assessment of EQ3 is informed by the inputs to EQ4*
k. *The number of responses to the targeted stakeholder survey and nature of responses to the public consultation survey did not enable a response to be made to EQ6*

### 4.4.1 Methodological challenges

One of the greatest challenges for the evaluation was the determination of a counter-factual scenario, i.e. what would have happened in the absence of the Strategy. In particular, the Strategy is one of several drivers for EU actors to take adaptation actions, and it is very difficult to determine what actions were taken solely in response to the

Strategy. As described in Section 2.3, the Impact Assessment included an analysis of the expected future situation if the Strategy had not been adopted.

### 4.4.2 Limitations of the analysis

Evidence gathering started with the literature survey and this provided limited evidence for assessment of Evaluation Questions 2, 5, 6 and 8.

The first stakeholder workshop provided valuable evidence in relation to the topics covered. However, it generally covered one action for the evaluation questions considered, so the extent of evidence was generally low.

The targeted stakeholder survey provided a moderate or high extent of evidence for Evaluation Questions 1, 3, 4 and 9. No questions were included on efficiency, and there was limited evidence for Evaluation Questions 2, 5, 6 and 10.

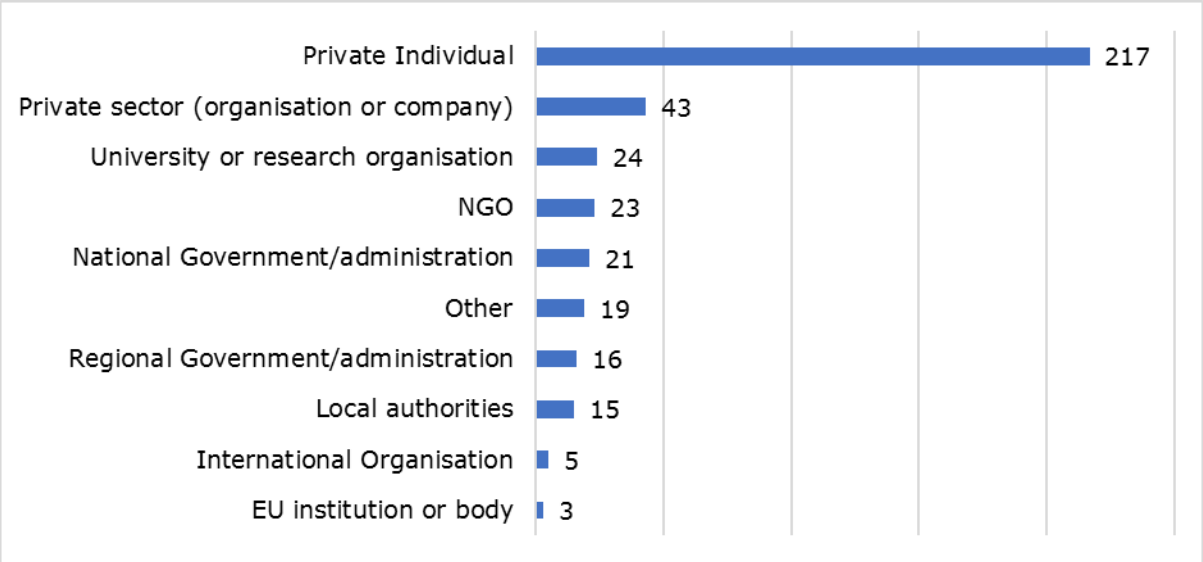
The stakeholder interviews were a substantial source of evidence, except for Evaluation Questions 2 and 6.

The second stakeholder workshop considered draft recommendations in detail. Contributions from the stakeholder panel and from the floor, provided additional evidence on Evaluation Questions 1, 9, 10 and particularly 4 and 5. A brief interactive exercise with members of Working Group 6 provided some limited evidence on Evaluation Question 4, 5 and 10.

Case studies were chosen to illustrate key points arising from the evaluation questions and to provide additional support for some of the report's key conclusions and recommendations.

The open public consultation had 386 respondents, of which 217 were private individuals and 169 other stakeholders (Figure 4-1). One section of the consultation addressed general conclusions related to draft recommendations. In a section on specific and technical conclusions, there were three or more questions relating to each of Evaluation Questions 1, 7, 9 and 10. In particular, there were sufficient stakeholder responses to consider responses by stakeholder type, where appropriate, providing evidence for Evaluation Questions 2 and 6.

**Figure 4-1 Type of respondents to the public consultation**




The greatest data limitation was associated with the targeted stakeholder survey. Although the combined response from 60 participants allows consideration of most of the evaluation questions in detail, it does not permit partitioning of responses by stakeholder groups, as required for Evaluation Questions 2 and 6. There were 34 interviews in total, which were

not intended to permit detailed assessment of evaluation questions by stakeholder type. Responses to the open public consultation have addressed this limitation in relation to EQ2 but the nature of responses does not enable provision of a response to EQ6. Notably, EQ6 is beyond the normal scope of the evaluation, as the Strategy's objectives and actions are directly targeted at public, private and third sector decision makers and the Impact Assessment's operational objectives and performance measures do not aim to measure the Strategy's societal impacts.

# 5 Analysis and answers to the evaluation questions

## 5.1 Relevance

### 5.1.1 To what extent do the objectives and actions of the Strategy (still) respond to needs within the EU and at international level?

Summary

1. There is a continuing need for adaptation action to be taken at all levels, because there is good evidence that large economic costs can be associated with inaction in a context of increasing climate change impacts.
2. There continues to be a need for more consistent and comprehensive climate-proofing of EU policies, investments in infrastructure in the EU, insurance and other financial products.
3. There are several key vulnerable sectors where greater focus on adaptation effort is required at EU level including: water and drought; local and urban adaptation; agriculture policy; and climate finance, insurance and business.
4. There continues to be a need to bridge the previously identified knowledge gaps. In addition, new knowledge gaps have emerged since the Strategy was launched.
5. New issues and knowledge gaps, not addressed in the present strategy, are relations between adaptation in Europe and adaptation in the rest of the world, as well as the need to align with the Paris Agreement; the impact of high-end climate change and tipping points; and strategies for implementation of adaptation measures and technologies in practice (e.g. climate services).
6. There continues to be a need to share knowledge across Europe, to assist the uptake of this information and to support cooperation, for example, through a platform like Climate-ADAPT.
7. Supporting the integration of adaptation in infrastructural sectors, such as energy, transport, water, waste and information and communication technologies (ICT), remains important. Significant benefits are possible with relatively low investments, when measures are taken in the construction phase.
8. Insurance and financial products remain relevant to involve the private sector in adaptation and to reduce disaster risk in business decisions.
9. Recent studies confirm that the frequency and economic costs of extreme events are continuing to rise. Hence, not only does the Strategy remain relevant but it may be necessary for its level of ambition to be revisited.

Since the Strategy was developed, estimates of the projected economic impacts of climate change in Europe have continued to emerge[104] (European Environment Agency, 2017). These estimates still only provide partial coverage and remain very uncertain. Recent studies indicate that the economic costs of climate change may be high, even with modest climate change. The costs may rise significantly with greater warming. The total reported economic losses caused by weather and climate-related extremes in EU Member States over the period 1980-2016 was approximately EUR 411 billion (in 2016 Euro values) (European Environment Agency, 2018b). This study showed that economic losses vary a lot per year and can suddenly peak because of just one event. The EEA study states that it is difficult to estimate the contribution of climate change to disaster losses in Europe, because rising costs are driven by a growing population, economic wealth and urbanisation. At a sub-regional level, the CIRCE[105] project estimated that Mediterranean countries could lose, on average, 1.2% of GDP by 2050. In relation to specific economic

[104] ECONADAPT: 'The Economics of Climate Change Adaptation'; CIRCLE 2 http://econadapt.eu/
[105] See page 283 of (European Environment Agency, 2017)

impacts, a recent modelling study showed that approximately 410,000 jobs would be lost by 2050 due to climate change if no further adaptation takes place (Triple E (Trinomics), TNO and Ricardo-AEA, 2014). Recent studies, e.g. (European Academies Science Advisory Council, 2018), confirm that the frequency and economic costs of extreme events are continuing to rise. Hence, not only does the Strategy remain relevant but it may be necessary for its level of ambition to be revisited.

EEA has highlighted that climate change is already having wide ranging impacts on ecosystems, economic sectors and human health and well-being (European Environment Agency, 2017). Most impacts have been adverse though some have been beneficial. Climate change will continue and have impacts on ecosystems and society for many decades. Hence, the Strategy's broad objective "to contribute to a more climate resilient Europe" remains very relevant.

The relevance of the Strategy has been further increased as result of new international policy developments since 2013, e.g. the Paris Agreement, the Sendai Framework for Disaster Risk Reduction and the Sustainable Development Goals (see Section 5.4.1 for further details). These international frameworks all stress the importance of addressing climate change, including adaptation.

The Paris Agreement (Article 7.1) has led to parity of international commitments to mitigation and adaptation with the establishment of a global goal to enhance adaptive capacity, strengthen resilience, and reduce vulnerability to climate change. There was a mixed response in the public consultation to the statement that "EU adaptation action is not aligned with international obligations and expectations under the Paris Agreement"; only 18% agreed and 27% disagreed. Notably, while more than 50% of NGO stakeholders agreed, only 11% of national government stakeholders did so.

The CBD's revised and updated Strategic Plan for Biodiversity, including the Aichi Biodiversity Targets, for the 2011-2020 period was adopted in October 2010. Aichi Target 10[106] states that "By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning." Aichi Target 15 adds: "By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks have been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification". The Strategy is, therefore, relevant to support fulfilment of these targets by the EU and Member States.

The Strategy focuses on climate change impacts within the EU and associated domestic action; see Section 3.3 and the Impact Assessment (European Commission, 2013b). Some respondents to the targeted stakeholder survey and some interviewees expressed concern that the Strategy does not meet the EU's needs with regard to climate change impacts beyond its borders. Climate change worldwide may have consequences for trade, food security, immigration, and biodiversity. A case study developed for this evaluation study on "Spill-over effects from climate change impacts occurring outside the EU" (Box 1, Section 5.2.3.4 and Annex 8) concludes that there appears to be a need for further research in order to identify Europe's vulnerabilities to climate change impacts elsewhere, particularly in neighbouring countries. This would then enable the EU to consider commensurate actions required within and beyond Europe to increase the EU's resilience to climate change. The EU Global Strategy on Foreign and Security Policy (European Union, 2016) mentions climate change explicitly as a threat e.g. "Climate change and environmental degradation exacerbate potential conflict, in light of their impact on desertification, land degradation, and water and food scarcity." For this reason, the EU

[106] https://www.cbd.int/sp/targets/

intends to enhance the energy transition within Europe and assist foreign countries with their adaptation and mitigation efforts. Water stress is one of the indicators included in the Global Conflict Risk Index (2015), which is used by EU services to assess conflict risk in countries beyond the EU[107]. The indicators have been selected according to their strong correlation with violent conflict and focus on risk for the third country rather than the EU.

#### 5.1.1.1 Objective 1 Promoting action by Member States

Objective 1 and its associated actions, respond to the need for adaptation action to be taken at all levels by promoting action by Member States.

Action 1 focuses on adaptation action at national level by encouraging all Member States to adopt comprehensive strategies. Interviewees suggest that there is still a need for such encouragement. For example, one stakeholder, from a national government body cited the Strategy's importance in keeping adaptation high on the political agenda at national level. Another stakeholder from a national government body suggested that even those Member States that already have national adaptation strategies need a continuing stimulus to maintain and translate them into action. A further benefit of the Strategy cited by another stakeholder is that the development of national adaptation strategies across all Member States enables an important overview of adaptation actions across Europe.

Action 2 aims to address the need for adaptation action to be taken at all levels by providing LIFE funding for capacity-building projects that promote resilient communities, as well as for projects that strengthen existing networks and collaboration between Member States. The LIFE Mid-Term Evaluation (MTE) is a key source of evidence on the need for financial support for adaptation projects. In the public consultation that supported the MTE, 96% of respondents active in the field of climate action agreed that there is a need for a specific European programme for the environment and climate action financed at EU level (Ecorys, 2017). In its response to the MTE, the European Committee of the Regions (Committee of the Regions, 2017a) recommended maintaining and strengthening LIFE's sub-programme on climate action in the 2nd LIFE Multiannual Work Programme (MAWP) and post-2020. Hence, the need to provide LIFE funding to support capacity building and step up adaptation action in Europe remains relevant.

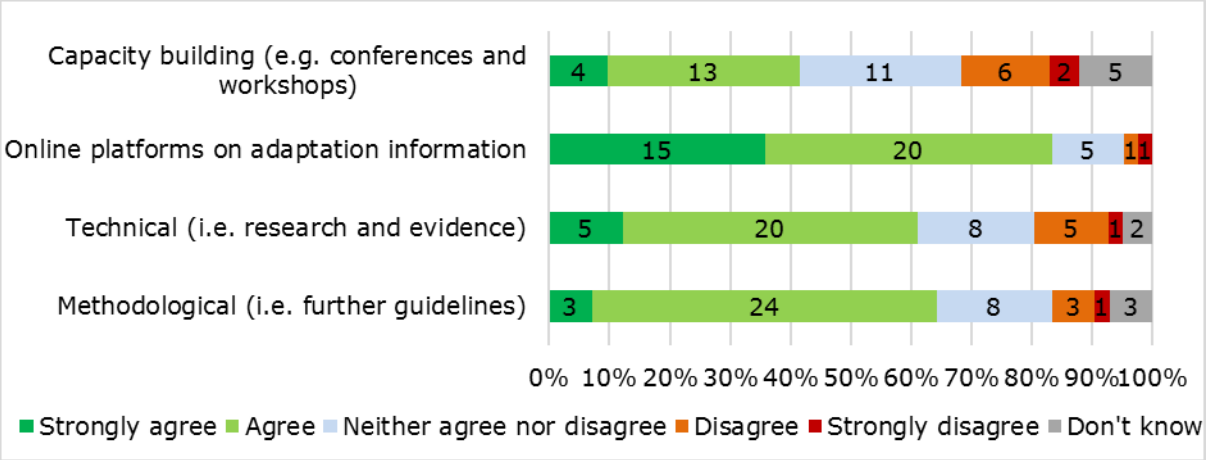
Action 3 aims to address the need for adaptation action to be taken at sub-national and local level through supporting the Covenant of Mayors framework. The literature review, stakeholder survey and interviews all provided evidence on the continuing need for adaptation action to be taken at sub-national and local level. Recent studies (Lukat, et al., 2016) highlight how impacts of climate change are already being felt across cities and urban areas in Europe. These impacts can be associated with significant economic costs. For example, flooding caused damage to buildings in Genoa in 2014 amounting to €100 million (European Environment Agency, 2017). Unless action is taken now, economic costs for EU cities associated with extreme weather events could reach over €190 billion annually by 2070 (Mabey, 2014). The stakeholder survey and interviews identified a continuing need for support for knowledge sharing and capacity building (e.g. conferences and workshops, online platforms, guidelines), as well as financial support for adaptation actions. Figure 5-1 shows that less respondents from the targeted survey agree that capacity building was provided to Member States compared to other forms of support. A majority of respondents (N = 28) also considered that these types of support had been provided at sub-national and local level, particularly via online platforms. Four respondents provided suggestions for other forms of support, such as:

- Information on and assessment of impacts and vulnerability (response by EU institution and national government body).
- LIFE Integrated Projects that will help to deliver tools (response by a sub-national government).

[107]Cover Note - Joint Staff Working Document: EU Conflict Early Warning System: Objectives, Process and Guidance for Implementation. http://data.consilium.europa.eu/doc/document/ST-5601-2016-INIT/en/pdf

- Establishment of long-term communities of practice (response by an international organisation).

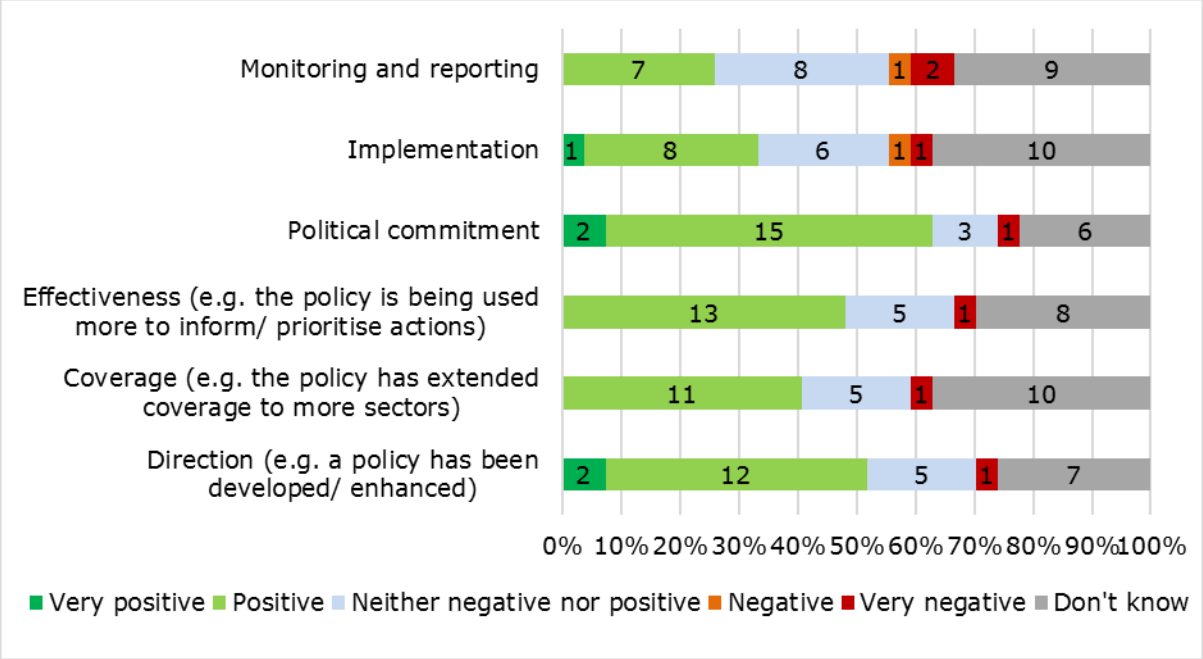
**Figure 5-1 Responses to the statement "The European Commission has provided the following types of support to Member States to help them adopt comprehensive adaptation strategies**




*Source: Results from the targeted stakeholder survey. 40-42 respondents*[108].

The targeted stakeholder survey (see Figure 5-2 below) confirmed that the Covenant of Mayors has had a range of positive influences on cities' adaptation strategies.

**Figure 5-2 Responses to the statement "The Covenant of Mayors has had the following influence on cities' adaptation strategies in relation to:"**




*Source: Results from the targeted stakeholder survey. 40-42 respondents*

#### 5.1.1.2 Objective 2 Promoting better informed decision-making

Objective 2, and its associated actions, respond to the need for adaptation action to be taken at all levels by enabling better informed decision making.

[108] The number of respondents for questions in the stakeholder survey is given below each relevant figure. Where there are several bars, the number of respondents can vary and the range is given.

Action 4 aims to enable better informed decision making by addressing key knowledge gaps in adaptation-related information. The literature review provides evidence on the continuing need in this regard. As described in Section 3.2.1, much progress has been made in addressing the knowledge gaps identified in the Strategy but some key gaps remain. Regarding the knowledge gap on costs and benefits, 14 studies and project were identified but knowledge on cost-effective measures is still needed (European Environment Agency, 2017). Local and regional risk and vulnerability assessments are widely available at EU, national, regional and local levels; with 52 studies and projects this is the knowledge gap where most effort has been made. However, vulnerable European regions and systems need enhanced approaches, including topics such as mountains, and the Mediterranean region, the European Union Outermost Regions and Overseas Countries and Territories (European Environment Agency, 2017b). Fundamental gaps also persist in the identification of expected sectoral impacts and vulnerabilities. A total of 39 studies and projects have addressed the knowledge gap on frameworks, models and tools to support decision-making, and many of their outputs are available on the Climate-ADAPT website[109]. Less work has been done to close knowledge gaps associated with monitoring of adaptation. Only eight studies have been identified and monitoring of adaptation still seems to be in its infancy.

The stakeholder interviews, specifically interviewees from the Ministère de la Transition écologique et solidaire (France), from DG RTD, a Representative of Commission Services dealing with research, and from Environmental Research Institute, University of College Cork, highlighted that there will be forever a need to close new knowledge gaps. Examples of such gaps highlighted by stakeholders include the implications of climate change impacts for: health, mountainous areas, countries beyond the EU and resultant spill-over effects for the EU, long-term lack of water resources, coastal issues, biodiversity, and high-end climate change. One interviewee from DG RTD noted that for the Strategy and adaptation-related information to be fit for purpose, it is important that the serious possibility of high-end climate change is considered. This was reflected by very strong support from respondents to the public consultation (90% agreed or strongly agreed; N=158) that there is a need to address the impact of high-end climate change (i.e. "global warming exceeding 2°C relative to pre-industrial", as defined by three ongoing Commission-funded projects: HELIX, IMPRESSIONS and RISES_AM[110]). An interviewee from Commission Services indicated that research on how to overcome barriers to implementation is also needed, for example, on whether it would be helpful to switch the framing of climate change adaptation from a focus on costs (negative) to (co-)benefits (positive). An interviewee from an Irish university suggested needs include behavioural and decision-making science; provision of climate services; and information on how to engage stakeholders and the broader public. At the second stakeholder workshop, it was noted that international guidance on ecosystem-based adaptation and associated actions, which have resulted from a stream of ongoing research, are very promising. It was also suggested that Eurobarometer data on attitudes to climate change are an important source of knowledge that can be used to support further development of the EU Adaptation Strategy.

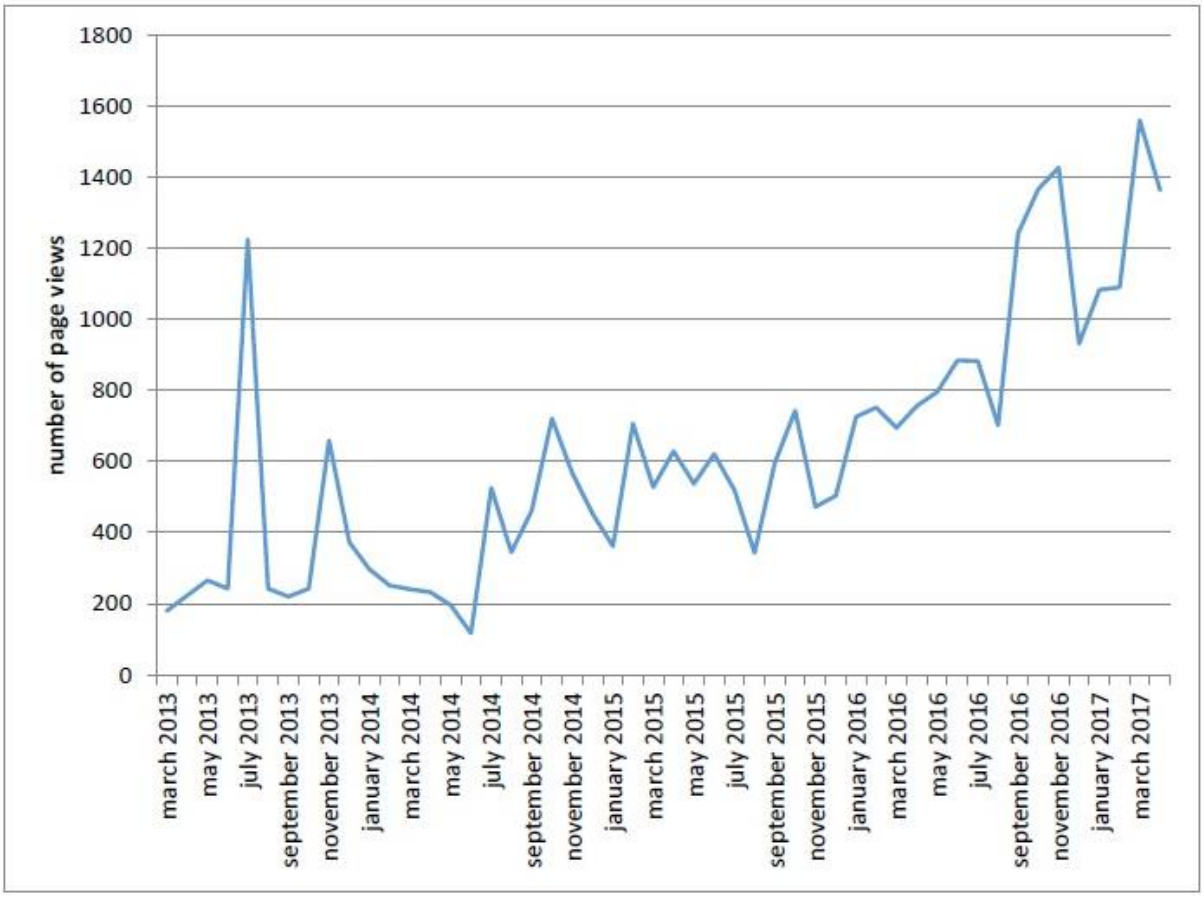
A summary overview of remaining research needs associated with the four main knowledge gaps identified in the Strategy is provided in Table 3-4, which is based on the EEA's report (European Environment Agency, 2017c).

Action 5 aimed to develop Climate-ADAPT as a one-stop shop for adaptation information in Europe. Web statistics identify that the number of users of Climate-ADAPT have increased ever since the start of monitoring in March 2013. At that time, 2,870 users accessed the Climate-ADAPT website and by April 2017 there were more than 11,000 users (see Figure 5-3 below). This suggests that the platform is even more relevant now

[109] http://climate-adapt.eea.europa.eu/knowledge/tools/adaptation-support-tool
[110] HELIX – High-End Impacts and Extreme; IMPRESSIONS – Impacts and Responses from High-End Scenarios: Strategies for Innovative Solutions; RISES-AM – Responses to Coastal Climate Change: Innovative Strategies for High-End Scenarios – Adaptation and Mitigation; http://highendclimateresearch.eu/

than when the Strategy was first launched. In relation to the specific areas of the website that might be most relevant, the user statistics indicate that Climate-ADAPT's most popular pages are: the homepage, EU policy pages, database search page, knowledge-adaptation information-case studies and adaptation options pages and country pages (European Environment Agency, 2018)). The EEA concluded these five areas are the 'core content' of Climate-ADAPT, which should be maintained and enhanced in future (European Environment Agency, forthcoming).

**Figure 5-3 Change in the monthly page views on the "database search page" of Climate-ADAPT in the period from 1 March 2013 to 30 April 2017**




*Source:* (European Environment Agency, 2018, forthcoming)

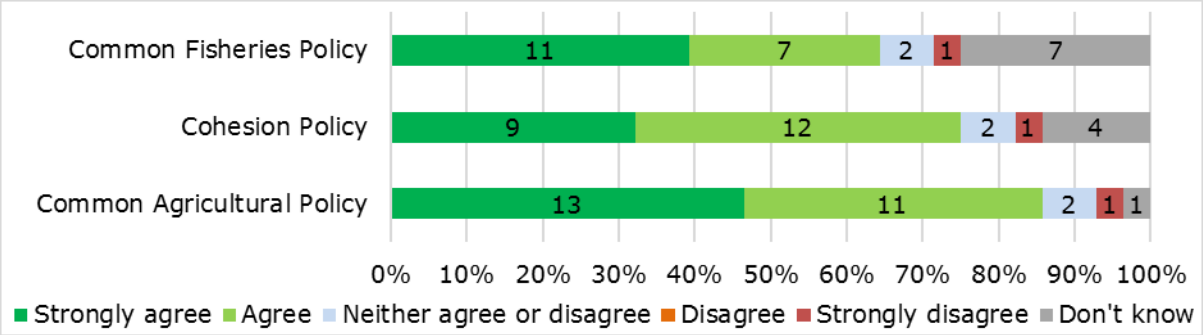
The evidence from our stakeholder interviews (specifically with interviewees from EEA, the Federal Public Health Service in Belgium, and a national research institute in Greece) supports the view that there is a continued need for a knowledge platform like Climate-Adapt. Although several other platforms now exist, the interviewees considered Climate-ADAPT to be the place where people start looking for information. However, they noted that people then continue to other information sources (e.g. national websites and research project websites) for more detailed information, rather than using Climate-ADAPT as a one-stop shop. The Climate-ADAPT draft evaluation report (European Environment Agency, 2018, Forthcoming)) identifies that the website succeeds in collecting and sharing relevant information in Europe by involving a wide range of information providers. This is exemplified by a range of case studies of how organisations at different governance levels across Europe have used Climate-ADAPT for various purposes, mainly related to the development of adaptation strategies and actions. Interviewees for our study noted that Climate-ADAPT is distinguished from other such platforms by providing a broad overview of the state of play in a comparative and structured way, which is of use for all Member States.

#### 5.1.1.3 Objective 3 Promoting adaptation in key vulnerable sectors

Objective 3, and its associated actions, respond to the need for adaptation action to be taken at all levels by promoting adaptation in key vulnerable sectors.

Action 6, aims to promote adaptation action in key vulnerable sectors by facilitating climate-proofing of EU actions[111]. There is a strong consensus from the targeted stakeholder survey (see Figure 5-4, based on 28 responses) and stakeholder interviews (from a Portuguese governmental organisation and from Commission Services) that there continues to be the need to climate-proof EU actions.

**Figure 5-4 There is a need to better integrate climate change considerations into EU programmes**



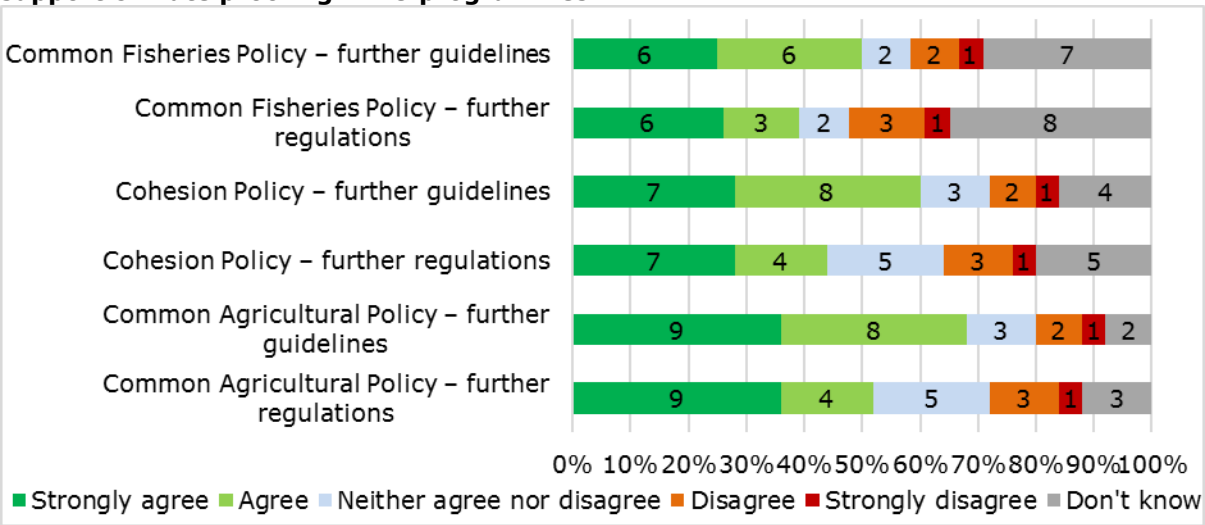

*Source: Results from the targeted stakeholder survey. 28 respondents[112].*

Other areas identified by targeted survey respondents as still needing better integration of climate change considerations include: the Water Framework Directive, the Floods Directive, the Habitats Directive, the ERDF, research and innovation, education, and the EU budget as a whole. Key vulnerable sectors identified by survey respondents were: coastal protection, energy infrastructure, forestry, green infrastructure, spatial planning, transport and communication, urban development, and water supply.

Evidence from the literature on the relevance of Action 6 includes a report from COWI on mainstreaming adaptation into the ESIF (COWI, 2017). The report recommended that the Commission further facilitates and supports implementation processes in Member States, for example, by establishing strong platforms for sharing best adaptation practices in implementing the programmes and in catalysing climate change adaptation actions. This is consistent with responses to the targeted stakeholder survey (Figure 5-5), which indicate agreement on the need for the EU to develop further regulations and guidelines to support climate proofing of EU programmes, in relation to the CFP, the CAP and Cohesion Policy. One respondent who disagreed explained that the Strategy should allow Member States flexibility as to how they adapt to climate change.

[111] By EU Actions in this case we mean those that relate to Common Agricultural Policy (CAP), Cohesion Policy, and the Common Fisheries (CFP).
[112] The number of respondents for questions in the stakeholder survey (N) is given below each relevant figure. Where there are several bars, the number of respondents can vary and the range is given.

**Figure 5-5 There is a need for the EU to develop further regulations and guidelines to support climate proofing in EU programmes**




*Source: Results from the targeted stakeholder survey. 23-25 respondents.*

Areas identified most frequently by targeted stakeholder survey respondents where further regulations or guidelines are required were health, spatial planning, transport, energy, disaster risk reduction and insurance.

Five targeted stakeholder survey respondents identified the following elements as missing from the Strategy. They perceive these elements are needed to promote complementarity between, on the one hand, climate proofing of the CAP, Cohesion Policy, CFP and policies in other key vulnerable sectors, and, on the other hand, further relevant policies and initiatives:

- CAP: a need to ensure climate proofing and relevant support for integrating adaptation at all levels; a more robust methodology and mechanisms to monitor the extent to which the CAP and its funding is meeting climate action objectives; incentives for a transition to sustainable farming; and minimizing the impact of agriculture on flooding and droughts
- Cohesion Policy: minimizing negative impacts of infrastructural projects on rivers, streams and coastal areas, by prohibiting reduction of storage capacity of flood plains and/or no new risks of causalities and damage in case of flooding; and better subsidising complex renovation of homes
- CFP: strengthening of measures against overfishing; more focus on the effects of the CFP on waters outside Europe; and ensuring that the CFP is itself adaptable
- Policies in other key vulnerable sectors: further development of flood risk protection towards integrated water resources management in which water surpluses, water shortages and water quality are all addressed, for example, through water retention to assist with future drought.

Interviewees, including an official working at a Ministry of the Environment, and two interviewees from EU institutions or bodies (DG REGIO, DG ENV), indicated that climate-proofing of EU policies is still very relevant but is difficult in practice. They perceived that little progress has been made with fisheries. Only 24% of respondents to the public consultation survey were aware that the Strategy also addresses the CFP. This may be reflective of the assessment by the European Court of Auditors (European Court of Auditors, 2016) that the current legal framework shows that "direct and clear references to climate change objectives, both mitigation and adaptation, are still rare and, as a result, the fisheries fund had not widened the scope of its contribution to climate action" (European Court of Auditors, 2016). No common guidance on adaptation or criteria have been developed so far for agriculture, forestry, rural development, flood risk management and infrastructure. One interviewee from DG AGRI stated that providing guidance will remain difficult as adaptation is a moving target, requiring a regular adjustment of

strategies. The technical guidance on integrating adaptation into Cohesion Policy is a positive example.

Action 7 aims to promote adaptation action in key vulnerable sectors by ensuring more resilient infrastructure. There is consensus from both the literature review and the interviews that climate-proofing vulnerable investments is essential. Interviewees (several from Commission Services and individuals from a Portuguese governmental organisation, a Belgian NGO, a Dutch private company, and an international organisation in Germany) suggested that supporting the integration of adaptation in infrastructure sectors is still very important. The process of engaging these sectors is only just starting and it is clear that huge benefits are possible with relatively low investments, when appropriate adaptation measures are taken during the construction phase. Some sectors are well engaged, such as the water sector and the transport sector. Others, such as the waste sector or broadband sector, have been a bit slower to embrace the need for adaptation. Translation of adaptation expertise into local languages is needed for stakeholders in the private sector.

A 2015 study by the JRC assessed the risks to critical infrastructure[113] in the EU (as well as Switzerland, Norway and Iceland) associated with seven climate hazards: heat and cold waves, wildfires, droughts, river and coastal floods, and windstorms (Joint Research Centre, 2015). The study showed that Europe will face a significant increase in multi-hazard, multi-sector damages in the next decades. Current damages of €3.4 billion per year are projected to triple by the 2020s, multiply six-fold by mid-century, and rise to €38 billion per year by the 2080s (undiscounted and with no socio-economic changes assumed). These numbers reflect only the damage from the seven climate hazards to the sectors considered: industry, energy, transport, social, environment, tourism, and ICT infrastructure. Total damages to society could rise from €12 billion per year currently to nearly €80 billion per year by the end of this century. The greatest increase is projected for the energy and transport sectors. The share of GDP at risk within the study area as a whole rises progressively from 0.03% now to 0.28% by the end of century. Southern and south-eastern European countries will suffer the greatest impact. The study shows that the benefits (or avoided damage) of climate-proofing critical infrastructure outweigh the costs.

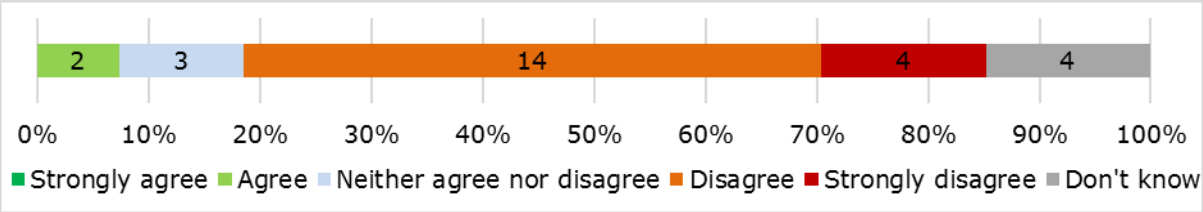
Similarly, the EEA's latest assessment of climate change impacts and vulnerability in Europe (European Environment Agency, 2017) highlights the vulnerability of construction and buildings, as well as energy and transport infrastructure to extreme events. Risks to energy transmission and distribution infrastructure include decreased capacity of the electrical network, EU-wide, due to extreme high temperatures and damage to infrastructure in mountainous regions caused by geological instability due to increased precipitation. Coastal energy infrastructure in Europe (oil, gas or liquefied natural gas tanker terminals and nuclear power stations) are vulnerable to sea-level rise. Impacts on transport will vary by mode and region. Transport systems in mountainous regions, coastal areas and regions prone to more intense rain and snow will be most vulnerable. Rail transport will face particularly high risks from extreme weather events: floods, storms and high temperatures. Climate change is also expected to affect air transport. For example, sea-level rise and flooding could affect airports located in coastal areas, while increased wind and storms could reduce capacity and increase delays (European Environment Agency, 2017a; European Environment Agency, 2017)). Water-borne transport in inland waterways or in coastal areas is not expected to be significantly affected by future climate change (European Environment Agency, 2017a).

The intent of Action 8 is to promote insurance and other financial products for resilient investments and decisions. There is evidence from the survey and stakeholder interviews that there is still a need to promote insurance and other financial products. Most survey

[113] JRC, 2015. Risk assessment methodologies for critical infrastructure protection. Part II: A new approach. Report EUR 27332 EN Defined as assets and systems that are essential for the maintenance of vital societal functions, health, safety, security, economic or social well-being of people, and the disruption or destruction of which would have a significant impact as a result of the failure to maintain those functions.

respondents disagreed with the statement that there is a well-developed market for insurance and other financial products for resilient investments (Figure 5-6). Interviewees indicate that the field of insurance and financial products is closely related to disaster risk reduction. The approach to disaster insurance is very different in each EU country, in some it is compulsory while in others it is seldom used. One interviewee from DG ECHO indicated that insurance and financial products are a good way to involve the private sector in adaptation.

**Figure 5-6 There is a well-developed market for insurance and other financial products for resilient investments**




*Source: Results from targeted stakeholder survey. 27 respondents.*

Insurance in general helps increase resilience to natural disasters, as compensation for damages will lead to a speedier recovery. However, insurers will have to adapt their insurance policies, as climate change is leading to increasingly frequent extreme events. Insurance risk models are challenged by a lack of data about increases in damage. To date, insurance companies have been reluctant to share information and could benefit from a third party playing an enabling role. In this regard, there seems to be a continued need for the Commission to remain involved in the topic.

### 5.1.2 How relevant is the Strategy for the different stakeholders at local, regional, national and supra-national level?

Summary

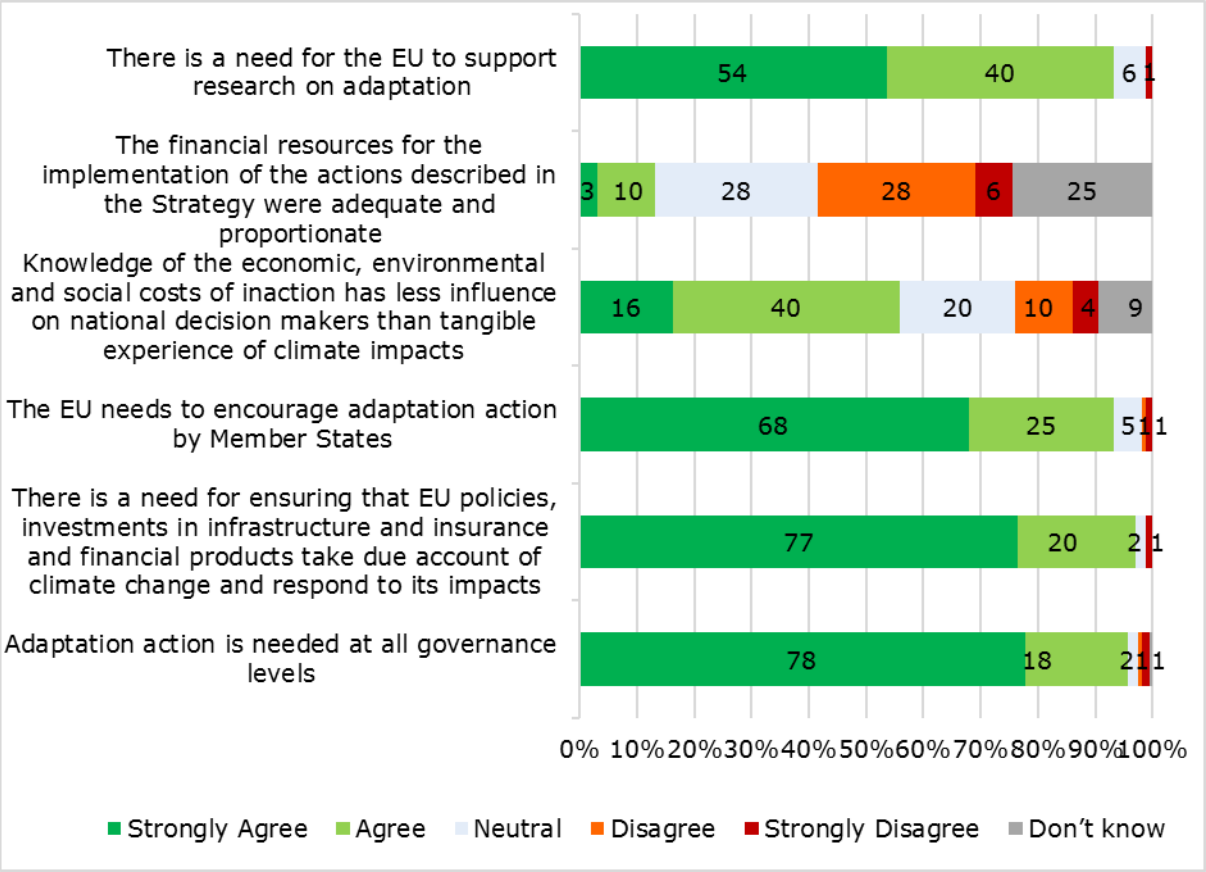
1. Evidence from the targeted stakeholder survey and interviews shows that the objective of promoting adaptation action by Member States remains relevant. Respondents have found information and explicit support from the EU helpful for developing and implementing adaptation actions.
2. The public consultation, and all other evidence, shows that if stakeholders want the EU to do anything then it is to create more knowledge on adaptation.
3. There are examples of the use of Climate-ADAPT to support decision making on adaptation at all governance levels and at all steps of the adaptation policy cycle across Europe. The platform is used as a starting point by stakeholders to extend searches, so it is a "first-stop shop" rather than a "one-stop shop" for adaptation information in Europe.
4. The local level and the private sector are crucial for climate-proofing of new infrastructure, but there remains a lack of capacity to undertake adaptation measures among these stakeholders.

The targeted stakeholder survey elicited too low a response rate to inform any meaningful differentiation of the Strategy's relevance to different stakeholders.

The Strategy is relevant for Member States, as it has helped to stimulate Member States to develop national adaptation strategies and to keep adaptation high on the political agenda (Action 1). The results from the open public consultation (Figure 5-7) show that encouraging Member States to take action is one of the statements for which the strongest support exists among the respondents. Such action is relevant to capacity building and stepping up adaptation action at the regional and local level, building the private sector's and municipalities' understanding of their vulnerabilities, adaptation options, and how to access EU funding (Actions 2 and 3). However, 14% of respondents to the open public consultation disagreed that the Strategy is relevant for private sector stakeholders.

Nevertheless, the public consultation results (Figure 5-7) provide support for the Strategy's relevance to different stakeholders and levels of government with regard to bridging the knowledge gaps (Action 4). Generating and dissemination knowledge at the local and regional level is perhaps more relevant because governments at these levels often have less opportunities for funding research. Knowledge at the supra-national level, for example, on river basins and mountain ranges, can help to enhance cross-border cooperation.

**Figure 5-7 Responses in the open public consultation to interim conclusions that relate to relevance of the EU Adaptation Strategy**




*Source: Results from open public consultation. 160 respondents*

The public consultation, and all other evidence, shows that if stakeholders want the EU to do anything then it is to create more knowledge on adaptation. Although Climate-ADAPT, EEA and many H2020 and FP7 projects try hard, it remains a challenge to make sure this large amount of knowledge actually reaches stakeholders. There is a continuous need to build the knowledge base, to share it across Europe, to assist the uptake of this information and to support cooperation. At transnational level, the Strategy is relevant to bridging knowledge gaps on, for example, understanding of and adapting to 'high-end climate change', as well as understanding the potential risks of indirect impacts of climate change on other countries that may have substantive implications for trade, security, immigration of people into the EU, and the arrival of invasive species.

According to the EEA evaluation, Climate-ADAPT has assisted the uptake of knowledge and thereby informed decision-making (European Environment Agency, 2018, forthcoming). Information that is presented within its policy context on Climate-ADAPT has a larger outreach and is better understood by users than if it is only presented on individual project websites. There are examples of the use of Climate-ADAPT to support decision making on adaptation at all governance levels (local, regional, national, EU), across different stakeholders and at all steps of the adaptation policy cycle across Europe.

Climate-ADAPT is used for a variety of processes supporting decision-making, including for developing evidence documents and assessments. It is used by stakeholders as the reference to identify the "state of the art" of adaptation in Europe, and as a starting point to extend searches and to develop tailor-made products for various policy processes. Hence, the platform is a "first-stop shop" rather than a "one-stop shop" for adaptation information in Europe (Action 5). The facilitation of climate-proofing of EU policies is very relevant for different sectors in the EU, such as water, agriculture and forestry sector across different stakeholders and levels (Action 6).

The Strategy is considered relevant for the private sector and businesses with respect to more resilient infrastructure and promoting insurance and financial products, despite disagreement from some respondents to the open public consultation (Action 7 and 8). An interviewee from DG ECHO suggested that insurance and financial products are a good way to involve the private sector in adaptation, as companies can weigh the costs of insurance against the costs of taking adaptive measures themselves. However, the approach to insurance of climate risks is very different in each Member State. The first stakeholder workshop results emphasised the importance of clarity on the approach adopted in each Member State regarding public versus private insurance mechanisms.

## 5.2 Effectiveness

### 5.2.1 To what extent have the objectives been achieved during the period 2013-2018?


Summary

The Strategy did not commit to achieving the operational objectives and associated performance indicators identified in the Impact Assessment. Nevertheless, they provided a useful reference point for identifying the extent to which the Strategy's objectives have been achieved during the period 2013 to March 2018. With the exception of Objective 1a, all operational objectives relate to impacts to be achieved by 2020.

1. Objective 1 "Promoting action by Member States":

- Objective 1a was substantially fulfilled by 2017 and is on track to be achieved in 2018 with regard to all Member States having adopted national adaptation strategies. Ten Members States have adopted national adaptation strategies since 2013, bringing the total to 25 out of the 28 Member States and strategies are being developed in the remaining three Member States but have not yet been adopted. Information on regional and local strategies is less readily available and requires judgement of where they are "appropriate", hence, the evaluation is inconclusive about their achievement.
- Objective 1a does not include targets associated with the performance measures for number and amount of LIFE grants, so the achievement of the operational objective with respect to these indicators is indeterminable. However, there are at least 59 ongoing adaptation-related LIFE projects. All involve experience transfer and can be classed as 'lighthouse' projects. A total of 40 of these projects are under the Climate Action sub-programme and there are two adaptation-related integrated projects. These 42 projects have a total value of €149,647,648 to which the Commission has contributed €78,751,776. Another 17 adaptation-related projects are under the Environment sub-programme.
- Objective 1b includes a target that by 2020 cities of more than 150,000 inhabitants have adopted an adaptation strategy. There are 497 European cities with a population of more than 150,000 people[114]. Although no breakdown is available for cities of this size, in relation to both associated performance


[114] http://www.citymayors.com/features/euro_cities.html

measures, there has been substantial progress that suggests the target will be largely or wholly achieved by 2020. By 14 March 2017, 7,755 signatories (local authorities) from 53 countries, covering 252 million inhabitants, had committed to the Covenant of Mayors, 1,078 signatories had committed to conduct vulnerability and risk assessments, and develop, implement and report on adaptation plans, of which 295 (27%) had submitted an adaptation action plan.

2. Objective 2 "Promoting better informed decision-making"

- Objective 2a seeks closure of all priority knowledge gaps identified in 2013. Although the knowledge base has increased substantially, none of the four priority knowledge gaps identified in the Strategy have been closed. Knowledge will always be incomplete and new knowledge gaps are emerging. The associated performance measure for a list of knowledge gaps in 2017 has largely been fulfilled by a valuable analysis in the EEA report on 'Climate change, impacts and vulnerability in Europe 2016'. A comprehensive assessment of new literature on adaptation in Europe is needed to identify knowledge gaps in 2020.
- Objective 2a does not include targets associated with the performance measures for number and value of adaptation-related H2020 and JRC projects, so achievement of the operational objective with respect to these indicators is indeterminable. However, a total of 45 H2020 projects (total budget €275 million) and 34 JRC reports (total budget estimated €10 million 2013-2017) that date from 2013 or later focus on adaptation to climate change.
- Objective 2b has been achieved in advance of the target date of 2020, as Climate-ADAPT has made information on climate change adaptation more easily accessible for decision-makers, including Member States, local authorities and firms. Targets were not set for associated performance measures for Climate-ADAPT in relation to numbers of visitors, pages most visited and number of registered users. However, it has received 267,300 visitors between 1 March 2013 and 30 April 2017, has a 'core content' of pages that are most used, has about 5,000 registered users, and has announced 107 adaptation-related events between 29 April 2014 and 31 March 2018. The performance measure for assessment of Climate-ADAPT's content, databases and metadata will be fulfilled by EEA's evaluation of Climate-ADAPT, which will be published in 2018.

3. Objective 3 "Promoting adaptation in key vulnerable sectors"

- Objective 3a establishes a target that by 2020, adaptation considerations have been mainstreamed in a consistent and comprehensive way in key EU policies Significant progress has been made but there is still some way to go before mainstreaming of adaptation in key EU policies can be described as "consistent and comprehensive". There are potentially areas of the EU's international engagement (e.g. trade, security) where climate adaptation should be considered more systematically.
- Objective 3a includes a performance measure that there should be a list of policies and legal acts where adaptation has been mainstreamed, which has been fulfilled by work undertaken for this evaluation.
- Objective 3a includes a performance measure, without target, for the Carbon Disclosure Project surveys, so achievement of the operational objective with respect to this indicator is indeterminable. Adaptation activities by private organisations reported in the surveys do not provide detailed information on climate action, hence, it would be valuable to develop a more relevant indicator to monitor delivery of this objective.
- Objective 3b that new major infrastructure investments are climate-proofed by 2020 has been achieved, as in the 2014-2020 programming period, approval of major projects funded by the European Structural and Investment Funds (ESIF) is subject to "an analysis of the environmental impact, considering climate

change adaptation and mitigation needs, and disaster resilience" (Article 101 of Regulation (EU) No 1303/2013).

- Objective 3b includes a performance measure regarding the amount of adaptation infrastructure investments (co-) financed by EU funds and/or public financial institutions, which does not have a target, so achievement of the operational objective with respect to this indicator is indeterminable. However, the Commission's Statement of Estimates for the Financial Year 2018 reports on climate mainstreaming in the EU budget and key expenditure programmes likely to fund infrastructure are the European Regional Development Fund (ERDF) and the Cohesion Fund (CF). Expenditure on climate adaptation from total climate action finance reported by the European Investment Bank in 2015 suggests that financing for adaptation has not increased since 2013.
- Objective 3b has an associated performance measure for progress on the mapping exercise by CEN-CENELEC. Good progress has been achieved. The 'Guide for addressing climate change adaptation in standards', which applies to infrastructure, was developed by CEN-CENELEC and adopted in April 2016. Existing standards have been screened and prioritised resulting in a short list of 13 standards; their revision started in early 2017 and will take about four years.

The extent to which the Strategy's objectives have been achieved during the period 2013-2018 with reference to Action 8 is not addressed, as the Impact Assessment did not include a relevant performance indicator in that regard. Hence, Action 8 is only discussed in relation to the other evaluation questions on effectiveness in Sections 5.2.2, 5.2.3 and 5.2.4.

The Strategy did not commit to achieving the operational objectives and associated performance indicators identified in the Impact Assessment (Section 2.2.2). Nevertheless, they still provided a useful reference point for identifying the extent to which the Strategy's objectives have been achieved during the period 2013 to March 2018. With the exception of Objective 1a ("by 2017, all Member States have adopted adaptation strategies, complemented by regional or local adaptation strategies, where appropriate"), all operational objectives relate to impacts to be achieved by 2020. Hence, the evaluation has assessed general progress made to date in relation to these endpoints.

Section 3 describes the state of play in relation to each of the Strategy's three objectives and constituent actions, including with regard to the operational objectives and performance indicators in the Impact Assessment. Hence, the extent to which the operational objectives have been achieved during the period 2013-2018 is only summarised here by operational objective and performance indicator in relation to the Strategy's objectives and actions. Further details of the evidence underpinning these summaries can be found in Section 3.

#### 5.2.1.1 Objective 1 Promoting action by Member States

- **Operational Objective 1a:** by 2017, all Member States have adopted adaptation strategies, complemented by regional or local adaptation strategies, where appropriate
  - **Performance indicator:** Number of national adaptation strategies and action plans and national climate change risk assessments (relates to Action 1)

Since 2013, ten Members States have adopted national adaptation strategies, bringing the total to 25 out of the 28 Member States. Strategies are being developed in the remaining three Member States (Latvia, Bulgaria and Croatia) but have not yet been adopted. Information on regional and local strategies is less readily available. Assessment of the objective requires a judgement of where it is "appropriate" for national strategies to be complemented at regional level. The UK, Austria, the Czech Republic and Portugal are examples of countries where regional and/or local adaptation strategies are already in place. Other countries, such as Ireland and Slovenia, are taking steps to encourage the

development of regional and/or local adaptation strategies. RAMSES, a European Integrated Project, co-financed by the Commission in the 7th Framework Programme, found that local climate change plans are almost universal in the UK, as they are compulsory. It also identified that the only other European country with similar legislation was France where such plans were, nevertheless, still taking a while to appear (Reckien, 2015).

- **Performance indicator:** Number and amount of LIFE grants used for experience transfer[115] (relates to Action 2)
- **Performance indicator:** Number and amount of LIFE grants used for lighthouse projects[116] on adaptation (this performance measure is included under Objective 1b in the Impact Assessment but as it also relates to Action 2 is included here)

There are at least 59 ongoing adaptation-related LIFE projects all of which involve experience transfer. A total of 40 of these projects under the LIFE Climate Action sub-programme are categorised to climate change adaptation in the LIFE projects database. In addition, there are two adaptation-related integrated projects. These 42 projects have a total value of €149,647,648 to which the Commission has contributed €78,751,776. The LIFE MTE (Ecorys, 2017) notes that another 17 adaptation-related projects are from other programme strands, such as nature.

On the basis that LIFE's lighthouse projects comprise pilot, demonstration, best-case and integrated projects, the number and amount of relevant LIFE grants are the same as reported in relation to experience transfer, as according to the LIFE Regulation 2014-2020 and the Multiannual Work Programme 2014-2017, all traditional projects should be either pilot or demonstration projects.

- **Operational Objective 1b:** by 2020, cities of more than 150,000 inhabitants have adopted an adaptation strategy
  - **Performance indicator:** Covenant of Mayors number of cities pledging to develop an adaptation strategy (relates to Action 3)
  - **Performance indicator:** Number of cities of more than 150,000 inhabitants in vulnerable areas with an adaptation strategy (relates to Action 3)

A breakdown is not available for cities of more than 150,000 inhabitants but by 14 March 2017:

- 7,755 signatories (local authorities) from 53 countries, covering 252 million inhabitants, had committed to the Covenant of Mayors.
- 1,078 signatories had committed to conduct vulnerability and risk assessments, and develop, implement and report on adaptation plans, of which 295 (27%) had submitted an adaptation action plan.

#### 5.2.1.2 Objective 2 Promoting better informed decision-making

- **Operational Objective 2a:** by 2020, priority knowledge gaps[117] identified in 2013 have been closed
  - **Performance indicator:** List of knowledge gaps now, in 2017, and in 2020 (relates to Action 4)
  - **Performance indicator:** Number of Horizon 2020 and JRC research projects dealing with adaptation and associated budget allocated (relates to Action 4)

Although the knowledge base has increased substantially, none of the four priority knowledge gaps identified in the Strategy have been closed. The EEA report on 'Climate

[115] These are projects that share experience and foster capacity building in relation to the development of national and regional adaptation strategies. This indicator is not solely concerned with action at city level, and is also relevant to some of the other indicators. It is also not the most relevant indicators for monitoring action at city-level.
[116] These are projects that develop, test and demonstrate policy or management approaches, best practices, and solutions, for climate change adaptation. This may include cross-sectoral and cross-border projects. It is assumed that allocation of this performance indicator to Objective 1b was an error and that it should instead relate to Objective 1a.
[117] The key knowledge gaps that were identified are: information on damage and adaptation costs and benefits; regional and local-level analyses and risk assessments; frameworks, models and tools to support decision-making and to assess how effective the various adaptation measures are; and, means of monitoring and evaluating past adaptation efforts.

change, impacts and vulnerability in Europe 2016' (European Environment Agency, 2017) provides an overview as well as a valuable analysis of remaining knowledge gaps. However, a comprehensive assessment of the large body of new literature on adaptation in Europe is needed to provide a balanced list of remaining knowledge gaps. We have identified a total of 45 H2020 projects and 34 JRC reports that are focused on adaptation to climate change and date from 2013 or later; the total budget for these H2020 projects is €275 million; the budget for the JRC reports could not be retrieved as JRC does not monitor this amount separately, however, an interviewee from JRC estimated the total amount at €10 million between 2013 and 2017.

- **Operational Objective 2b:** by 2020, communication tools allow for available information on climate change adaptation to be more easily accessible for decision-makers, including Member States, local authorities and firms
    - **Performance indicator:** Number of visitors to Climate-ADAPT, pages most visited, number of registered users, assessment of the content, databases and metadata (relates to Action 5):
        - Number of visitors to Climate-ADAPT: 267,300 visitors between 1 March 2013 and 30 April 2017
        - Pages most visited: database, adaptation support tools, case studies, EU policy pages and the country pages
        - Number of registered users: about 5,000 (recipients of the newsletter)
        - Assessment of the content, databases and metadata: will be provided by EEA's evaluation of Climate-ADAPT (European Environment Agency, 2018, forthcoming).
    - **Performance indicator:** Number of conferences, workshops, adaptation events registered in Climate-ADAPT (Relates to Action 5):
        - 107 such events were announced on Climate-ADAPT between 29 April 2014 and 31 March 2018.

#### 5.2.1.3 Objective 3 Promoting adaptation in key vulnerable sectors

- **Operational Objective 3a:** by 2020, adaptation considerations have been mainstreamed in a consistent and comprehensive way in key EU policies
    - **Performance indicator:** List of policies and legal acts where adaptation has been mainstreamed (Relates to Action 6)

Policy initiatives mentioned in the Strategy where adaptation has been mainstreamed, was considered for mainstreaming or could be further pursued is provided in Appendix 5. Significant progress has been made, however, there is still some way to go before adaptation mainstreaming can be described as "consistent and comprehensive". There are potentially areas of the EU's international engagement (e.g. trade, security) where climate adaptation and risk assessments should be more systematically considered.

- **Performance indicator:** Adaptation activities by private organisations as reported in the Carbon Disclosure Project surveys (Relates to Action 6)

This private sector indicator is more problematic than the indicator relating to policies and legal acts, since it is more loosely linked to the climate-proofing of EU action. A 2014 assessment the Carbon Disclosure Project[118] produced soon after the Strategy's launch provides a baseline but has not yet been repeated. The report reveals that 1,365 EU companies were reporting climate data. However, while the report provides valuable information on the sectors concerned and the nature of the risks identified, it does not provide detailed information on climate action taken in response to risk assessment. It would, therefore, be valuable for the Commission to discuss with the Carbon Disclosure Project, or other possible sources of relevant data, development of a more targeted indicator of relevant progress in the delivery of this objective.

[118] Carbon Disclosure Project, 2014: "Climate Change Resilience in Europe: A Snapshot of the Private Sector"

- **Operational Objective 3b:** by 2020, new major infrastructure investments are climate-proofed
    - **Performance indicator:** Amount of adaptation infrastructure investments (co-) financed by EU funds and/or public financial institutions (Relates to Action 7)

Investments in adaptation infrastructure are by their nature already climate-proofed, and do not provide elucidate the level of climate-proofing achieved in other infrastructure investments. The latest Commission reporting on climate mainstreaming in the EU budget is provided in the Statement of Estimates for the Financial Year 2018[119]. Key expenditure programmes likely to fund infrastructure are the European Regional Development Fund (ERDF) and the Cohesion Fund (CF). Budget allocations to Thematic Objective 5, i.e. promoting climate change adaptation, risk prevention and management, (compared with total budget) recorded for 2018 are: ERDF €445.7 million (€5,581.5 million); CF €355.4 million (€2,596.5 million). Some relevant climate adaptation infrastructure may also be funded under other Thematic Objectives, particularly TO4 (Low-carbon economy), TO6 (Preserving and protecting the environment and promoting resource efficiency) and TO7 (Promoting sustainable transport), and not all investments recorded under TO5 will be relevant to climate adaptation. Expenditure under other programmes particularly relevant to climate adaptation is less likely to focus on infrastructure investment (e.g. climate expenditure under the European Agricultural Fund for Rural Development, EAFRD). LIFE programme expenditure on adaptation (€38 million out of a total budget of €247.2 million in 2018) includes significant investment in best practice and knowledge sharing. The European Investment Bank reported[120] that in 2015, €0.9bn was spent on climate adaptation from total climate action finance of €20.7 billion, on a par with annual adaptation expenditure reported for the preceding 5 years. This suggests that the level of financing for adaptation has not increased since publication of the EU Adaptation Strategy, although long lead times for project finance negate the possibility of an immediate impact.

- **Performance indicator:** Progress on the mapping exercise by CEN-CENELEC[121]. (Relates to Action 7)

The 'Guide for addressing climate change adaptation in standards', which applies to infrastructure, was developed by CEN-CENELEC and adopted in April 2016. Existing standards have been screened and prioritised resulting in a short list of 13 standards; their revision started in early 2017 and will take about four years.

### 5.2.2 To what extent has each of the eight actions of the Strategy contributed to these achievements?

Below, we explain:

- To what extent each of the Strategy's eight actions contributed to the achievements identified in Section 5.2.1, and
- The extent to which effects achieved by each of the eight actions were expected or unexpected (i.e. not considered when the Strategy was adopted).

Actions 1, 2 and 3 contribute to delivery of Objective 1. Actions 4 and 5 relate to Objective 2. Actions 6, 7 and 8 contribute to Objective 3.

[119] COM(2017) 400 'Draft General Budget of the European Union for the financial year 2018, - General Introduction, - General statement of revenue, - General statement of revenue and expenditure by section', and SEC(2017)250 'Statement of estimates of the Commission for 2018 (Preparation of the 2018 Draft Budget) Document I, Policy highlights - May 2017

[120] See the publication "Finance for Climate Action" at http://www.eib.org/attachments/thematic/climate_action_en.pdf

[121] The European Committee for Standardization (CEN) and the European Committee for Electrotechnical Standardization (CENELEC).

#### 5.2.2.1 Action 1: Encourage all Member States to adopt comprehensive adaptation strategies


Summary

1. The Strategy's effectiveness in encouraging development and adoption of national adaptation strategies is difficult to assess, as most Member States were already developing them at the time of the Impact Assessment. Other factors, most notably the global adaptation goal established by the Paris Agreement, may have been equally important.
2. Despite uncertainties about the impact of the Strategy relative to other drivers, it may be inferred that the voluntary nature of actions under the Strategy has been effective in encouraging Member States to adopt national adaptation strategies.
3. Feedback from stakeholders suggests that the Strategy increased political salience of the need for Member States to adopt national adaptation strategies.
4. The adaptation ex ante conditionalities for ESIF programmes seems to have been an effective mechanism for ensuring adoption of national adaptation strategies.
5. The Strategy appears to have been more effective in encouraging preparatory activities and less effective in promoting implementation and review.
6. The Commission's guidelines have been used by Members States that had not previously developed national adaptation strategies and by other Member States in the review or translation of their existing strategies into national, sectoral or local adaptation plans.
7. Information to assess the effectiveness of the Strategy in promoting regional and local strategies is not readily available and would require assessment of where it is "appropriate" for national strategies to be complemented in this way. Member States vary in the extent to which development of regional, sub-regional and local adaptation strategies has been encouraged, and there is no centralised information about them in some Member States.


It is difficult to establish with any certainty the extent to which the EU Adaptation Strategy has been effective in encouraging development and adoption of new national adaptation strategies, as most Member States were already developing them at the time of the Impact Assessment (McCallum, et al., 2013). Other factors may have been equally important, most notably establishment of the global adaptation goal by the Paris Agreement (UNFCCC, 2015), which gives adaptation parity with mitigation in an international policy context. Nevertheless, it might be inferred that the voluntary nature of the actions under the EU Adaptation Strategy have been effective in encouraging Member States to adopt national adaptation strategies and plans, given that 25 Member States have now adopted them and the remainder are developing them.

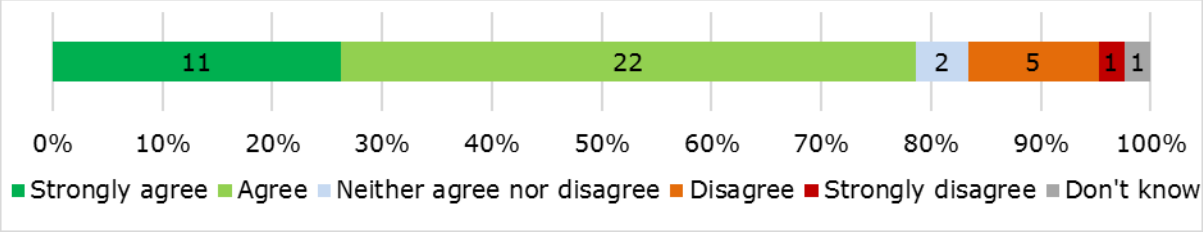
More than half of 42 respondents across all stakeholder types agreed to a statement in the targeted stakeholder survey that "The EU Adaptation Strategy has encouraged Member States to adopt comprehensive adaptation strategies", and a further quarter strongly agreed (Figure 5-9). Indeed, interviews with eight governmental stakeholders from Member States suggest that the EU Adaptation Strategy played a role in ensuring increased political salience of the need for Member States to adopt national adaptation strategies and plans, where they were not already in place, and to revise existing strategies and plans (e.g. in the Netherlands where an interviewee stated that the EU Strategy had provided impetus and convinced decision-makers).

Actions to encourage Member States to adopt adaptation strategies included mainstreaming of adaptation into other areas of EU policy (Objective 3), particularly Action 6 on climate-proofing the CAP, regional policy, and the CFP (see Section 5.2.2.6). Evidence from interviews suggests that mainstreaming of adaptation into other policy areas,

particularly (but not exclusively) the use of ex ante conditionalities specifically linked to TO5 in ESIF, was an important factor in encouraging the adoption of national adaptation strategies in Member States that had not already done so. Although, the open public consultation was more ambivalent with only 23% of respondents (N=160) agreeing or strongly agreeing that use of the ex ante conditionalities had been an effective mechanism in this regard, it also suggests that it is national and sub-national government stakeholders who are most aware of the role played by the adaptation ex ante conditionalities (Figure 5-8).

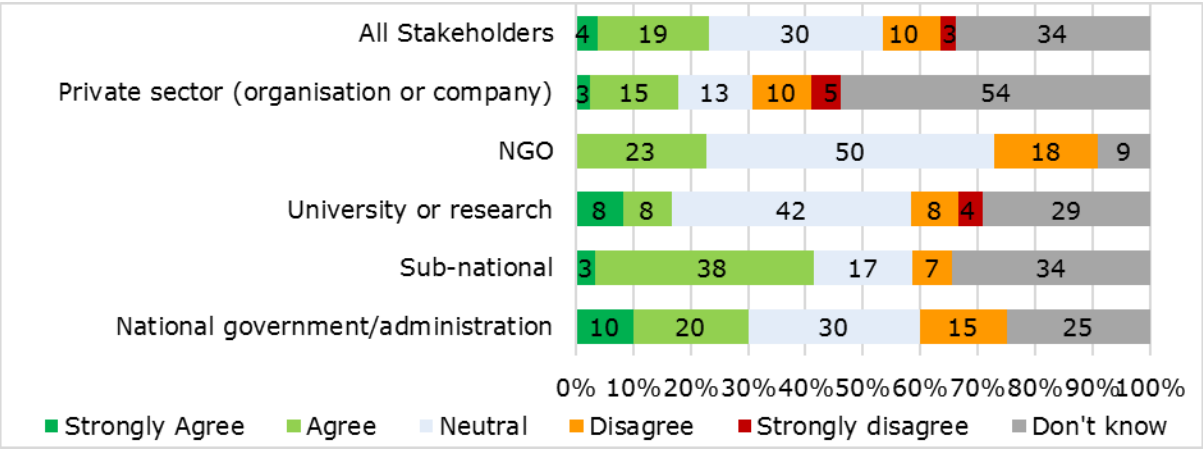
Responses from across all stakeholder types to the statement in the targeted stakeholder survey that "The EU Adaptation Strategy has encouraged Member States to adopt high quality adaptation strategies" were more evenly balanced (Figure 5-10). Interviews with stakeholders from national government bodies seem more positive. For example, one such stakeholder involved in developing their national adaptation strategy and evaluating other countries' strategies noted that there has been an increase in quality in recent years.

**Figure 5-8 Responses to the statement "The EU Adaptation Strategy has encouraged MS to adopt comprehensive adaptation strategies"**



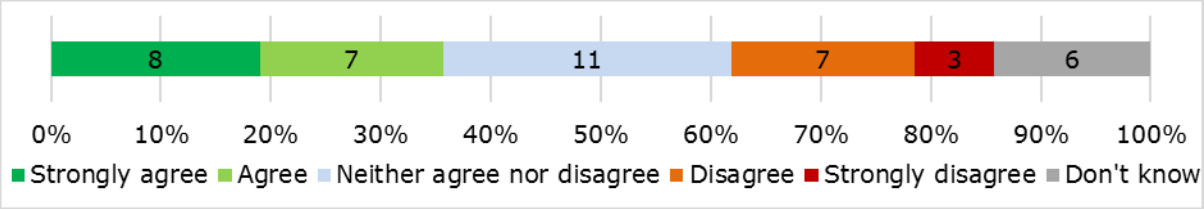

*Source: Results of the targeted stakeholder survey. 42 respondents.*

**Figure 5-9 The ex-ante conditionalities on adaptation for accessing EU funding (ESIF programmes) has been an effective mechanism for ensuring the adoption of national adaptation strategies**




*Source: Results of the open public consultation survey. 159 respondents in All stakeholders, 20-39 respondents in stakeholder groups.*

**Figure 5-10 Responses to the statement "The EU Adaptation Strategy has encouraged MS to adopt high quality adaptation strategies"**




*Source: Results of the targeted stakeholder survey. 42 respondents.*

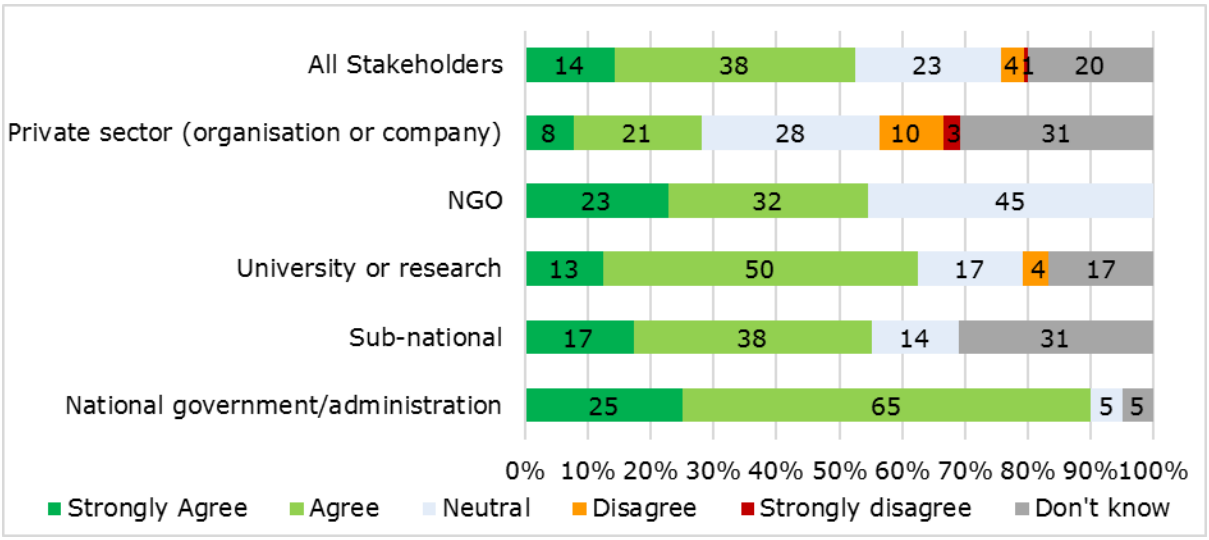
There appear to be significant gaps in the effectiveness of Member State's implementation of their strategies, with resources for the follow-through of commitments in some cases being reduced or withdrawn, or in other cases not identified. The review of Member States' national adaptation strategies and plans in relation to the Commission's 'adaptation preparedness scoreboard' (Figure 3-1) suggests that:

- Most Member States have progressed:
  - Coordination (28 Member States have a central body, 21 have horizontal coordination mechanisms)
  - Stakeholder involvement (26 Member States) and
  - Transboundary cooperation (27 Member States).
- More than half of Member States already have access to suitable data, have developed scenarios, and undertaken risk assessments, and most other Member States are making progress in these respects.
- While relatively few Member States have built capacity to address adaptation (13 Member States) or funding for climate resilience (13 Member States), other Member States, with few exceptions, are progressing these issues.
- Less than half of Member States have addressed climate change in relation to many aspects of implementation and review. The remainder are not progressing related issues. The latter include consideration of climate change in disaster risk plans, land use planning, major projects, and national, sectoral and sub-national monitoring and reporting.

The mixed picture from the adaptation preparedness scoreboard is reflected by responses to a statement in the targeted survey about the types of actions at a Member State level that the EU Strategy has been an important factor in encouraging. The targeted survey responses suggest that stakeholders generally felt that the EU Strategy has been more effective in encouraging preparatory activities, i.e. preparing the ground, assessing risks, identifying options, and less effective in promoting assessment of options, implementation and monitoring and evaluation. This was also supported by the open public consultation, with 52% of respondents (N = 160) agreeing or strongly agreeing that the Strategy has been more effective in encouraging preparatory adaptation activities than in encouraging implementation and review of such activities. Indeed, only responses from the private sector were more ambivalent (Figure 5-11)[122].

[122] Additional views are given in position papers and letters in association with the open public consultation (Appendix 2E). For instance, the European Public Service Union considers that insufficient adaptation action has been taken including in relation to national plans, financial measures, and monitoring processes. EPSU advocates a greater focus on consulting trades unions and the work force to ensure appropriate implementation.

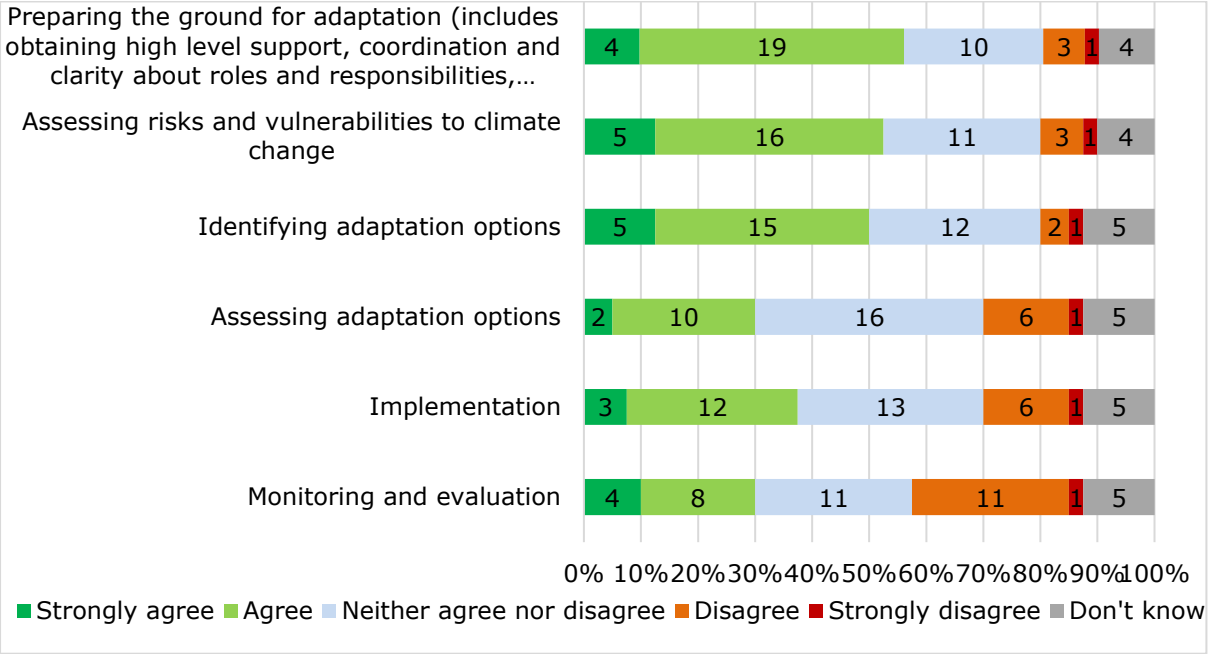
**Figure 5-11 The Strategy has been more effective in encouraging preparatory adaptation activities, than in encouraging the implementation and review of such activities**




*Source: Results of the open public consultation survey. 160 respondents in All stakeholders, 20-39 respondents in stakeholder groups.*

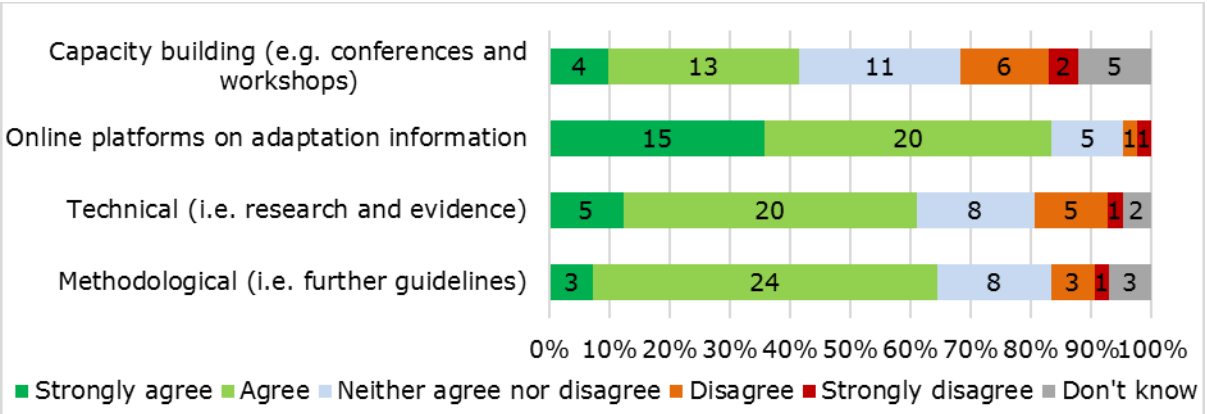
The targeted stakeholder survey also provided varying responses to a statement that "The European Commission has provided the following types of support to Member States to help them to adopt comprehensive adaptation strategies" across a range of activities (Figure 5-13). A large majority of respondents agreed or strongly agreed that the Commission had provided an online platform on adaptation information and there was also strong agreement about the provision of methodologies (e.g. guidelines) or technical information (e.g. research). However, there was less agreement regarding whether the Commission had supported capacity building, although a higher proportion of 'neither agree nor disagree' and 'don't know' responses may suggest respondents were less informed on this topic. When asked whether Member States had developed adaptation strategies that responded to the expected impacts and needs understood at the time of the IA, respondents to the targeted survey provided answers across the full spectrum from strong disagreement to strong agreement (Figure 5-12).

**Figure 5-12 Responses to the statement "The EU Adaptation Strategy was an important factor in encouraging the following actions at MS level"**



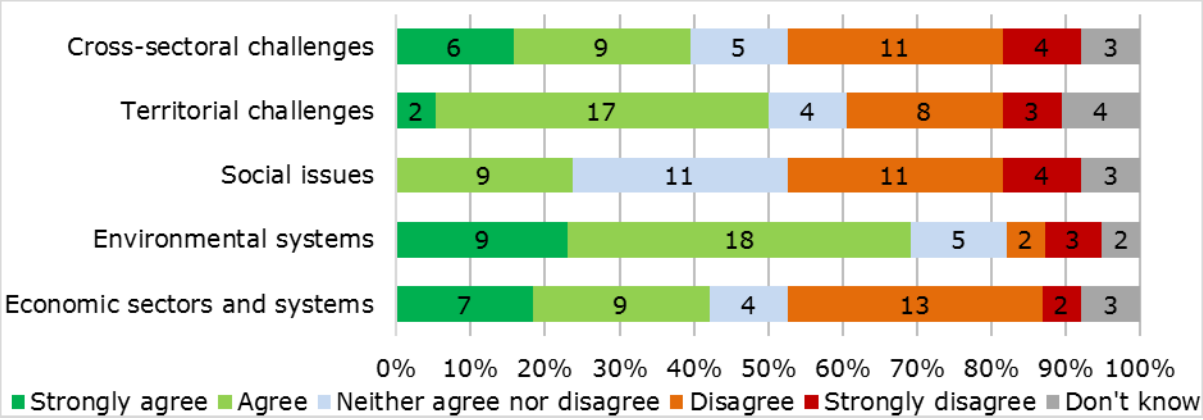

*Source: Results of the targeted stakeholder survey. 40-41 respondents. Full text for first bar is "Preparing the ground for adaptation (includes obtaining high level support, coordination and clarity about roles and responsibilities, planning of funds, use of already available information, checking awareness of climate change issues)"*

**Figure 5-13 Responses to the statement "The European Commission has provided the following types of support to MS to help them to adopt comprehensive adaptation strategies"**




*Source: Results of the targeted stakeholder survey. 41-42 respondents.*

**Figure 5-14 Responses to the statement "MS have developed adaptation strategies that respond to the expected impacts of climate change and adaptation needs as understood at the time of the Impact Assessment in 2013"**

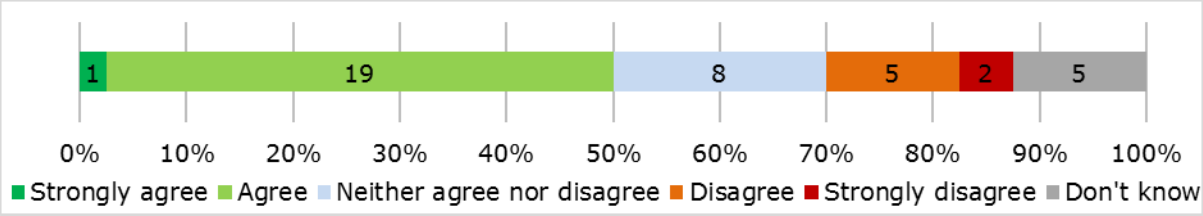



*Source: Results of the targeted stakeholder survey. 38-39 respondents.*

Targeted stakeholder survey respondents seemed unsure about whether Member States have chosen to follow the Commission's guidelines in the development of their adaptation strategies, as the most popular response to this question was 'neither agree not disagree' with a relatively high number of 'don't know' responses (Appendix 2B). However, almost twice as many stakeholders expressed agreement than disagreement (13 as compared with 8 out of 43 responses). Interviews with national government bodies revealed that the extent to which the guidelines were used in detail by Member States appears to have depended on whether there were pre-existing adaptation strategies and governance mechanisms. One such stakeholder noted that the guidance built upon lessons learnt and experiences of Member States that had already adopted strategies and was very useful for other Member States. At the other end of the spectrum, some stakeholders noted that they had not used the guidelines for development of their national strategies because these had already been developed. However, other such Member States have used the guidelines, for example, when developing federal and national adaptation plans in Belgium or for sectoral and local level plans in Ireland. Notably, more than half (28 out of 43) of respondents to the targeted stakeholder survey agreed that the guidelines are useful (Appendix 2B). Interviewees from national government bodies also all agreed that the guidelines were useful in whatever way they had made use of them or for Member States that had not previously developed national adaptation strategies.

There was a high level of agreement from targeted survey respondents (excluding those who were ambivalent of did not know) that the adoption of adaptation strategies has been effective in enhancing the preparedness and capacity of Member States to respond to the impact of climate change (Figure 5-15).

**Figure 5-15 Responses to the question "Has the adoption of adaptation strategies been successful in enhancing the preparedness and capacity of MS to respond to the impacts of climate change?"**




*Source: Results of the targeted stakeholder survey. 40 respondents.*

Respondents to the targeted stakeholder survey were invited to provide specific examples to back up their views. Among those who agreed, several emphasised the role of adaptation strategies in raising awareness, supporting inter-ministerial and inter-sectoral

exchange, collaboration and action, and the importance of having vulnerability assessments in place. However, it was also noted that as this is the first generation of strategies, further work and revision will be needed. Some of those who responded 'neither agree nor disagree' or 'don't know' noted that it is too early to assess the impact of their national adaptation strategies (e.g. Hungary and the Czech Republic).

The voluntary nature of national adaptation strategies has been effective in enabling Member States to choose how to direct adaptation action. Sweden has chosen to do so through the development of regional and local strategies, rather than through national coordination. Information to assess the effectiveness of the Strategy in promoting regional and local strategies, more generally, is less readily available and would require assessment of where it is "appropriate" for national strategies to be complemented in this way. However, the draft country fiches produced to inform the adaptation scoreboard indicate that Member States vary in the extent to which development of regional, sub-regional and local adaptation strategies has been encouraged. Furthermore, there is no centralised information or evidence about them in some Member States.

The UK, Austria, the Czech Republic and Portugal are examples of countries where regional and/or local adaptation strategies are already in place. The devolved administrations in the UK Northern Ireland, Scotland and Wales are required by legislation to develop adaptation programmes. In Austria, the Bundesländer (NUTS II) have developed regional adaptation strategies separate from or integrated with regional mitigation strategies. The Czech Republic has one regional and six local adaptation strategies, which address 18% of the Czech population. Portugal's revised National Adaptation Strategy, adopted in 2015, includes information relating to regional adaptation strategies developed by Madeira and Azores. Training of local officers in Portugal by ClimAdaPT.Local, a project under the European Economic Area Grant's Programme AdaPT[123], has also led to development of 27 local adaptation strategies and to mainstreaming of local adaptation into planning. This training is being replicated by other sub-national regions in Portugal through the POSEUR[124] programme under the Cohesion Fund. Other countries, such as Ireland and Slovenia, are taking steps to encourage the development of regional and/or local adaptation strategies. Local authorities will be mandated under Ireland's statutory National Adaptation Framework (in development) to prepare local adaptation strategies; relevant guidelines were launched in 2016. It is intended that these local strategies will complement national sectoral adaptation plans. Slovenia has a plan to develop adaptation strategies at a sub-national level in 2018. Until now, local and regional adaptation initiatives in Slovenia were project-based but new national legislation will mean that adaptation becomes integral to local and regional development processes.

RAMSES, a European Integrated Project, co-financed by the Commission in the 7th Framework Programme, undertook analysis of cities' climate change plans across Europe (Reckien, 2015). It found that urban climate change plans are almost universal in the UK, as local climate change plans are compulsory. Similar legislation in other European countries only existed in France but even though legislation required the development of urban climate change plans, the RAMSES project noted these can take a while to appear. While Reckien et al. (Reckien, 2015) presume that national plans facilitate urban plans by acting as guidance documents, they noted that this effect is by no means always evident, as at that time 72% of cities across Europe had no adaptation plan (e.g. Italy 97% of cities; Spain 81% and UK 20%). They highlighted the launch of the Covenant of Mayors initiative for adaptation to climate change, as a demonstration of institutional awareness of the paucity of adaptation guidelines available to local authorities. Nevertheless, respondents to our targeted stakeholder survey noted that the EU Adaptation Strategy has helped to overcome barriers at sub-national and local levels through provision of advice and support, funding and guidance.

[123] http://apambiente.wixsite.com/adapt
[124] http://poseur.portugal2020.pt/en/

#### 5.2.2.2 Action 2: Provide LIFE funding to support capacity building and step up adaptation action in Europe (2014-2020)

Summary

1. LIFE funding is not matched to the scale of the climate change challenge but stakeholder feedback suggests that LIFE is acting as an effective catalyst, providing and disseminating solutions and best practices.
2. LIFE "integrated projects" were introduced to implement environmental legislation and goals on a wider scale and to increase the impact of the LIFE programme, hence, they can potentially aid adoption and implementation of national adaptation strategies and complementary regional or local strategies.
3. All LIFE projects include measures for dissemination of information and awareness raising but monitoring focuses on projects individually and is, thus, ineffective in assessing the programme's role in knowledge transfer and capacity-building across the EU.

While DG CLIMA has overall responsibility for the LIFE sub-programme for climate action, the stakeholder from EASME/LIFE interviewed for this current study noted that DG ENV provides the programme with its policy priorities. They noted that for adaptation the priorities relate to the Strategy and focus on vulnerable areas and sectors. There is an almost equal split in the outcomes of proposals between measures relevant to urban areas (with a focus on extreme weather events – flooding/heavy rain events and heat islands, particularly in Mediterranean countries) and rural areas (e.g. drought, mountains and islands, resilient agriculture and forestry).

There are at least 59 ongoing adaptation-related LIFE projects targeting implementation across a combined area of more than 35 million hectares. A total of 40 of these projects are under the LIFE Climate Action sub-programme[125], two adaptation-related integrated projects and another 17 adaptation-related projects are from the LIFE Environment sub-programme. Although some participants in the public consultation meeting for this evaluation expressed concern that geographical coverage of LIFE projects was uneven, the MTE notes that adaptation-related projects have wide geographical coverage: Spain, Italy, Greece, Belgium, France, Germany, Netherlands, Poland, Portugal, Slovakia and Estonia.

The LIFE MTE stresses the potential of "integrated projects", which were introduced to be able to implement environmental legislation and goals on a wider scale and to increase the impact of the LIFE programme. These projects are aimed at implementing plans, programmes or strategies at regional, multiregional, or national scale, across a range of themes specifically including climate change adaptation but also nature, water, waste, air and climate mitigation and adaptation. Hence, the interviewee from EASME/LIFE for the current study noted that integrated projects are important in relation to the Strategy as they can potentially aid adoption and implementation of national adaptation strategies and complementary regional or local strategies. To date, two adaptation-related integrated projects have been funded: C2C CC led by the Central Denmark Region and supported by around 30 other beneficiaries; and NADAPTA-CC, which aims to increase resilience to climate change in the Spanish region of Navarre (for more see Section 3.1.2).

All LIFE projects include measures for dissemination of information and awareness raising. So, all climate adaptation projects and integrated projects funded under the Climate Action sub-programme provide for experience transfer in line with the performance indicator identified by the Impact Assessment. The MTE highlights that this means the contribution of the projects specifically designed for experience transfer is relatively insignificant (about

[125] http://ec.europa.eu/environment/life/project/Projects/index.cfm

7-8%) if measured against the cumulative number of information events, individuals and stakeholders reached by all projects.

Importantly, given the scale of challenges posed by climate change in comparison to the LIFE budget spent on adaptation, a survey and interviews undertaken for the MTE identified that stakeholders agreed that LIFE is acting as a catalyst, providing and disseminating solutions and best practices. A large majority of LIFE project monitoring experts (80%) and national and regional focal points (70%), confirmed that LIFE is accelerating and stimulating change through the Environment and Climate Action sub-programmes, however, the MTE also notes that it is more evident for nature projects.

The stakeholder from EASME/LIFE interviewed for this current study noted that in the past (i.e. pre-2014) LIFE projects focused on resolving local, singular problems and did not strive to replicate innovative ideas whereas the latter is now their main purpose. While LIFE projects always had dissemination events on project completion, it is now compulsory to demonstrate the potential for transferability and to include actions leading to actual replication. The LIFE MTE found that almost all stakeholders consulted (99%) agreed that the Programme contributes to "EU-wide sharing of 'best practices', knowledge transfer, demonstration, and awareness raising" (Ecorys, 2017). However, as ongoing projects in the current work programme started in 2015 and will continue to 2019–2022, the interviewee from EASME/LIFE felt that it is too early to assess the effectiveness of LIFE projects in raising awareness of adaptation. Nevertheless, they pointed to Rotterdam, as a 'lighthouse' project that demonstrates the potential. LIFE funding in 2015 had sought to build upon the city's previous development and implementation of an adaptation strategy. The stakeholder from EASME/LIFE noted that Rotterdam already actively promotes knowledge transfer both within its city administration and to other cities (e.g. through the Covenant of Mayors, C40 Network and Eurocities Network).

The MTE concludes that the Programme could be more effective if there were stronger facilitation of the replication and uptake of results (Ecorys, 2017). While the current LIFE MAWP provides guidance on project-level outcome indicators[126], the LIFE MTE recommends that the Programme's communication strategy should adopt performance indicators that would allow measurement beyond outputs[127] (Ecorys, 2017). Similarly, while the stakeholder from EASME/LIFE highlighted that the LIFE programme puts a strong focus on measurable impacts, they noted that monitoring is focused on the projects not on how they are leading to knowledge transfer and capacity-building across the EU. As LIFE funding is not matched to the scale of the climate change challenge, projects are expected to have a catalytic impact, however, the interviewee noted that it is beyond the Programme's capacity to assess whether LIFE projects have EU-wide impact.

#### 5.2.2.3 Action 3: Introduce adaptation in the Covenant of Mayors framework (2013/2014)


Summary

1. The effectiveness of cities' membership of the Covenant of Mayors is supported by it being the strongest positive influence on the development of adaptation plans identified by correlation analyses undertaken in 2015 by the RAMSES project on a large sample of European cities. However, limited stakeholder feedback for this evaluation indicates some uncertainty as to the extent to which the Covenant of Mayors has been effective in having a positive impact on various aspects of cities' adaptation strategies.


The RAMSES project undertook analysis of cities' climate change plans across Europe (Reckien, 2015). It highlighted that local climate change plans are compulsory in the UK

[126] "LIFE projects need to report on their outcomes and be regularly monitored and evaluated based on the outcome indicators defined at project level and on the basis of those defined in the multiannual work-programme at programme level." See: http://ec.europa.eu/environment/life/toolkit/pmtools/life2014_2020/documents/160215_LIFEproject_level_outcome_indicators.pdf

[127] Recommendation 38e in the LIFE MTE

cities and as a result the vast majority of cities had one. The only other Member State with similar legislation at that time was France but the RAMSES project noted that urban climate change plans were still taking a while to appear. Most other European countries had published national climate change strategies without binding cities to produce plans. In countries with national adaptation and mitigation strategies but no specific directive for cities, such as Germany and Spain, quite a large number of cities had produced climate change mitigation plans at the time of the RAMSES analysis, fewer had both an adaptation and mitigation plan, but none had a plan focused solely on adaptation. Reckien et al. (Reckien, 2015) presumed that national plans helped to guide urban plans but noted that this was not always apparent. At that time 72% of cities across Europe had no adaptation plan (e.g. UK 80% of cities; Spain 19% and Italy 3%). They pointed to the launch of Mayors Adapt (the Covenant of Mayors Initiative on Adaptation to Climate Change) in March 2014, as an acknowledgement of local authorities needing greater guidance on adaptation. The importance of cities' membership of the Covenant of Mayors is underlined by it being the strongest positive influence on the development of adaptation plans identified by correlation analyses undertaken by the RAMSES project (Reckien, 2015)(see Section 5.2.3.3 for further details).

To foster adaptation at local and sub-national level, over the period 2013 to 2017, the following have been supported by the Commission, initially through the Mayors Adapt programme which is now integrated within the Covenant of Mayors for Climate and Energy ('the Covenant of Mayors'):

- Increased visibility of local authorities' commitments and actions
- Development of technical guidance, including for monitoring and reporting
- Outreach and awareness raising to encourage cities and local authorities to sign up to the initiative to commit to local-level adaptation action
- Peer-to-peer networks and facilitation of exchange of experiences
- Capacity building events and webinars
- Online discussion forums
- A twinning programme
- Networking events.

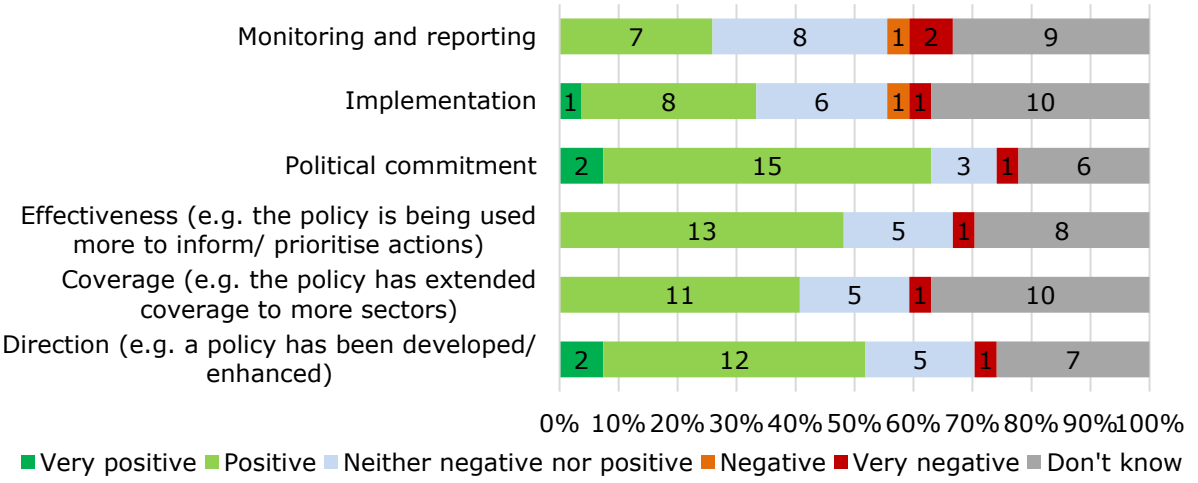
By 14 March 2017, 7,755 signatories (local authorities) from 53 countries, covering 252 million inhabitants) had committed to the Covenant of Mayors. Of those, 1,078 signatories from 41 countries, covering 82.5 million inhabitants (33% of the total signatories' population), had also committed to conduct vulnerability and risk assessments, 295 (27%) had submitted an adaptation action plan, and 106 were monitoring results of their action plans. Respondents to the targeted stakeholder survey overwhelmingly agreed (22 out of 28 responses) that local and regional authorities have developed or are updating plans that include adaptation to climate change.

Signatories to the Covenant of Mayors have voluntarily committed to develop a climate vulnerability and risk assessment and an action plan for targeted adaptation options within two years of signing up to the initiative. The Covenant of Mayors' website provides detailed information for each signatory on a profile page, with an overview, including the current status of progress (Step 1: signature; Step 2: action plan submitted; Step 3: results monitored; or on hold – deadline over), and further details regarding action plans and status.

An interviewee from Climate Alliance, part of the Covenant of Mayors Office, said the framework had given a real boost to raising awareness of the need for adaptation among a significant number of municipalities in Europe. They explained that becoming a signatory to the Covenant of Mayors is accompanied by clear actions, timeframes, steps and a roadmap, which help structure cities commitments, planning and implementation. They noted that it is the cities that commit to act but regional, provincial and sub-national authorities also seek to assist them and that the Covenant of Mayors is also working on providing greater support to these actors. A government official from the Provincial Council of Barcelona emphasised the importance of municipalities engaging with the Covenant of

Mayors, as a means of clarifying processes for decision makers by providing objectives, options and a methodological framework. However, someone working as a national focal point on adaptation and on coordination of their national strategy felt unable to comment on whether the Covenant of Mayors has fostered adaptation action. The national focal point noted that, although many municipalities are signatories to the Covenant of Mayors, most commitments relate to mitigation and no information is provided on action. Asked whether the Covenant of Mayors has had a positive or negative influence on cities adaptation strategies in relation to a list of factors (Figure 5-16), almost half or more of targeted survey respondents chose to 'neither agree nor disagree' or gave 'don't know' responses, including in relation to effectiveness.

**Figure 5-16 Responses to the statement "The Covenant of Mayors has had the following influence on cities' adaptation strategies in relation to"**




*Source: Results of the targeted stakeholder survey. 27 respondents.*

The interviewee from Climate Alliance noted that without financial support from the Commission for managing the Covenant of Mayors Office, no concrete support would have been provided to the committed cities. The interviewee highlighted that in their view this institutional support brings credibility and allows the Covenant of Mayors to be embedded in the EU policy framework. Furthermore, they perceived that the Commission has played a key role in shaping and continuously fine-tuning the initiative, providing support at a strategic level, and helping to build direct bridges between the local and sub-national authorities. An interviewee from the Provincial Council of Barcelona similarly noted the importance of the Commission's support for the Covenant of Mayors office in boosting cities credentials, for example, in relation to securing finance.

#### 5.2.2.4 Action 4: Bridge the knowledge gap

Summary

1. The Strategy has been effective in reducing the knowledge gaps identified when it was launched. Most effort has been focused on addressing regional and local-level analyses and risk assessments, and on frameworks, models and tools to support decision making.
2. The EEA provided a valuable analysis of remaining knowledge gaps in 2017, which have been mapped onto those identified in the Strategy (i.e. they are yet to be fully addressed). The conclusions of PESETA III, which may be released in 2018, could provide an up-to-date indication of knowledge gaps in relation to climate change adaptation.

The 120 climate change related research items published since 2013 that have been categorised according to the four knowledge gaps identified in the Strategy (Section 3.2.1) focus on the following issues (some items were categorized to more than one issue):

- Local and regional analyses and risk assessments (52 items)
- Frameworks, models and tools (39 items)
- Costs and benefits (14 items) and
- Monitoring and evaluation (8 items)
- Other issues (50 items): mainstreaming; cooperation; adaptation technologies; high-end climate change; and a more general category including aspects of the climate system and resilience.

The research items span many sectors with those that span multiple sectors or addressing nature, water and agriculture being the most frequent. Using spending on H2020 as a proxy, it appears most money has been spent on adaptation research looking across a wide range of sectoral domains and particularly in relation to water, cities and disaster risk reduction.

There was very strong agreement among targeted stakeholder survey respondents to the statement that "In general, the EU Adaptation Strategy has helped to reduce knowledge gaps on adaptation in the EU". Only two out of 38 respondents chose to disagree. In responding to a request in the targeted stakeholder survey for specific examples of knowledge gaps that have been bridged through EU action informed by work following the Strategy, many of the 13 respondents identified sources of knowledge supported by the EU (e.g. Climate-ADAPT, LIFE adaptation projects, EEA reports, Copernicus, and CORDEX) rather than gaps themselves. About the latter, three examples relate to impacts, risks and vulnerabilities and there are single instances relating to monitoring and policy making, financial costs of adaptation, and consideration of climate change in infrastructure. An interviewee from Commission Services dealing with research particularly highlighted reports associated with projects under PESETA focused on fluvial and coastal flooding, droughts and forest fires.

Interviewees confirm the notion that there will always be more knowledge gaps, and that the EU has a future role in addressing these. As noted in Section 3.2.1, the EEA (2017a) has provided a valuable analysis of the remaining knowledge gaps. These are mapped in detail in Table 3-4 against the four knowledge gaps identified in the EU Adaptation Strategy.

Asked about overall systematic assessments of remaining knowledge gaps in relation to climate change adaptation, a representative of Commission Services dealing with research noted that the conclusions of PESETA 3, which are due to be released soon, may provide an up-to-date summary of the gaps. An interviewee from the Environmental Research Institute, University College Cork also highlighted that the Joint Programme Initiative (JPI) Climate, an EU-wide consortium involving 20 Member States that was recently awarded a very large H2020 grant, has mapped research gaps in relation to climate services. Pointing to their involvement with a number of major EU-funded research programmes over a long period of time, the interviewee noted the pivotal role of people working at the science-policy interface in making the links, seeing where the gaps are, understanding what is happening at an EU level, how it can be married up at the national level, what research needs building upon and avoiding duplication.

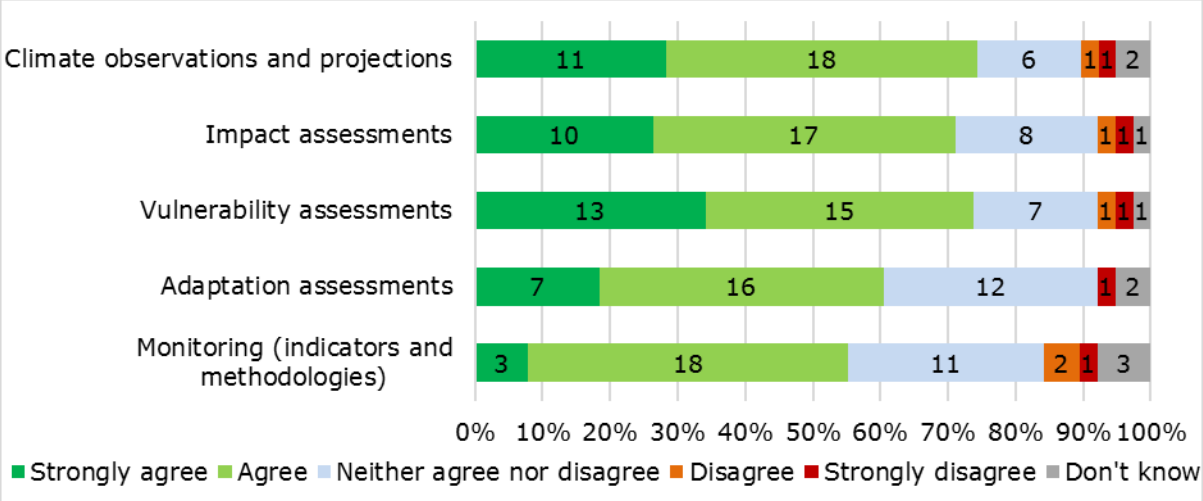
A total of 20 respondents to the targeted survey agreed or strongly agreed that both the development of state-of-the-art reports on available knowledge and science-policy forums have been used to improve the uptake by policy makers of research results on adaptation with almost all other respondents choosing to 'neither agree nor disagree' or providing 'don't know' responses. All examples from respondents of other means used to improve the uptake by policy makers of research results on adaptation refer to other methods of exchanging information, e.g. workshops, events and web pages.

A representative of Commission Services dealing with research interviewed for this study agreed that in relation to this evaluation it is important to bear in mind that there is a time delay between research being undertaken and it leading to better informed decision making. For example, a participant at the public consultation meeting for this evaluation noted that it is a challenge to ensure that results emerge from investment in Copernicus at a sufficient speed to feed in to current policymaking processes. However, a total of 22 out of 40 respondents to the targeted stakeholder survey agreed or strongly agreed that the Strategy has led to better decision making through reduction of knowledge gaps on adaptation in the EU, with only three people choosing to disagree. When prompted for specific examples of how analysis by the JRC (e.g. PESETA) has been used to inform decision making on climate adaptation, most of the 11 examples provided by targeted stakeholder survey respondents referred to access to information. Similarly, when prompted for specific examples of how FP7 and H2020 have been used to inform decision making on climate adaptation, the eight targeted survey responses related to general accessibility of information (e.g. conferences and the role of organisations involved in knowledge transfer), specific projects (BASE, Geoland 2, ImagineS, EUPORIAS, CLIMRUN, IMPACT2C and Copernicus precursor projects) and to resources (e.g. H2020 as a source of resources for implementation).

One key FP7 project for adaptation, HELIX[128], that was not mentioned by respondents to the targeted stakeholder survey, is assisting decision-makers and the research community in making adaptation to our changing climate more understandable and manageable by providing a set of credible, coherent, global and regional views of different worlds at 1.5, 2, 4 and 6°C. It has also further focused on delivering the knowledge needs of Northern Sub-Saharan Africa, South Asia and Europe. However, one stakeholder from a Dutch research organisation noted that FP7 and H2020 have had a limited effect on decision making and that H2020 is too implementation-oriented to substantially further knowledge development.

The targeted survey identified that a majority of respondents agreed that a range of other research activities supported at national or local level, not directly related to the Strategy, have helped to address key knowledge gaps, see Figure 5-17.

**Figure 5-17 Responses to the statement "Other research activities supported at national or local level, not directly related to the EU Adaptation Strategy, that have helped to address key knowledge gaps include"**




*Source: Results of the targeted stakeholder survey. 38-39 respondents.*

An interviewee from the Environmental Research Institute, University College, Cork noted that sectoral or local decision-makers do not know how or where to find relevant research

[128] https://www.helixclimate.eu/our-research/

information unless they have been involved in its development. They suggested that Climate-ADAPT and national platforms need to address how to disseminate EU research more effectively. Similarly, an interviewee from Commission Services dealing with research highlighted the importance of researchers interacting with those who may make use of their results. However, they noted that interaction needs to be fostered at a local level and that this is a role for national authorities rather than the Commission. Furthermore, they emphasised the need to ensure that research is communicated in ways that can be easily understood by non-specialists, including its interpretation in policy-relevant material. In this regard, an interviewee from the Ministry of Ecological and Solidarity Transition, France, expressed particular concern about communication of how to manage for uncertainty.

#### 5.2.2.5 Action 5: Further develop Climate-ADAPT as the 'one-stop shop' for adaptation information in Europe

Summary

1. The Strategy has been effective in supporting continued development of Climate-ADAPT, including provision of communication tools to make information more readily available to decision makers. Visitor numbers have increased steadily.
2. EEA's ongoing evaluation of Climate-ADAPT has identified that it has been an effective source of knowledge for feeding into a variety of policy processes, primarily to inform development of supporting documents but also, more directly, to inform the development of adaptation plans and strategies. In these ways, the evidence suggests that it has been used to support decision making at all stages of the adaptation policy cycle across Europe, mostly by governmental decision makers but also by sectoral experts to a lesser extent.
3. EEA's evaluation identified five core content elements (EU policy; country strategies and actions; adaptation support tools; database; case studies and adaptation options) of Climate-ADAPT that should remain a focus for future developments of the platform.
4. Feedback indicates stakeholders find Climate-ADAPT a very useful source of EU-level information on adaptation but an increasing number of other means of knowledge exchange, as well as national platforms and language barriers suggest that Climate-ADAPT should continue to develop as a 'first-stop-shop' rather than as a 'one-stop shop'.

EEA is undertaking its own ongoing evaluation of Climate-ADAPT. Its draft report (European Environment Agency, 2018, Forthcoming), supplied since the interviews with EEA, confirms that Climate-ADAPT was effective in capturing the growth of knowledge related to climate change adaptation in the evaluation period, published in Europe in English, and publicly available, in terms of quantity, timeliness and in all its diversity. More specifically, it confirms that this included the knowledge that was generated through FP7, H2020, LIFE, and Interreg. EEA's draft evaluation report also notes that Climate-ADAPT presents this knowledge in the policy context in which it is relevant and that research outcomes can be searched via metadata through the database. Nearly half of the respondents to a user/provider survey for EEA's draft report stated that Climate-ADAPT made specific information more relevant, that users gained a better understanding, and that a few providers have even received feedback from users.

EEA regularly analyses detailed web statistics in a relative way to assess trends in users of Climate-ADAPT. The total number of visitors and duration of page views has increased steadily, including to pages relating to the adaptation support tool, national actions, case studies of adaptation actions and the database. There are a substantial number of users from outside Europe (e.g. including regular visitors from the USA). The EEA evaluation has shown that Climate-ADAPT is used as the reference to identify the "state of the art" of adaptation in Europe, to develop tailor-made products for various policy processes, and as

a starting point to extend searches. Hence, it has become a "first-stop shop" rather than a "one-stop shop" for adaptation information in Europe.

Interviewees from EEA said it was difficult to substantiate whether further development of Climate-ADAPT had led to better-informed decision making under the Strategy. However, the user/provider survey for the draft report of EEA's own ongoing evaluation, supplied since the interviews with EEA, has identified that knowledge sourced from Climate-ADAPT has been used primarily to support development of evidence documents (including case studies and impact and vulnerability assessments) and methodologies (e.g. in relation to indicators) that, in turn, have fed into a variety of policy processes. The EEA's survey has also identified that evidence obtained from Climate-ADAPT has been used more directly to inform the development of adaptation plans and strategies. A total of 26 respondents to our targeted stakeholder survey gave specific examples of how they have used Climate-ADAPT of which 19 related to searches for country-level information, cases studies or good practice. Other respondents reported using the site for accessing tools and uploading information.

Around 50% of respondents to the targeted stakeholder survey neither agreed nor disagreed or answered 'don't know' in response to the statement that "The development of Climate-ADAPT has led to better development and implementation of adaptation strategies and actions at a sub-national/urban scale, national or transnational scale". However, 50% of respondents (N=160) to the open public consultation agreed or strongly agreed that Climate-ADAPT has been an important and useful information source in climate change adaptation work with only 4% disagreeing or strongly disagreeing with this statement.

EEA's draft report includes 17 case studies in relation to various specific adaptation challenges, which indicate that Climate-ADAPT has been effective in promoting better informed decision making, primarily by governmental stakeholders but also by sectoral experts, at all governance levels and stages of the policy cycle across Europe. A specific survey, carried out for the case studies, indicated that knowledge from Climate-ADAPT has been used in decision making at all levels of governance and all stages of the adaptation policy cycle across Europe, mostly by governmental decision makers working on adaptation but also by sectoral experts to a lesser extent. EEA's draft evaluation report identifies that success factors have been the transparent and systematic development of Climate-ADAPT that has led to a brand that is a trusted source of information.

#### 5.2.2.6 Action 6: Facilitate the climate-proofing of the Common Agricultural Policy (CAP), the Cohesion Policy and the Common Fisheries Policy (CFP)

Summary

1. Mainstreaming adaptation into EU policy has been effective in focusing on areas of Commission activity where the Strategy made commitments to mainstream.
2. The Commission's guidance on how to further integrate adaptation into the CAP, Cohesion Policy and the CFP has led to progress but has not yet proved effective in promoting comprehensive and consistent mainstreaming.
3. Adaptation is not explicitly an objective of specific measures of rural development programmes or the way in which both the European Agricultural Fund for Rural Development (EAFRD) and the European Agricultural Guarantee Fund (EAGF) are tracked.
4. Both the European Regional Development Fund (ERDF) and the Cohesion Fund (CF) provide contributions to climate adaptation objectives in many sectors but are particularly important for infrastructure investments.
5. The European Maritime and Fisheries Fund (EMFF) seems to have a minor focus on adaptation, raising questions about the extent to which the fisheries sector is climate-proofed.

6. The European Social Fund (ESF) targets social and employment actions, so has less potential to be climate-proofed.

Appendix 5 (Mainstreaming adaptation into EU policies) reviews the Commission's existing understanding of areas where there is, or has been, activity to ensure the integration of climate adaptation concerns. In general, our review suggests that mainstreaming has been effective in focusing on Commission activities where there are commitments made in the Strategy. However, only 22% of respondents (N=160) to the open public consultation agreed or strongly agreed that climate change adaptation has been effectively mainstreamed in EU spending. Responses varied significantly by stakeholder type with both regional (36%) and national authorities (45%) being more positive about the effectiveness of mainstreaming.

Our review has identified that notable areas of the Commission's policy agenda where there appears to have been less effort include:

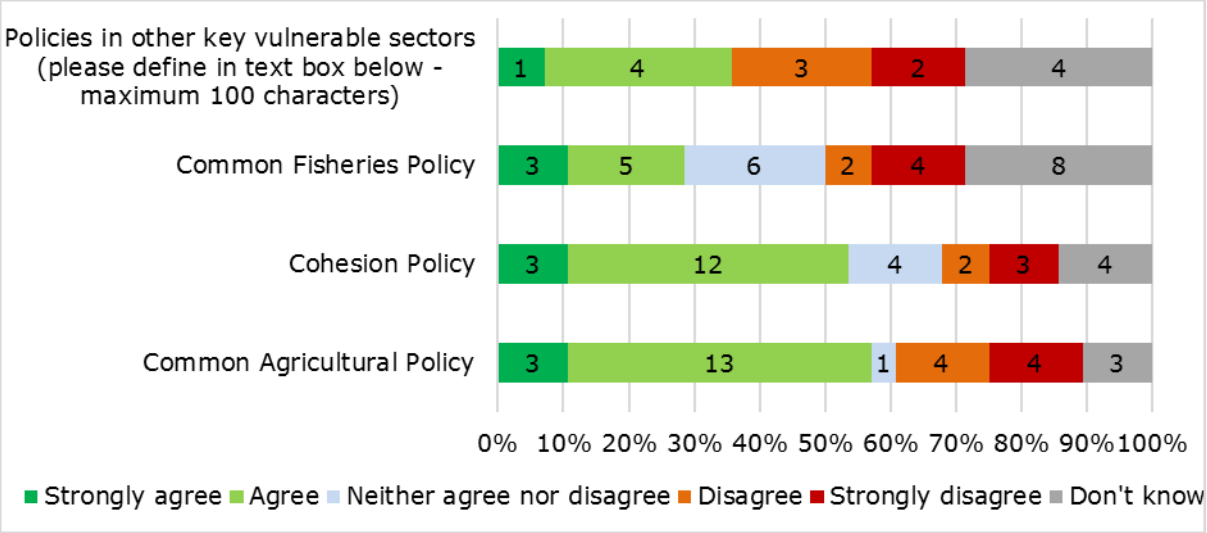
- Direct and indirect impacts of climate change within and beyond the EU on trade
- Plant and animal health disease risks resulting from climate-induced changes in the prevalence of existing diseases and the emergence of new diseases, which may also be the result of climate-induced changes in the range of disease vectors or their inadvertent import through global trade
- European Defence Action Plan and Global Strategy on Foreign and Security Policy, e.g. in relation to implications for the EU of climate change impacts on other countries
- Cyber resilience
- Climate change mitigation in relation to synergies and conflicts with adaptation
- Ecosystem-based approaches to adaptation (e.g. the Strategy indicates that "the Commission will in 2013 explore the need for additional guidance for authorities and decision makers, civil society, private business and conservation practitioners to ensure the full mobilisation of ecosystem-based approaches to adaptation." However, no such guidance has yet been produced.).
- Social resilience (e.g. increasing social inclusion and providing support for vulnerable communities).

It should be noted that Appendix 5 was only compiled from a desk study, so it may not comprehensively identify all actions taken to mainstream climate change adaptation in relation to all policy areas.

Alongside the Strategy three key technical guidance documents were published by the Commission to help managing authorities and other national stakeholders within Member States to consider climate change adaptation effectively within the programming cycle of the CAP (European Commission, 2013h), the Cohesion Policy (European Commission, 2013g) and the CFP (European Commission, 2013p) (see more in Section 3.3.1.1). The documents were published in April 2013, and, as such, had potential to influence the development of the Member State Operational Programmes (OPs) and Rural Development Programmes (RDPs).

The recently published COWI study (COWI, 2016) analysed all OPs and RDPs and aimed to identify the extent to which funds have been allocated to climate change adaptation objectives. The results show a varied picture across the different funds, and as such the various sectors (see more in Section 3.3.1). It was reflected by responses to the open public consultation for this evaluation, as only 22% of respondents (N=160) agreed or strongly agreed that climate change adaptation has been effectively mainstreamed in EU spending. There was also a diverse mix of responses in the targeted stakeholder survey to the statement that "Climate considerations are considered in EU programmes" (Figure 5-18). In relation to the Cohesion Policy and CAP, there was greater agreement or strong agreement that climate consideration had been taken into account than disagreement or strong disagreement. However, for the CFP the balance was more equal, although there were more 'don't know' responses.

**Figure 5-18 Responses to the statement "Climate considerations are taken into account in EU programmes"**

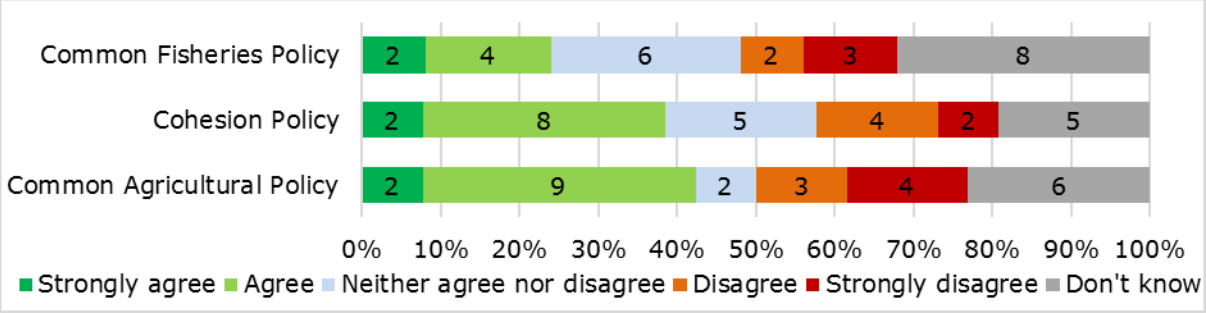



*Source: Results of the targeted stakeholder survey. 28 respondents.*

When prompted for policies in other key vulnerable sectors, four respondents to the targeted survey mentioned water-related policies and other policies mentioned, each by one respondent were the Birds and Habitats Directive, the European Regional Development Fund and on energy infrastructure.

There was a diversity of targeted survey responses as to whether relevant mechanisms introduced by the new regulatory framework for ESIF (2014-2020) have improved mainstreaming across all three policy areas (Figure 5-19).

**Figure 5-19 Responses to the statement "The mechanisms for integrating climate change considerations introduced by the new regulatory framework for the European Structural and Investment Funds for the 2014-2020 period have improved mainstreaming of climate adaptation"**




*Source: Results of the targeted stakeholder survey. 25-26 respondents.*

Overall, adaptation seems to play the largest role in the CAP (i.e. agriculture and forestry) nevertheless there are important caveats which raise concerns about the accuracy of such assumptions (see more in Section 3.3.1). In second and third place are the ERDF and CF, which can target many sectors but in general have an important role in funding infrastructure investments. This is further strengthened by the requirements to conduct vulnerability and risk assessments for the ERDF and CF major projects (see more in Section 3.3.1). Finally, the level of focus on adaptation seems to be minor in the EMFF, as its legislation does not specifically address TO5 ("Promoting climate change adaptation, risk prevention and management"), raising the question about the extent to which the fisheries sector is climate-proofed (see more in Section 3.3.1.3). The same is true of the ESF, which targets social and employment actions and as such has less potential to be climate-proofed. The lack of climate integration in the EMFF and ESF was also emphasised by the

ECA (European Court of Auditors, 2016). In its response published alongside the ECA report, the Commission identified that "the potential contribution of each of the funds varies according to its primary missions"… "Nevertheless, the Commission recognises the need to continue efforts to increase climate relevance across EU programmes…".

The literature review linked to the degree to which adaptation is mainstreamed into CAP, Cohesion Policy and the CFP does not provide specific details of the extent to which adaptation has been promoted on the ground in the various sectors. This will depend on the extent to which the adaptation priorities indicated in the OPs and RDPs are translated into the projects on the ground and are implemented.

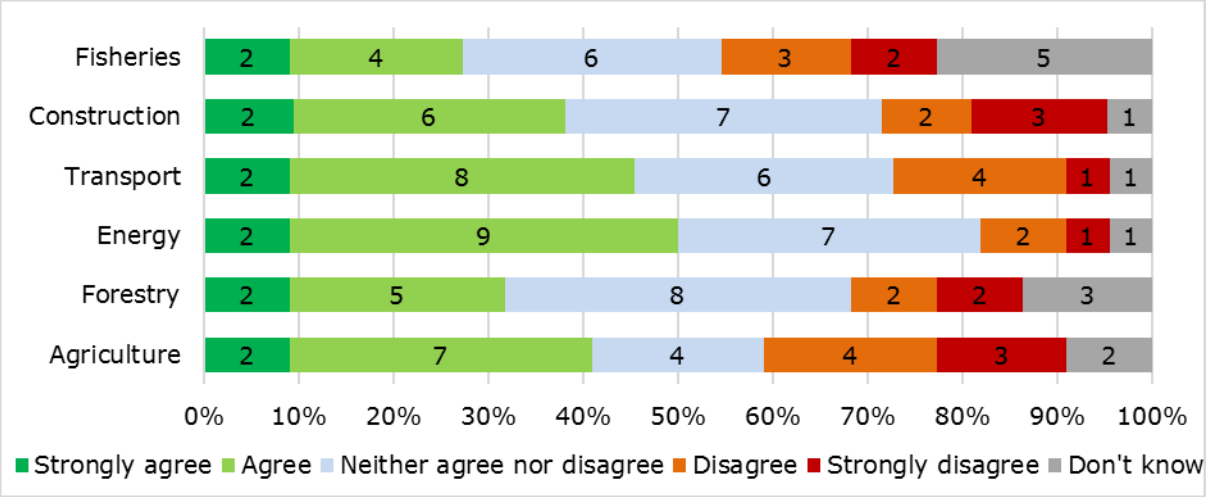
The COWI study (COWI, 2017) states that "a number of Member States have established clear links in their programmes to their national adaptation strategies and action plans at the strategy level. However, when it comes to specific objectives and actions under selected specific Investment Priorities, there is often scope to further strengthen the strategic links between the programmes on the one hand, and the strategies and action plans on the other. Improved coordination between relevant sector ministries at the national and regional levels as well as a strengthened coherence between climate adaptation and disaster risk reduction at the programme level may further strengthen the strategic links." A total of 56% of respondents (N=160) to the open public consultation for this evaluation agreed or strongly agreed that adaptation and disaster risk reduction policies are inadequately coordinated at the EU level with only 12% of respondents disagreeing or strongly disagreeing with this statement. The COWI study also indicates that adaptation has been less successfully integrated into several sectors, including environment, transport, fisheries and agriculture. This chimes with the results of the open public consultation for this evaluation in which, as previously noted, only 22% of respondents (N=160) agreed or strongly agreed that climate change adaptation has been effectively mainstreamed in EU spending, albeit that 45% of respondents from national authorities agreed or strongly agreed.

The overview of the adaptation scoreboard indicator assessment (Section 3.1.1, Figure 3-1) identifies that Member States have made greater progress with horizontal coordination (achieved in 21 Member States and ongoing progress in the remainder) as compared with vertical coordination (achieved in 12 Member States and ongoing progress only being made in a further 12 Member states). However, several stakeholders who provided further comments in response to the open public consultation noted that, beyond the necessity for adaptation at all levels of governance (local, national, and international), links across these levels was in some ways more important in ensuring effective action.

A good practice example of how promotion of adaptation in key vulnerable sectors led to better informed decision making is the requirement to conduct vulnerability and risk assessments for all major projects supported by the ERDF and CF. This has great potential to ensure a greater understanding of climate change risks by project developers and, thus, can help to make better decisions about large infrastructure projects. There may be value in expanding these requirements to all EU infrastructure projects not just major projects. Given the nature of how ESIF are managed – i.e. their management is shared by the Commission and the Member States – there is less scope to influence the project level decisions taken on the ground in the other sectors and funds.

More respondents to the targeted stakeholder survey agreed than disagreed that the promotion of adaptation in key vulnerable sectors has led to better informed decision making at Member State level (Figure 5-20). In addition to the sectors listed in the survey, two respondents also noted that promotion of adaptation in the water sector has led to better informed decision making at Member State level.

**Figure 5-20 Responses to the statement "Promotion of adaptation in key vulnerable sectors has led to better informed decision making at Member State level"**




*Source: Results of the targeted stakeholder survey. 21-22 respondents.*

### 5.2.2.7 Action 7: Ensuring more resilient infrastructure


#### Summary

1. The 'Guide for addressing climate change adaptation in standards', which applies to infrastructure, was developed by CEN-CENELEC and adopted in April 2016.
2. Existing standards have been screened and prioritised resulting in a short list of 13 standards; their revision started in early 2017 and will take about four years.
3. The highly technical language of 'The European Commission Non-paper Guidelines for project managers: making vulnerable investment climate resilient' may limit their use by project developers. However, the Commission's subsequent brochure on Climate "Change and Major Projects" has been helpful in explaining the requirements.
4. Climate change adaptation considerations have been included in the preparation and approval process of European Structural and Investment Funds (ESIF) major projects (i.e. projects having a total eligible cost exceeding €50 million, or €75 million in the case of transport projects) and this has contributed to climate-proofing of such projects. However, the requirements do not apply to smaller projects or projects financed through other funds.
5. The Strategy has been effective in encouraging steps towards ensuring resilient infrastructure.


The Environmental Impact Assessment (EIA) Directive was updated in 2014 to include the impact of projects on climate and the vulnerability of projects to climate change among the aspects to be considered in assessments. The transposition deadline was 16 May 2017. According to the country information in the 'adaptation preparedness scoreboard' (June 2017 version) and EUR-lex (national transposition measures communicated by the Member States)[129], by June 2017 the requirements of the revised EIA Directive had been transposed in 15 Member States (which has since increased to 19; Section 3.1.1, Figure

[129] http://eur-lex.europa.eu/legal-content/EN/NIM/?uri=CELEX:32014L0052

3-1).[130] In most cases, the legislation transposing the revised directive dates from 2016 or 2017. It is unclear to what extent adaptation was considered in impact assessments prior to 2016.

As described in Section 3.3.2.1 in May 2014, the ESOs were given a mandate[131] to undertake standardisation activities in support of the EU Adaptation Strategy's implementation. An interviewee from JASPERS (Joint Assistance to Support Projects in European Regions) explained that a coordinating group was established to assess standards in priority sectors (building/construction, transport, and energy), identified by the Commission, to determine to what extent the standards should be adapted to take account of climate change and thereby ensure more resilient infrastructure. The Dutch Standardisation Institute acted as a secretariat. CEN-CENELEC tried to involve all of the technical committees in the process. The interviewee from JASPERS explained that when a detailed questionnaire was circulated to these committees it was met with little understanding as to what adapting standards to climate change might entail. CEN-CENELEC then developed the 'Guide for addressing climate change adaptation in standards'[132], which was subsequently adopted in April 2016 and applies to infrastructure standards.

An interviewee from CEN-CENELEC said that feedback on their guide had been positive and that a decision tree in the document was generally considered useful. They reported that there had been several hundred views and downloads of the guide after its publication. CEN-CENELEC organised a webinar explaining the importance of climate change adaptation and how to use the guide. The interviewee from JASPERS explained that a series of workshops were also held, not only in the Netherlands but also in other European countries to ensure a broad range of stakeholders could participate. Contractors screened existing standards and presented a list to the technical committees to identify and prioritise the most relevant standards. This process resulted in a short list of 13 standards. At the beginning of 2017, the technical committees began work on revising the standards, which is expected to take about four years. CEN-CENELEC will then consider whether the process should be extended to other standards. According to the interviewee from CEN-CENELEC, the technical committees are currently asking for more detailed information on climate change projections data.

The CEN-CENELEC guide was offered to the International Organisation for Standardisation (ISO and the International Electrotechnical Commission (IEC) for their possible adoption. The CEN-CENELEC interviewee noted that ISO has since used several of the CEN-CENELEC guide's approaches in drafting a new ISO guide on climate mitigation and adaptation.

As outlined in more detail in Section 3.3.2, the key guidance documents on ensuring more resilient infrastructure developed at EU level are:

- European Commission Non-paper Guidelines for project managers: making vulnerable investment climate resilient (European Commission, 2013k)Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (EIA) (European Commission, 2013l)
- Guidance on Integrating Climate Change and Biodiversity into Strategic Environmental Assessment (SEA) (European Commission, 2013m)
- Climate Change and Major Projects. Outline of the climate change related requirements and guidance for major projects in the 2014-2020 programming period. Ensuring resilience to the adverse impacts of climate change and reducing the emission of greenhouse gases (European Commission, 2016b)
- Integrating Climate Change Information and Adaptation in Project Development: Emerging Experience from Practitioners (EUFIWACC, 2016).

[130] Austria, Belgium (only Flanders), Bulgaria, Denmark, Germany, Finland, Hungary, Latvia, Lithuania, Netherlands, Poland, Slovakia, Slovenia, Spain and the UK.
[131] Commission Implementing Decision of 28.5.2014 on deciding to make a standardisation request to the European standardisation organisations pursuant to Article 10 (1) of Regulation (EU) No 1025/2012 of the European Parliament and of the Council in support of implementation of the EU Strategy on Adaptation to Climate Change, C(2014) 3451 final.
[132] https://www.cencenelec.eu/standards/Guides/Pages/default.aspx

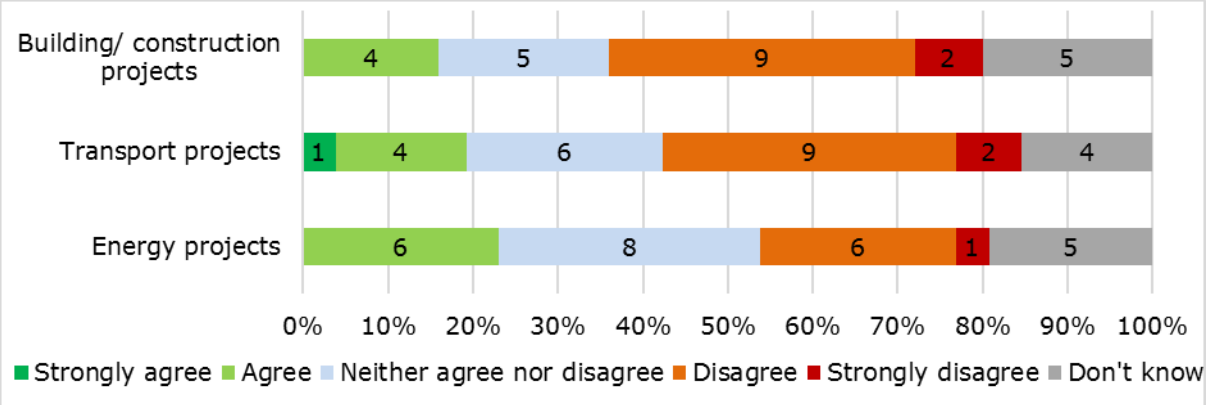
- European Commission brochure on "Climate Change and Major Projects"

The targeted stakeholder survey asked respondents whether they were aware of specific guidelines considering adaptation in infrastructure projects. A total of 21 to 29 responses were received. Most respondents were unaware, for example, only eight people said that they knew of the European Commission Non-paper Guidelines for project managers (European Commission, 2013k) and EUFIWACC (EUFIWACC, 2016). Furthermore, only two respondents said they had used any of the guidelines, although this may perhaps reflect that they were not relevant to the others' roles. Examples provided by targeted stakeholder survey respondents of how the guidelines have been used include for: designing climate resilient infrastructure investments, providing advice on guidelines to developers of projects, and integrating climate in SEA and EIA. Not surprisingly, only a small number of respondents, therefore, expressed a view on how useful they found the guidelines with 5 or 6 agreeing that they were useful.

Further information on the take-up of the guidance documents is limited. Based on experience from several research projects, an interviewee from the consultancy ARCADIS suggested that use of the Commission Non-paper Guidelines varies among Member States. They noted that the extent to which the guidelines are used may relate to whether a Member State applies frequently for EU funding on major projects, has its own system/procedures in place or is developing supporting material (e.g. methodologies, changes in design standards etc.). The interviewee stated that the guidelines seem to be very useful and in some Member States smaller projects also have to follow a similar approach. An interviewee from JASPERS also noted that the European Commission Non-paper Guidelines are being used but suggested that they have not been particularly helpful for project developers, as they are written in highly technical language. They noted that the EUFIWACC guide is useful but is also aimed at experts, so the language used is again not necessarily understandable by non-experts. The brochure on "Climate Change and Major Projects" was developed following a Networking Platform event held by JASPERS. The interviewee from JASPERS felt that the document has generally been useful as it explains the requirements to project developers and managing authorities.

More respondents to the targeted stakeholder questionnaire disagreed than agreed that "Promotion of more resilient infrastructure has led to the integration of consistent and comprehensive consideration of climate adaptation in decision making" (Figure 5-21).

**Figure 5-21 Responses to the statement "Promotion of more resilient infrastructure has led to the integration of consistent and comprehensive consideration of climate adaptation in decision making"**




*Source: Results of the targeted stakeholder survey. 25-26 respondents.*

#### 5.2.2.8 Action 8: Promote insurance and other financial products for resilient investment and business decisions

Summary

- Evidence is equivocal in relation to the effectiveness of the Commission's actions to promote insurance and other financial products for resilient investment and business decisions.

The EU and its Member States have established and committed to the Global Strategy for the European Union's Foreign and Security Policy also known as the "EU Global Strategy" (European Commission, 2017d). This framework among other things seeks to "build, maintain or restore livelihoods in the face of major pressures" and will place greater emphasis on "other structural pressures including environmental degradation, climate change...". The framework also builds on the 2013-2020 Resilience Action Plan and is aligned with EU commitments to the 2030 Agenda. In the framework, economic resilience is discussed as being an important area to consider for the overall resilience of the EU. It mentions financial contingency measures, sustainable and inclusive investment, and promotion of a circular economy to protect vital services and facilities in case of instability. Furthermore, it states that the EU should "work with the European Investment Bank, other International Financial Institutions (IFIs), business sector organisations and social partners to enhance investment frameworks for economic and social resilience". In accordance with this suggestion, the framework goes on to say that the EU should "promote risk transfer through risk financing mechanisms such as insurance and contingency credit".

In seeking to contribute to a more climate resilient Europe, the EU Adaptation Strategy mentions insurance as an effective tool in relation to the risks of climate hazards. The 'Green Paper on Insurance of Natural and Man-made Disasters' was launched concurrently and seeks to pave the way for insurers to manage more efficiently risks stemming from climate change. To date, natural disasters have been covered by annual insurance contracts and the Green Paper suggests that insurers should seek to explore provision of longer-term contracts but cautions against making their regulation uniform across the EU (European Commission, 2013j). Since 2013, the Cohesion Policy, which refers to the ERDF, the ESF and the CF, has included specific provisions on climate change adaptation, in the context of overall risk planning, disaster management and a low-carbon economy. National and/or regional risk assessments for disaster management are a precondition for funding and, where relevant, there is a requirement that these consider the national climate change adaptation strategies (European Commission, 2013g).

In response to a question about what actions the Commission has taken to engage with the insurance and financial sector, since adoption of the EU Adaptation Strategy and the Green Paper, an interviewee from DG ECHO suggested that it is easier to convince people to take adaptation actions when shown that this can reduce losses. The interviewee explained that there has been dialogue with Member States, stakeholder meetings (run jointly by DG CLIMA and DG ECHO) and establishment of an expert group to consider how to collect better data on losses. They noted that industry representatives' involvement in this group has been particularly helpful and that there are some examples of data being shared between Member States to good effect. In addition, they pointed to the PLACARD research platform, which brings together relevant stakeholders in the disaster risk and climate change communities and a Commission working group on ecosystem-based adaptation. An interviewee from the Federation of European Risk Management Associations (FERMA) said that FERMA was not aware of such actions. They claimed that in terms of engagement with the risk management profession, there has been no follow-up engagement since the Green Paper. As such, they said that FERMA was pleased to see the topic considered again by this evaluation.

The interviewee from DG ECHO said that Member States often focus on extreme weather events when they happen but are not necessarily planning ahead in their regard. They

explained that risk assessments usually only span 2-5 years while climate projections are longer term. DG ECHO is considering how it can help Member States in this regard with several research projects modelling shorter-term climate change. The interviewee noted that disaster prevention is relevant across several of the Commission's Directorate-Generals and that it is important not leave the issue to be addressed by DG ECHO alone. They, therefore, welcomed DG CLIMA's push for action in this area in recent years and felt that mention of insurance and risk prevention in the EU Adaptation Strategy had helped to sustain momentum. According to the interviewee, DG FISMA has been reluctant to pursue a legislative approach to promoting insurance and other financial products for resilient investment and business decisions, so DG CLIMA and DG ECHO have stepped in to take the agenda forward through dialogue with Member States. An interviewee from the Geneva Association, a leading international think tank of the insurance industry, expressed concern that across Member States, EU Institutions and Commission Directorate-Generals, disaster risk management and climate adaptation are dealt with in silos (e.g. falling under the remit of different ministries). They advocated that there is a need for a cross-sectoral, cross-disciplinary approach to improving resilience and that public-private partnerships are crucial, as governments cannot finance adaptation alone.

The interviewee from DG ECHO said that, at this stage, they were unsure if the promotion of a market for disaster risk insurance has led to the greater use of financial products, and internalisation of climate costs but that it might do in future. They noted that often these things work in parallel, so for example, it is hard to know if introduction of compulsory insurance in France is because of actions by the Commission. A participant at the public consultation meeting for this evaluation suggested other financial mechanisms may also be relevant, for example, the regulation in France obliging banks to disclose climate risks associated with their assets.

A total of 18 out of 26 respondents to the targeted stakeholder questionnaire stated that they were aware of the Commission's activities to promote insurance and other financial products for resilient investment and business decisions. However, there were mixed responses to the statement "The European Commission's activities have contributed to using the potential of insurance to promote climate risk awareness and mitigation". Slightly more respondents (10 out of 27) agreed or strongly agreed than disagreed or strongly disagreed (7 out of 27). Responses were also mixed in relation to the statement that "The EU Adaptation Strategy helped to gather the support needed to close the climate risk protection gap". Slightly more disagreed or strongly disagreed (9 out of 26) than agreed (5 out of 26). Twelve respondents neither agreed nor disagreed or did not know (Appendix 2B).

### 5.2.3 What drivers and barriers (expected or unexpected) contributed to or stood in the way of implementation of the EU Adaptation Strategy and how did they affect it?

#### 5.2.3.1 Action 1: Encourage all Member States to adopt comprehensive adaptation strategies

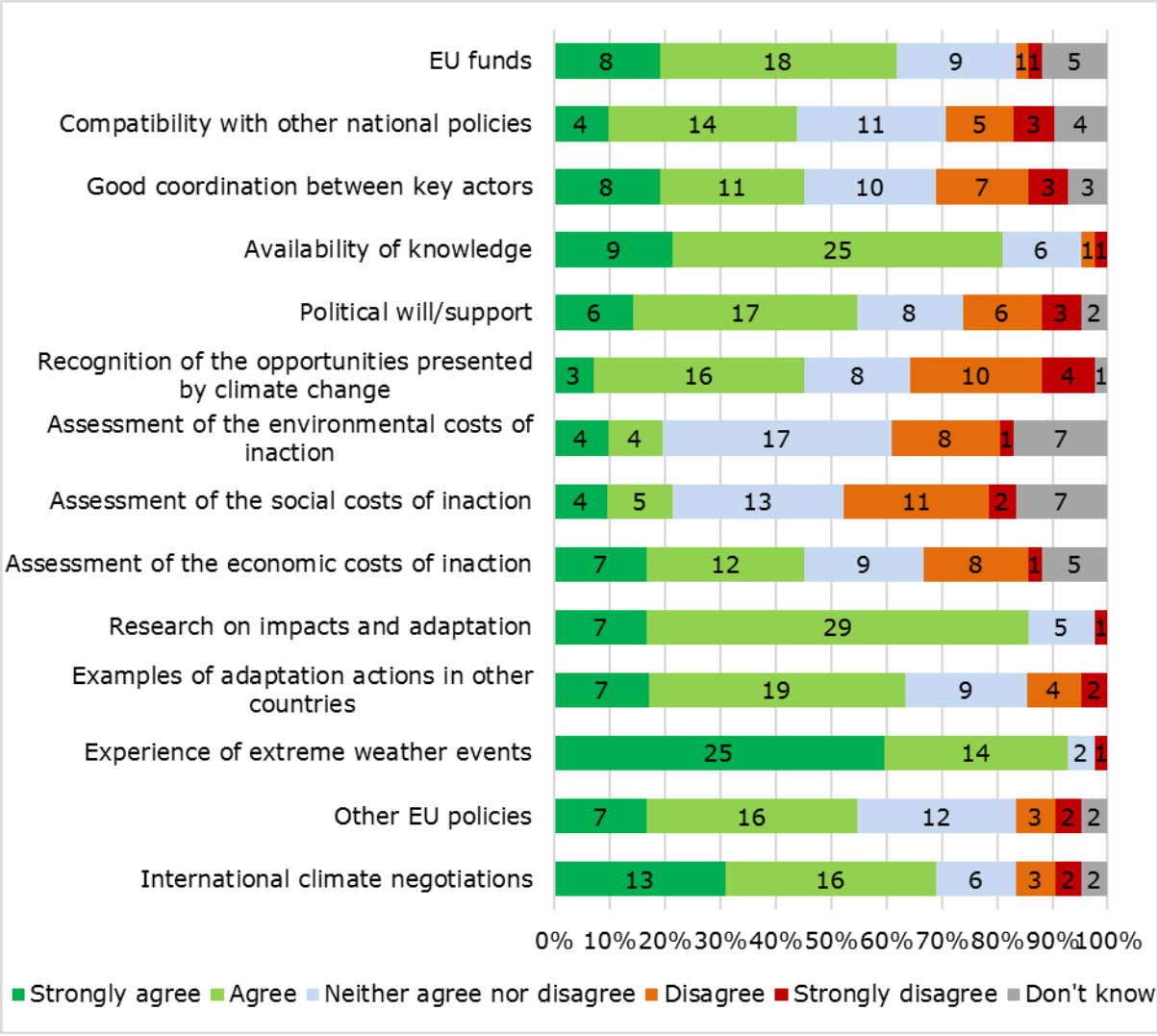
Summary

1. As already noted, the Paris Agreement may have been as important as the Strategy in encouraging development of national adaptation strategies, although feedback from stakeholders suggests many other factors may have encouraged climate adaptation, particularly experience of extreme weather events.
2. Knowledge of economic, environmental and social costs of inaction may have less influence on national decision makers than tangible experience of climate impacts.
3. National adaptation strategies were in general not effective in identifying and addressing regional and cross-border issues; although to some extent European

Territorial Cooperation (ETC) programmes under the European Structural and Investment Funds (ESIF) were able to address this shortfall.

As already noted, it seems likely that establishment of the global adaptation goal by the Paris Agreement (UNFCCC, 2015) may have been as important as the EU Adaptation Strategy in encouraging Member States to continue developing comprehensive adaptation strategies. However, responses to the targeted stakeholder survey suggest that a wide range of other factors have had at least some positive influence at Member State level on encouraging climate adaptation (Figure 5-22).

**Figure 5-22 Responses to the statement "Other factors that have had a positive influence at Member State level to encourage climate adaptation include"**




*Source: Results of the targeted stakeholder survey. 41-42 respondents.*

The factor with which respondents most strongly agreed was "experience of extreme weather events", which was also highlighted as a factor by two interviewees. Interestingly, three of the options that received a greater proportion of disagreement were in relation to assessment of the social, environmental and economic costs of inaction. This suggests that knowledge of the costs of inaction may have less influence on national decision makers than the more tangible practical experience of those potential impacts. Indeed, 56% of respondents to the open public consultation (N=160) agreed or strongly agreed with this conclusion, and only 14% disagreed or strongly disagreed. An additional factor cited by one targeted stakeholder survey respondent was integration of adaptation and mitigation,

as an integral part of national to local planning, supported by aligned policies, legislation and related incentives to promote action. An interviewee from Climate Action Network Europe (Europe's largest coalition working on climate and energy issues) also highlighted pressures from the private and voluntary sectors (such as conservation NGOs), as a factor.

#### 5.2.3.2 Action 2: Provide LIFE funding to support capacity building and step up adaptation action in Europe (2014-2020)

Summary

1. The complexities of LIFE funding may be a substantial barrier to its uptake.
2. The LIFE mid-term evaluation (MTE) has highlighted that integrated projects are complex and need public-private partnership models or grant funding to be viable.
3. With regard to the Natural Capital Financing Facility (NCFF), it has taken time for the European Investment Bank (EIB), investors and project promoters to understand how projects can generate revenue or cost savings from goods that are freely available for people to use.
4. From the perspective of EIB, a strong regulatory framework can encourage investment in adaptation but the regulatory framework for adaptation is generally weak, so does not encourage investment, which has implications for the NCCF.
5. As lack of technical assistance in developing viable business models for complex innovative projects may be a barrier to provision of loans by the NCCF, the EIB is building its capacity to support climate change adaptation.

Two interviewees noted that the complexities of LIFE funding may be a substantial barrier to its uptake. They suggested that the programme might be streamlined further or a simpler mechanism developed, as they advocated that there is still a need for demonstration projects that link providers of information to decision-makers with a view to enhancing decisions. An interviewee with responsibilities as a national focal point on adaptation and for coordinating a national strategy explained that the approval rate of LIFE applications from their Member State is lower than the EU average. As a result, the national focal point has a capacity-building project to help change this situation. They suggested that the programme's evaluation criteria are often not fully understood, which does not guarantee equality of support between Member States. They also noted that the overall budget of the LIFE programme as well as co-funding by the EU are very low, especially when compared with ESIF. They saw this as is a big constraint and that LIFE is not matched to the financial needs of adaptation.

As noted in Section 3.1.2, the Natural Capital Financing Facility (NCFF) implemented by the European Investment Bank (EIB) was introduced to the LIFE programme in 2015 (MAWP 2014 – 2017) in order to provide financial solutions to bankable projects. Three of the five projects that have been under appraisal are adaptation-related: the Irish Sustainable Forest Fund, Alzette River Renaturalisation, and the Croatian Development Bank (HBOR) Natural Capital Multi-Beneficiary Intermediated Loan (MBIL). A number of these projects are in the pipeline, but for the time being, no finance has yet been made available. The first project supported by the NCFF, signed in April 2017, was a €6 million loan to Rewilding Europe Capital, a funding facility that provides financial loans to new and existing business that support rewilding in Europe. While focused on nature and biodiversity the project also has adaptation-related benefits.

The LIFE MTE notes that key barriers for the NCFF are affordable SME finance and low or risky profitability of projects especially for new business lines. The MTE also refers to a report on climate adaptation investments and financing instruments (Ecorys, 2017), which shows that business models heavily depend on the possibility of integrated land development projects and revenue generation across sectors (e.g. energy, land and urban

development, tourism). The report gives the example of a flood safety barrier combined with nature development that provided possible income streams from land and urban development. The LIFE MTE notes that such integrated projects are complex and need public-private partnership models or viability gap grant funding to arrive at viable implementation models. The MTE suggests this could be an area where support through the NCFF instrument in combination with LIFE grants for integrated projects or ERDF grants would be worth further investigation.

To some degree consistent with thoughts from the LIFE MTE, the interviewees from the EIB noted that the main barrier that they have faced is the time it has taken to establish the NCFF, as a new instrument to provide finance to projects as loans that would normally have received grants from the Commission or nationally. In particular, the interviewees stated that it has taken a mind shift for EIB, investors and project promoters to understand how projects can generate revenue or cost savings, where associated goods have no price and can be used freely by other people. The EIB interviewees also explained a strong regulatory framework aided investment in adaptation but felt the regulatory framework for adaptation was generally weak, so does not encourage investment. They cited wastewater taxation as an example of the beneficial impact of a strong regulatory framework on investment in adaptation. The interviewees noted that in those EU countries or sub-regions of countries where a wastewater tax is imposed there is a lot of investment in "unsealing" land and in green roofs in order to reduce wastewater entering drains and thereby avoid taxation.

The LIFE MTE suggests limited experience in financial institutions or funds with some innovative business lines could be a barrier. Hence, lack of technical assistance in developing, structuring and developing viable business models for more complex and innovative projects may be another barrier. In this regard, the interviewees from the EIB noted that the Bank is seeking to step up its game in supporting climate change adaptation through building capacity within the EIB. They explained that EIB staff would then be able to raise appropriate questions about climate risks and relevant adaptation measures, understand sector-specific sensitivities and the level of understanding of project promotors, and assess in which cases technical assistance is needed. The EIB interviewees highlighted that offering technical assistance with the assessment of project's climate risks, when projects apply for finance can be a real eye opener for people, raising awareness of the risks and of the need for adaptation.

#### 5.2.3.3 Action 3: Introduce adaptation in the Covenant of Mayors framework (2013/2014)

Summary

1. Analyses of potential drivers and barriers affecting the development of adaptation plans for a large sample of European cities identified that cities' current adaptive capacity was a more important driver of adaptation planning than anticipated impacts and vulnerabilities.
2. Interviewees for this evaluation all identified that the following issues, many of which relate to adaptive capacity, have been important barriers to adaptation action by cities and local authorities: insufficient financial resources, translating results of cost-benefit analyses to a local level, lack of awareness and relevant technical expertise among staff, and uncertainties in climate change projections.

The final report prepared by the delivery team for Mayors Adapt (Milieu, 2016) highlighted several key areas where they experienced challenges, which mostly related to transitioning to the integrated Covenant of Mayors framework, for which they suggested solutions, as summarised below:

- **Lack of publication of urban and local adaptation strategies and plans**, and a need for DG CLIMA, EEA, CoR and national institutions to encourage local authorities

to share their documents once produced, regardless of the language in which they are written.

- **Major structural changes during the project**, most notably the establishment of the Covenant of Mayors for Climate and Energy in October 2015 and the ongoing transition to the Global Covenant of Mayors for Climate and Energy. These were resolved through close coordination between the consortia, DG CLIMA and DG ENER, and task forces that met on a regular basis until the end of Mayors Adapt to ensure coherence and avoid duplication. The final report from the Mayors Adapt team also noted more clarification was needed of the requirements and expectations from the integrated Covenant of Mayors to maintain momentum from 2017 onwards.
- **Developing a monitoring and reporting framework** that meets cities, towns and more generally local authorities' needs. The Mayors Adapt project integrated requests from practitioners and the Commission to improve the overall content, structure and user-friendliness of the template, and noted the importance of allowing time for thorough consultation with cities and local authorities in close collaboration with the Commission, Covenant of Mayors and other key stakeholders.
- **Cities working on adaptation are not always members of adaptation initiatives**, as they may perceive that a need for additional reporting outweighs potential benefits. Enhancing the role of Covenant National Co-ordinators will, therefore, be crucial in building bridges between adaptation policy making at European and national levels, and facilitating cities use of national policy instruments, additional funding schemes, and technical assistance tools in national languages.
- **City profile factsheets were of less interest to cities than expected**, so future data related to adaptation will be integrated into existing profiles and the new reporting template to minimise reporting burdens.
- **Language barriers**, as limited resources meant materials and tools could only be made available in English, so DG CLIMA and the Covenant of Mayors team need to ensure materials are available, wherever possible, in local languages to ensure greater accessibility.

The correlation analyses undertaken by the RAMSES project to identify potential drivers and barriers affecting the development of adaptation plans for a large sample of European cities determined general, broad-scale influences rather than location and context-specific factors (Reckien, 2015). Other than membership of the Covenant of Mayors, which was determined to have the strongest positive influence on the development of adaptation plans (Section 5.2.2.3), a city's population size, and current adaptive capacity were found to be the most significant drivers of adaptation. C40[133] and ICLEI[134] membership, as well as average GDP per capita and population density were all associated with adaptation planning, but were less statistically significant. Membership of climate networks (apart from the Climate Alliance[135]), originally founded to support mitigation action, was also significantly correlated with adaptation plans.

Reckien et al. (Reckien, 2015) identified a relatively large number of barriers to adaptation planning, compared with mitigation. There was a significant negative correlation with smart cities, which invest in ICT to develop social and environmental capital. This may suggest that they have committed all their resources to the smart city concept and/or have perceived conflicts with adaptation. Cities very close to the sea or with relatively warm summer temperatures also had less chance of having an adaptation plan, so risks of coastal flooding or heatwaves were not found to be a driver of climate change plans. This was reinforced by the fact that cities at risk of severe climate change impacts and with a high degree of future vulnerability had fewer adaptation plans. Hence cities' current capacity to engage in climate actions was a more important driver of adaptation planning than anticipated impacts and vulnerabilities. Adaptive capacity was most strongly

[133] http://www.c40.org/
[134] http://www.iclei.org/
[135] http://www.climatealliance.org/home.html

associated with GDP per capita, which was in turn significantly lower in cities at high risk of climate change impacts.

Interviewees for our study from Climate Alliance, the Provincial Council of Barcelona, and an organisation with responsibilities as national focal point on EU adaptation and on coordination of the national strategy, all identified that the following issues, many of which relate to adaptive capacity, have been important barriers to adaptation action:

- **Lack of financial resources** – The interviewee from Climate Alliance noted that this is the main barrier to adaptation raised by cities and local authorities. While there is funding available at EU level, they said that many do not know either it is there or how to access it. Adaptation may require substantial investment, as highlighted by the interviewee from Barcelona Province highlighted. To exemplify the point, they explained that many rivers have been canalised and that even just to restore them to a more natural state, as a means of avoiding flooding, will involve addressing a lot of infrastructure.
- **Challenges posed by cost-benefit analysis** – The interviewee from Climate Action explained that there is a barrier in moving beyond information or results that arise from assessing costs and benefits of climate change to what it means at the local level. The interviewee from the Provincial Council of Barcelona noted that municipalities are easily prevented from implementing adaptation actions, if they cannot provide cost-benefit analyses. Participants at the public consultation meeting also noted that there is a lack of financial tools, based on cost-benefit analyses, to support selection of climate adaptation options.
- **Lack of awareness and relevant technical expertise** – With few people and few resources, many local authorities' technical staff have to cover a wide range of technical areas, particularly in municipalities that have a small population but cover a large land area. Many have previously focused on mitigation and are only now beginning to address adaptation, so there is a need to build awareness, capacity and technical expertise. In addition, the interviewee from the Provincial Council of Barcelona noted a need for greater mainstreaming of adaptation within local authorities, as technical staff tend to work in silos. A respondent to the targeted stakeholder survey also gave public administration capacities and lack of a clear framework as a specific barrier to adaptation action.
- **Uncertainties in climate change projections –** This was raised as a barrier when Mayors Adapt was launched in 2014, according to the interviewee from Climate Alliance. As cities understand that they may not be affected directly or immediately by extreme weather events, many question why they should take action. The interviewee from the Provincial Council of Barcelona explained that, even if projections suggest a high probability, lack of certainty can make it difficult to convince decision makers. Hence, the national focal point on adaptation coordinating a national strategy expressed a desire for further downscaling of climate scenarios.

A wider issue raised by the person from the Provincial Council of Barcelona is that the EU is focusing adaptation on urban areas and it is important to appreciate that the climate resilience of urban areas also depends on their rural surroundings.

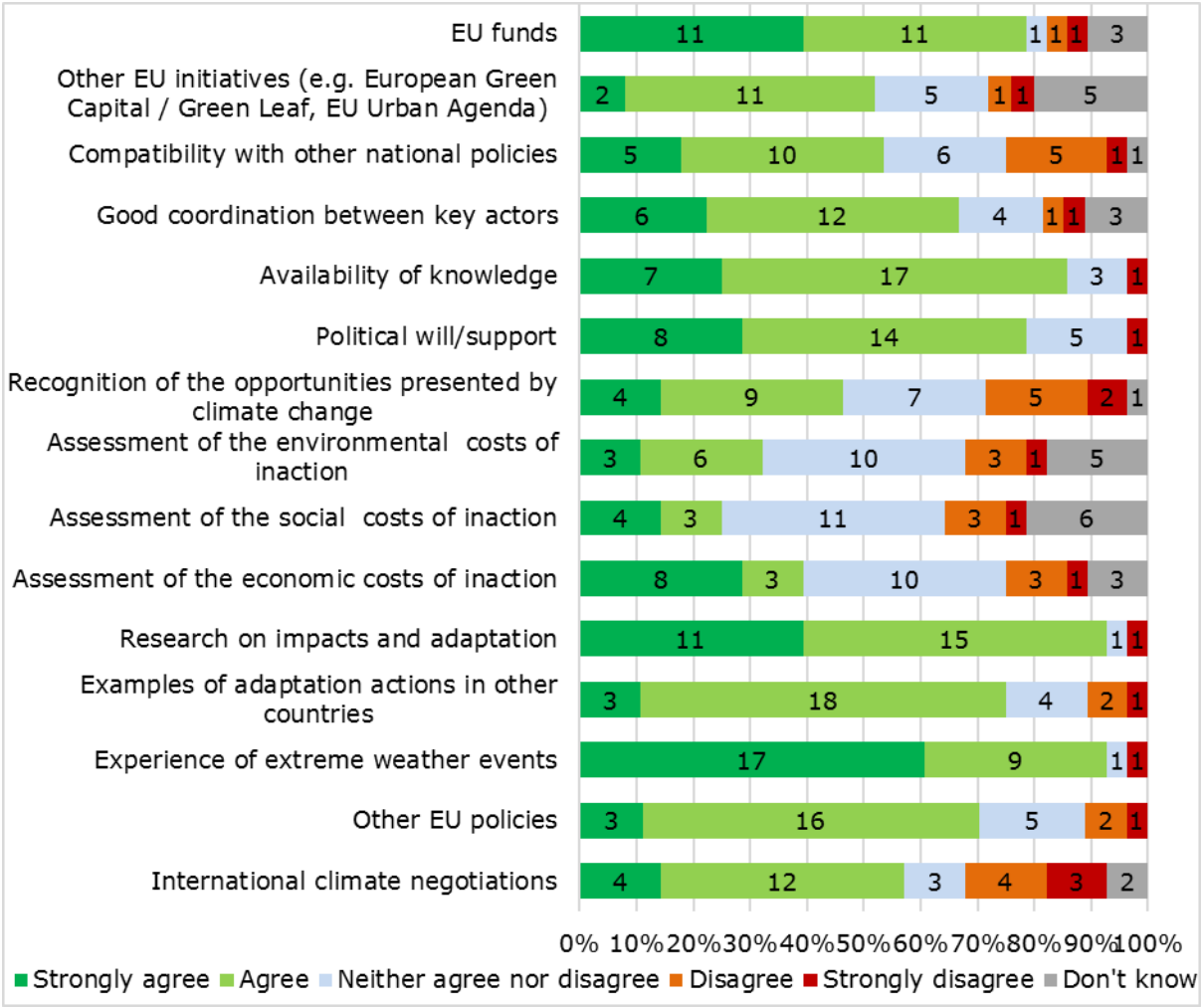
An interviewee from the City of Munich highlighted the importance of national funding, which had enabled them to develop their adaptation strategy. The interviewee noted that it may take time to discern barriers to implementation. They suggested that only once adaptation actions recently passed by their city council have been implemented in about a year's time will they be able to comment more.

The interviewee from Climate Alliance noted that adoption of a national adaptation strategy or plan often catalyses action at a sub-national or local level. For example, adoption of the national adaptation strategy in Italy was accompanied by round table discussions with cities and regions. They also noted that the different tools and online portals developed have helped cities and regions preparedness through access to more information and guidelines (e.g. Covenant of Mayors/Mayors Adapt websites and Climate-

ADAPT platform). Furthermore, they pointed to several adaptation-related EU or national projects have helped to foster adaptation[136].

Responses to the targeted stakeholder survey suggest that a wide range of factors, other than the EU Adaptation Strategy, have had at least some positive influence on encouraging climate adaptation at a sub-national and local level (Figure 5-23) (see also Figure 5-22). The factor with which respondents again most strongly agreed was experience of extreme weather events. Reflecting thoughts from our interviewees on challenges posed by cost-benefit analyses explained above, interestingly, the targeted stakeholder survey responses suggest that knowledge of the costs of inaction may have a greater influence on decision makers at sub-national or local level than at a national level. This in turn suggests that cost-benefit analyses may be more beneficial when undertaken local to decisions.

**Figure 5-23 Responses to the statement "Other factors that have had a positive influence on actions taken at sub-national and local level to encourage climate adaptation include"**




*Source: Results of the targeted stakeholder survey. 25-28 respondents.*

[136] Future Cities, http://www.future-cities.eu/ ; Ramses, http://www.ramses-cities.eu/ ; BASE, http://base-adaptation.eu/ ; TURAS, http://www.turas-cities.org/ ; SEAP-Alps, http://seap-alps.eu/hp2/Home.htm

#### 5.2.3.4 Action 4: Bridge the knowledge gaps

Summary

1. Barriers to EU activities increasing knowledge of climate change impacts and adaptation, include: the way that themes are separated and structured within the Commission; lack of political will in some Member States; insufficient interactions between scientists, policymakers and practitioners; difficulties with accessing data; insufficient cooperation between policymakers across Member States; and insufficient funding for research.
2. The Strategy has helped to increase knowledge and awareness of climate change impacts and adaptation through provision of information, including Climate-ADAPT.

Different barriers to EU activities increasing knowledge of climate change impacts and adaptation were highlighted by each of the three interviewees for our study who commented on this issue.

A person from DG RTD identified:

- **Institutional barriers** – The way in which themes are separated and structured within the Commission is not necessarily conducive to joint working and has an impact on the way research and innovation programmes are designed, which has meant some knowledge gaps have not yet been sufficiently addressed, e.g. in relation to health and climate change, a thematic area relevant to all four knowledge gaps identified in the Strategy
- **Lack of political will demonstrated by some Member States** – For some Member States, climate change adaptation is not a political priority. There is a clear divide between the EU15 (comprising Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, United Kingdom) and the EU 13 (other Member States) in the number of proposals on climate change submitted to RTD, which may reflect a lack of awareness of the Commission's priorities. Hence, RTD seeks to organise ministerial events with decision-makers, policymakers and researchers in some of the EU13 Member States
- **Insufficient interactions between scientists and practitioners** – Adaptation is still seen as a science-led issue. In the EU15, scientists and consultants talk to one another and get things done but this is not necessarily the case in the EU 13.

Another interviewee from Commission Services dealing with research noted that barriers to EU activities increasing knowledge include:

- **Access to data –** Member States either do not collect data on past losses, are reluctant to share it, or it is difficult to compare across Member States due to differences in the way it is collected and parameters used. JRC has tried to fill some of these gaps through assessments or modelling but the data may only be perceived as valid for research purposes not for policymaking. Targeted stakeholder survey responses noted that problems with data increase with decreasing scale, e.g. a lack of data available at country level to assess vulnerability and potential impacts.
- **A need for greater cooperation between policymakers across Member States** – However, researchers are generally willing to cooperate and work together. Related points made by respondents to the targeted stakeholder survey were that Member States have different historical backgrounds and natural resources and that there is a lack of integrated approaches and methodologies.

An interviewee from the Environmental Research Institute, University College, Cork highlighted:

- **Researchers need to ensure that their research can be used by decision makers –** There is a need to focus research more on implementation. The big challenge is not only creating and generating knowledge but trying to ensure that it

can be used by decision makers. Related points made by respondents to the targeted stakeholder survey were that:

- Much of the research is undertaken by individual states, and there are few platforms to undertake EU-wide research. The Joint Programming Initiative "Connecting Climate Knowledge for Europe" (JPI Climate) was cited as an example that has limited support.
- The scientific community is not obliged to work with policy makers to address the most important issues, so research is too distant from policy needs.
- Research activities can be overcomplex and produce results that are difficult to turn into policy recommendations.
- There is inefficient transfer of knowledge from research to operations.

Other examples of barriers to research activities in the EU on climate change impacts, vulnerabilities and adaptation provided by 12 respondents to the targeted stakeholder survey (Appendix 2B) related to:

- **Funding –** Research funding can be difficult to obtain at a Member State level; a point reinforced at the public consultation meeting for this evaluation when the need for multi-country coverage was highlighted as a barrier. Direct research is not eligible for funding by the LIFE programme and is limited to H2020. The latter is focused on large projects with many partners from different Member States, so it may be difficult to secure for country-specific research. There are considerable risks of duplication and a lack of flexibility in funding provision due to such uncertainty, as auditing may conclude that the results do not justify the funding.
- **International impacts –**There was agreement or strong agreement from 60% of respondents to the open public consultation (N=160) that "The EU's vulnerabilities to impacts outside of the EU (because of other countries not taking proper adaptation action) are not yet mapped" with only 6% disagreeing with this statement. However, notably EEA did recently produce a report that included a section on 'Europe's vulnerability to climate change impacts outside Europe' (European Environment Agency, 2017a; European Environment Agency, 2017); Section 6.4). There was also agreement or strong agreement from 47% of respondents to the open public consultation that "Cooperation is not in place with third countries to reduce EU vulnerabilities to climate impacts from outside the EU" with only 10% of respondents disagreeing.

A case study was developed for this evaluation which sought to provide supporting evidence by focusing on the impact of climate change outside the EU on food production and supply within the EU (see Box 1 below). However, reflecting on the EU response to date and feedback from Member States, described in the case study, there appears to be a broader need for the EU to review existing evidence and invest, where necessary, in further research in order to identify Europe's vulnerabilities to climate change impacts elsewhere, particularly in neighbouring countries. This would then enable the EU to consider the extent of likely impacts from spill-over effects on Member States and commensurate actions required within and beyond Europe to increase the EU's resilience to climate change. Guidance could subsequently be provided to Member States on the potential urgency of preparing for these impacts, for example, through review and further development of national adaptation strategies.

A total of 20 targeted stakeholder survey respondents also provided examples of barriers to the use of knowledge on climate adaptation in decision-making in the EU, which relate to other themes (Appendix 2B):

- Difficulties with accessing relevant data
- Lack of (political) will
- Divergent interests
- Lack of capacity
- Lack of (sufficient) funding
- The complexities of combining adaptation across sectors and with mitigation.

**Box 1. Case study on spill-over effects from climate change impacts occurring outside the EU**

This case study was developed to provide supporting evidence about the impact of climate change outside the EU on food production and supply within the EU. In 2012, DG CLIMA commissioned a study to investigate spill-over effects in the EU of climate change impacts occurring outside the EU (AMEC, 2013). The report concluded that no matter how robust adaptation planning is within the EU, it will remain vulnerable to the impacts of climate change outside the EU, particularly from neighbouring countries. Food production and supply has been recognised as a vulnerable priority sector to such spill-over effects, especially in relation to crops grown elsewhere on which the EU is reliant (Benzie et al., 2017).

The EEA's latest report on climate impacts in Europe in 2016 (European Environment Agency, 2017a; European Environment Agency, 2017) (Section 6.4) highlighted how climate change impacts have already affected agricultural production outside the EU and had spill-over effects on Europe through regional or global markets and value chains. For example, the 2010 wheat crisis in Russia, caused by severe heatwaves, destroyed 30% of Russia's grain harvest, resulting in an export ban on wheat that contributed to a 60% to 80% increase in global wheat prices (Foresight, 2011); Coghlan et al., 2014, cited by (European Environment Agency, 2017c). Other EU-funded research has since found that soya bean, which is used in Europe as an animal feed for meat and dairy production, is currently sourced from a region highly vulnerable to climate change (Ercin A.E, 2016). More generally, it has been noted that Southern Europe is likely to be particularly vulnerable to climate change related spill-over effects from outside the EU (European Environment Agency, 2017a; European Environment Agency, 2017).

Representatives of three Member State authorities were consulted with regard to this case study. It appears from these consultations with that the issue of spill-over effects, at least in relation to food production and supply, has not yet been addressed by some, and perhaps all, national adaptation strategies or plans. One Member State confirmed that it was unaware of this issue at the time of preparing its first national adaptation plan and that, as it had not been raised as a concern, it was not factored in to its future adaptation planning priorities. Another Member State noted that while its current national adaptation plan did address the issue of spill-over effects, future iterations of the plan would consider such impacts. A further Member State reflected that there is a need for clarity as to what is meant by spill-over effects, for example, in relation to their link with climate change as compared with other drivers and policies. It noted also that there is very little literature and guidance available on this issue and that a subsequent EU-level review of relevant existing studies at the sector level would be helpful, for example, in relation to impacts on food production and supply within the EU. In addition, it questioned if the EU Adaptation Strategy is the best place to address spill-over effects or whether they should be addressed by other policies.

The interviewee from Commission Services dealing with research noted that national and local authorities were best placed to comment on whether the EU Adaptation Strategy has been effective in overcoming these barriers. The person from the Environmental Research Institute, University College, Cork doubted whether the barriers had been fully anticipated when the Strategy was prepared. They felt that the research culture has rapidly evolved from a focus on the research itself to how it will be used, and what that means for what level and type of information is required at different levels of decision-making, what needs to be done to provide it and how it is provided. However, five examples were provided by respondents to the targeted stakeholder survey of how the Strategy has helped to overcome these potential barriers. Four related to provision of information, including the Climate-ADAPT platform.

#### 5.2.3.5 Action 5: Further develop Climate-ADAPT as the 'one-stop shop' for adaptation information in Europe

Summary

1. Evidence from EEA interviewees suggests development of Climate-ADAPT has been limited by: insufficient past involvement of Directorates-General other than DG CLIMA, difficulties in implementing specific IT needs of the Covenant of Mayors, and annual resources that have necessitated balancing dissemination and networking with quality of content update and functionality.
2. Evidence from EEA identifies drivers that have stimulated Climate-ADAPT's development are: increasing interest in adaptation, and efficient links to and networking with Member States through the platform's management by a European Topic Centre (ETC).
3. Growing interest and engagement of various DGs and EU agencies means EEA is increasingly receiving information on EU policy developments and outputs from EU-funded work, which is required to reach sectoral organisations that should mainstream adaptation.

Interviewees from EEA explained that the following drivers have acted as barriers or limited efforts to further develop Climate-ADAPT:

1. **Difficulty in engaging DGs other than DG CLIMA –** The interviewees noted that it has proven difficult after the start of Climate-ADAPT (in 2012) to engage other DGs and their level of interest has not been as great as needed. Establishment of an advisory group for Climate-ADAPT has apparently been a positive step but it has only been possible in the last since 2016. The Commission is establishing various new thematic platforms (e.g. on green infrastructure or nature-based solutions), funded through EU research funds, and there is growing awareness that these initiatives need to be coordinated to enhance synergies with and avoid inefficiencies in the further development of existing platforms, such as Climate-ADAPT.
2. **Evolution of the Covenant of Mayors initiative** – The launch of Mayors Adapt in 2014 and subsequent merger with the Covenant of Mayors initiative, as well as extension of the latter into a global initiative in 2016, has led to difficulties in Climate-ADAPT implementing the specific IT needs of the adaptation support tool and provision of information on cities' actions.
3. **Current annual resources** – These comprise one project manager, other staff within EEA's Impacts, Vulnerabilities and Adaptation Group for a limited amount of their time, one person in IT, and €200,000 annually on content development through ETC/CCA (Table 5-1). In addition, DG CLIMA has provided various contracts to support dissemination and use of Climate-ADAPT, as well as for development of functionalities through IT contracts.

Drivers identified by the EEA interviewees as having stimulated further development of Climate-ADAPT are:

1. **Increasing interest from politicians and practitioners in adaptation** – Climate-ADAPT has tried to encourage the development of adaptation strategies and actions, while the increasing importance of adaptation for the international policy agenda has also driven the content of Climate-ADAPT. The interviewees noted that there is a lot of interest from countries in learning from each other and Climate-ADAPT is helping in this respect, but is only one way of doing so
2. **Management of the platform by an ETC networking with EEA member countries** – The interviewees noted that EEA's regular contacts with the member countries' representatives on developments of Climate-ADAPT have helped to enhance interest in and use of the platform. Networking activities have included the annual Eionet workshop, several dedicated expert meetings held with countries in the period 2013-2016, webinars held in 2016-2017, and a regular newsletter

since 2015, which have all ensured efficient links with the Member States. In addition, the Climate-ADAPT ETC's experts promote the platform intensively in their countries (confirmed by the number of people using Climate-ADAPT per country). The EEA has also promoted use of Climate-ADAPT at many conferences and workshops across the EU.

EEA aims for Climate-ADAPT to be fully up-to-date with EU policy developments and the outputs from EU-funded work (e.g. FP7, H2020, JPI, Interreg, LIFE). EEA (and the Climate-ADAPT ETC) collected and analysed a lot of EU-level information itself. However, with the growing interest and engagement of various DGs and EU agencies, EEA is increasingly receiving direct input and relevant information from them. EEA has done a lot of dissemination, and DG CLIMA has implemented various dissemination projects and a project trying to develop 'communities of practice' in key EU sector policies. Interviewees noted that Climate-ADAPT has been intended as the key knowledge platform for adaptation in Europe, which they consider is a big challenge, as it means it should be recognised as such by all relevant stakeholders at EU, transnational, national and possibly even sub-national level. In their opinion, it is not there yet and they suggested that there is doubt whether it will ever get there.

The EEA interviewees pointed to the many other players now in the field and noted that the focus of the platform has shifted from it becoming a 'one-stop-shop' to being the 'first-stop-shop' providing access to a wide variety of information sources. This has been confirmed by the results of the Climate-ADAPT evaluation. The main future challenge that the EEA interviewees see is to identify the links and complementarities between the many knowledge initiatives and platforms at EU-level, particularly in relation to climate services, disaster risk management, biodiversity and green infrastructure. In addition, they suggested complementarity with national adaptation platforms will need to be further explored, a point also made by some other interviewees including a person from the Environmental Research Institute, University College, Cork.

Current annual resources demand that EEA balances efforts on quality of content update, functionality, and dissemination and networking. The EEA interviewees report that the organisation has increased dissemination and networking over the last few years, e.g. by introducing a newsletter and webinars. They acknowledged that this has led to somewhat less attention on updating and improving some of the content but noted that various sections have been substantially updated and improved, including the pages based on official country reporting, case studies and on EU policies and the database, which has been expanded considerably. The whole content management system has changed from when Climate-ADAPT was launched to EEA's own system at a cost of €100,000. This will deliver a wide range of benefits, for example, it will enable the Climate-ADAPT search tool to be upgraded to be the same as the one on EEA's web site.

#### 5.2.3.6 Action 6: Facilitate the climate-proofing of the Common Agricultural Policy (CAP), the Cohesion Policy and the Common Fisheries Policy (CFP)

Summary

1. High-profile political commitment to the Paris Agreement, establishment of the 20% climate mainstreaming target and associated climate expenditure tracking methodology have been important drivers of climate-proofing of the CAP, the Cohesion Policy and the CFP.
2. Mainstreaming promoted by the Strategy was not always picked up by managing authorities at programme and investment levels.
3. Connections made between adaptation, risk prevention and civil protection in the Cohesion Policy have sometimes helped promote adaptation in key vulnerable sectors.
4. National adaptation strategies have served as a driving force for integrating adaptation considerations into key sectors

5. It is challenging to define and measure adaptation actions, and establish adequate output indicators.
6. Adaptation measures need to be applied locally and regionally, which makes establishment of high-level political targets more challenging than for mitigation.
7. The lack of focus on adaptation and relevant targets within the Europe 2020 Strategy has made it harder to drive adaptation, than mitigation, actions.
8. Lack of dedicated EU legislation on climate change adaptation can be regarded as a barrier.

An interviewee from DG REGIO noted that the Paris Agreement has been an important factor promoting adaptation in key vulnerable sectors. At the EU level, the establishment of the 20% climate mainstreaming target and the development of a climate expenditure tracking methodology has served as an important driving force in climate-proofing of the CAP, Cohesion Policy and CFP and the relevant sectors (see more in Section 3.3.1). While this can be seen as complementary to Action 6 of the Strategy, given the high profile of the political commitment to the 20% target, the role of the Strategy in climate-proofing these policy areas might have been less prominent. Furthermore, concerns were raised at the stakeholder workshop organised under the Commission's service contract on "Climate mainstreaming in the EU Budget: preparing for the next MFF" that mainstreaming promoted by the Strategy was not necessarily picked up by managing authorities at programme and investment levels (Ricardo Energy & Environment, IEEP, Trinomics, 2017). According to an interviewee from DG REGIO another activity that has promoted adaptation in key vulnerable sectors has been the connections made between adaptation, risk prevention and civil protection in the Cohesion Policy, which have helped to raise awareness among more actors in the Member States.

At the national level, the national adaptation strategies have served as key a driving force for integrating adaptation considerations into key sectors. Specific examples provided by 15 respondents to the targeted stakeholder survey of other factors that might have promoted adaptation in key vulnerable sectors relate to extreme weather events, and the floods and fires that may follow.

The high-level political nature of the 20% target has served as an important factor in providing momentum for managing authorities to consider climate change mitigation and adaptation in their PAs, OPs and RDPs. At the same time, the nature of the target has raised concerns with regards to its practical implication, particularly as a result of the lack of a process in ensuring that the 20% target is met in practice (Ricardo Energy & Environment, IEEP, Trinomics, 2017). The 20% commitment is mentioned in the EU Adaptation Strategy as an important factor in financing adaptation actions in the EU.

With regards to barriers, it is challenging to define and measure adaptation actions, and as such establish adequate output indicators. Many adaptation measures need to be applied at the local and regional level, which makes it more difficult to establish high-level political targets for adaptation than for mitigation. The lack of focus on adaptation and the establishment of relevant targets within the Europe 2020 Strategy has made it difficult to drive adaptation actions at the same level as for mitigation. A total of 14 respondents to the targeted stakeholder survey provided specific examples of barriers to EU activities promoting adaptation in key vulnerable sectors (Agriculture, Forestry, Energy, Transport, Construction, Fisheries; Appendix 2B). Overarching barriers that some respondents identified as applying to several sectors include:

- Level and scale of available information on climate impacts and uncertainties of extreme events (frequency and magnitude) – energy, transport and construction sectors
- Need for climate proofing standards – energy, transport and construction sectors
- Attitudes towards climate change, lack of collaboration between sectors – all six sectors
- Insufficient EU initiatives to promote adaptation – energy and transport sectors

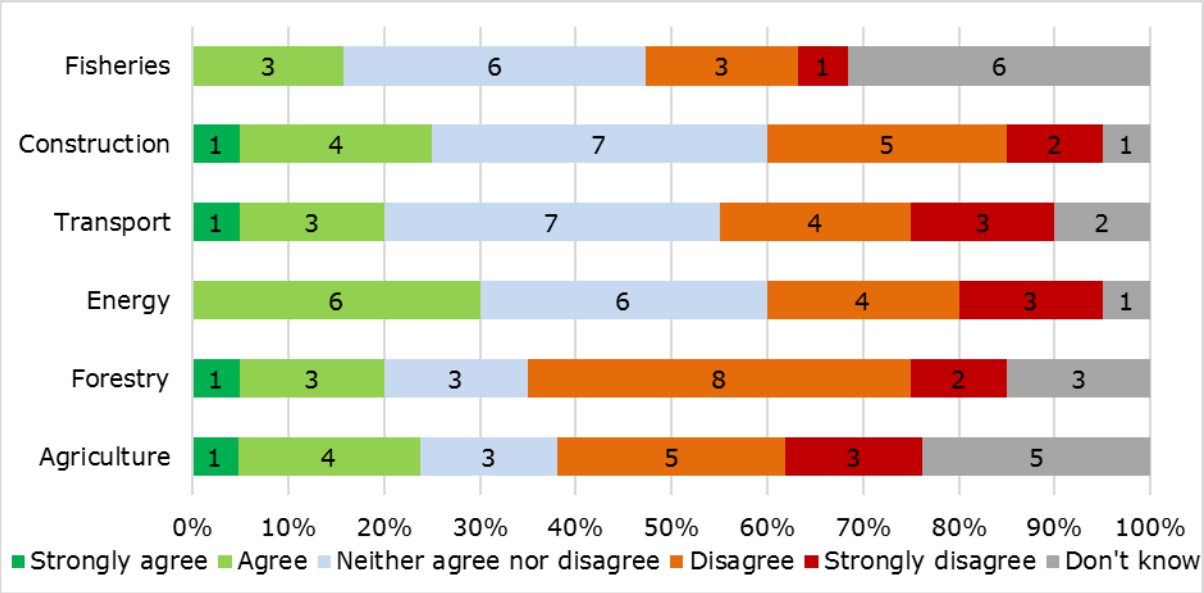
- Funding – all six sectors
- No legal obligation to consider climate risk (or very limited) – energy, transport and construction sectors.

Participants in the public consultation meeting for this evaluation also suggested that the EU Habitats Directive may be an impediment to adaptation, on the grounds that it restricts scope for making changes to the landscape. Participants also suggested that certain requirements of Good Agricultural and Environmental Conditions (GAEC) under the CAP have a similar effect. Regardless of whether this perception is accurate, it suggests there is at least a lack of clarity in the advice reaching land managers.

Given the challenges of defining adaptation actions, it is more difficult to mainstream adaptation objectives as compared with those for climate mitigation. Furthermore, it is challenging to clearly define in some policy areas whether an action really delivers adaptation benefits or only has adaptation potential (e.g. many environmental measures targeting biodiversity, soil, or water) and will not deliver any benefits on the ground. This is further complicated by problems with adaptation indicators (see above).

When asked whether the Strategy has helped to overcome barriers to EU activities promoting adaptation in key vulnerable sectors, respondents gave a mixed response (Figure 5-24). The level of disagreement was greatest in the forestry sector.

**Figure 5-24 Responses to the statement "Thinking of barriers in response to the previous question, the EU Adaptation Strategy helps to overcome these barriers"**




*Source: Results of the targeted stakeholder survey. 19-21 respondents.*

### 5.2.3.7 Action 7: Ensuring more resilient infrastructure

#### Summary

1. Factors that have contributed to promotion of more resilient infrastructure in the EU include:
   - Some European cities' involvement in '100 Resilient Cities' and the 'Making Cities Resilient' campaign (both non-EU initiatives), and
   - The requirement that projects must fulfil conditions set out in the EIB's 'Environmental and Social Handbook' to receive finance from the bank.
   - The requirement that all major projects under the ESIF should have an analysis of the environmental impact, taking into account climate change adaptation and mitigation needs, and disaster resilience.

Asked whether there any other factors than the EU Adaptation Strategy that have promoted better inclusion of adaptation considerations in infrastructure standards, an interviewee from CEN-CENELEC emphasised that they felt the Strategy itself played an important role in triggering action.

As mentioned in Section 3.3.1, in the 2014-2020 programming period, approval of major projects[137] funded by the ESIF is also subject to "an analysis of the environmental impact, considering climate change adaptation and mitigation needs, and disaster resilience" (Article 101 of Regulation (EU) No 1303/2013). The inclusion of climate requirements in major projects financed under ESIF has been useful, according to an interviewee from JASPERS. The interviewee said that in many cases it is these requirements that make beneficiaries incorporate adaptation considerations in the first place (i.e. after initially seeing adaptation as a requirement, project promoters start to see it as good project practice). Yet not all EU-funded infrastructure projects are required to do so, which may be a missed opportunity to promote climate resilience. An interviewee from ICLEI highlighted that the involvement of some European cities in two non-EU initiatives, '100 resilient cities' initiative and the 'Making Cities Resilient' campaign, has also contributed to promotion of more resilient infrastructure in the EU.

The EIB's requirements set out in the Bank's Environmental and Social Handbook (European Investment Bank, 2013), which all projects must fulfil to secure finance, have been a factor in ensuring climate-proofing of infrastructure projects. The Handbook provides that proposed projects undergo a vulnerability assessment, based on an evaluation of:

- The climate risk in the region, country, sector activities or project sites (where data is available)
- The capacity of the country/region to factor in these risks given its level of development or specific actions that it may have already undertaken
- The capacity of the project promoter to manage climate risks, and
- The extent to which the project may have adverse consequences on the vulnerability of natural ecosystems and human structures.

If it is determined that the project may be vulnerable to climate change, the promoter is required to introduce climate change parameters into the preparation and design of the projects, and to identify and apply adaptation measures to ensure the sustainability of the project. In cases where projects are at high risk due to climate change or when they affect the vulnerability of a country or geographical area, the promoter may be required to implement design changes.

The targeted stakeholder survey requested specific examples of barriers to assessing climate impacts as part of infrastructure projects and programmes. Examples were provided by 11 or 12 respondents for projects relating to energy, transport or building/construction (Appendix 2B). The examples highlight procedures, lack of awareness, behavioural aspects, standards/guidelines, data and the degree of uncertainty in impacts. A participant at the public consultation meeting similarly noted that the private sector needs to understand the risks, and that there is a knowledge gap between high-level projections and more specific information. There were mixed responses from 25 stakeholders to the targeted stakeholder survey as to whether the Strategy helps to overcome such barriers. Excluding 'don't know' responses, more stakeholders disagreed (or strongly disagreed) than agreed (seven or eight vs. four) and no-one strongly agreed.

[137] A major project has a total eligible cost exceeding €50 million (and €75 million for transport projects).

**Box 2. Case study on adaptation of infrastructure in the energy sector: underground electricity cables**

This case study was developed to examine the actions being taken in the energy sector to adapt to climate change. It focuses on examples of adapting power networks to climate change. This is important as energy infrastructure is critical to modern society. The long lifespan and large investments associated with infrastructure mean that adaptation measures are best taken as early as possible. Energy infrastructure, particularly transmission and distribution lines, is particularly vulnerable to a number of different climate impacts. These impacts impose significant costs for network operators, from the short-term damage repair costs to longer-term costs to reputation (and losing customers), higher insurance premiums and potential for financial penalties for poor service quality. These potential costs provide important financial incentives for operators to adapt and by doing so boost the security of energy supply.

Increased wind and storm damage, increased temperatures (decreases conductivity) and other impacts (e.g. flooding, sagging, thawing permafrost) all pose an important risk for overhead transmission and distribution cables. Operators are, therefore, starting to adopt underground cables as a solution. For example, in Finland, the distribution system operator (DSO) Elenia, one of more than 70 DSOs in the country, has committed to all new cables being put underground with the climate proofing benefits a major driver of this move. More than €120 million is being invested in the replacement of more than 3,000 km of overhead cables in 2017-2018, with 70% of cabling to be underground by 2028. This move is also driven by regulation in Finland which will penalise firms that have extended power cuts in future. Similar moves towards underground cabling can be found in Denmark and Germany.

Private stakeholders are expected to take the lead in climate proofing in the energy sector to protect their assets and respond to the financial and regulatory incentives in place. The EU and national governments can play a role in creating stronger incentives and removing barriers to such action.

#### 5.2.3.8 Action 8: Promote insurance and other financial products for resilient investment and business decisions

Summary

1. As highlighted by the Federation of European Risk Management Associations (FERMA), the market penetration of insurance is influenced by insurance pools and systems controlled by the state, and the maturity of natural disaster insurance markets.
2. It is difficult to compare market penetration rates among Member States, as data collection is not standardised among national authorities.
3. Inadequate risk awareness and variations in the insurance culture among Member States may have limited market development for risk management and insurance policy instruments.
4. An important barrier may be that Member States' disaster risk management and climate adaptation are dealt with in ministerial silos.

An interviewee from the Geneva Association noted that risk transfer and insurance solutions should be an integral part of a comprehensive approach to climate adaptation and risk management. They noted that there is growing evidence that countries with widespread market-based insurance coverage do recover faster from the financial impacts of extreme events. While the benefits of risk transfer tools, such as insurance, are increasingly being recognised globally, they noted that there is still a large, and in some places growing protection gap. The interviewee highlighted that, on average, more than

two thirds of the economic losses from natural hazards remain uninsured globally. They estimated that the gap in EU countries could be as high as 50%, given the level of development and concentration of people and assets in high-risk zones.

An interviewee from FERMA noted that two key factors influencing the market penetration of insurance are:

- The presence of insurance pools and systems controlled by the state, which affects demand on the part of industry
- The maturity of natural disaster insurance markets. In some Member States (e.g. France, UK) the market is mature, as the countries have historically dealt with these issues, while in other European countries relevant insurance products have only been introduced more recently.

In terms of barriers, the interviewee noted that the market capacities exist (i.e. FERMA members have access to disaster insurance products) but it is difficult to compare market penetration rates among Member States, as data collection is not standardised and is dependent on the rules set by national authorities. A lack of data was also identified as a key barrier by an interviewee from DG ECHO. They stated that inadequate risk awareness and variations in the culture of insurance among Member States have also stood in the way of efforts to further develop the market for risk management and insurance policy instruments. The interviewee noted that insurance is a useful tool but others are also needed, as it can only work if combined with other tools that, for example, increase risk awareness. They pointed to use of seed funding in humanitarian aid to increase resilience. They also acknowledged that activities within the Covenant of Mayors are important in illustrating what can be achieved at a local level.

The interviewee from the Geneva Association felt that it is critical that countries develop capacities to analyse and communicate the risk, as underpinning information to develop the right measures. They suggested that development of insurance programmes and related markets should go hand-in-hand with governments' efforts to:

- Reduce or prevent (new) risks through measures such as land zoning, enforcement of robust building codes, incorporation of risk reduction in the planning design and maintenance of critical infrastructure, and investment in natural infrastructure.
- Establish emergency preparedness and early warning systems that expedite responses to and recovery from disasters.
- Promote innovative risk financing and risk transfer measures for governments, businesses and individuals to distribute the residual financial risks through engaging private sector insurance companies.
- Plan effective reconstruction after any event, prevent recurrent risks and build resilience to future events.

The interviewee from the Geneva Association noted that disaster risk management and climate adaptation are dealt with in ministerial silos by Member States. They suggested that this is also the case within the EU institutions and the Commission's Directorate-Generals. They advocated that there is a need for a cross-sectoral, cross-disciplinary approach to improving resilience and that public-private partnerships are crucial, as governments cannot finance adaptation alone.

### 5.2.4 What effects has the Strategy produced so far for different stakeholders, e.g. according to socio-economic background and vulnerability?

Summary

1. The Strategy's objectives and associated actions are directly targeted at public, private and third sector decision makers. The Impact Assessment's operational objectives and performance measures do not aim to measure the societal

impacts of the Strategy, so this question extends beyond the normal scope of the evaluation.

2. The Strategy will have wide-ranging indirect impacts on other stakeholders across society. It foresees that adaptation action will contribute to a more climate-resilient Europe and, in doing so, will bring new market opportunities, jobs and benefits for people.
3. As the Strategy was only launched in 2013, it is too early to determine whether it has had such resultant societal impacts.
4. There were too few responses to the targeted survey to differentiate the Strategy's effects on different stakeholders.
5. While more people responded to the public consultation, the results only aid understanding of how different stakeholders perceive the effectiveness of the Strategy's implementation not how it has affected stakeholders differentially.

The Strategy's objectives and associated actions are directly targeted at Commission Services, Member State authorities, local authorities, researchers, and private and third sector decision makers. The same is true of the Impact Assessment's operational objectives and performance measures, which do not aim to measure the Strategy's societal impacts. This question, therefore, extends beyond the normal scope of the evaluation.

The actions taken by the stakeholders directly targeted by the Strategy will have wide-ranging indirect impacts on other stakeholders across society. The Strategy foresees that adaptation action will contribute to a more climate-resilient Europe and, in doing so, will bring new market opportunities, jobs and benefits for stakeholders, in such sectors as agricultural technologies, ecosystem management, construction, water management and insurance. For example, mainstreaming of climate change adaptation in the Common Agricultural Policy by policy and decision makers will provide benefits to farmers through reducing climate sensitivities and increasing their adaptive capacities to cope with climate change. However, as the Strategy was only launched in 2013, it is too early to determine whether it has had such resultant societal impacts.

The targeted stakeholder survey elicited too low a response rate to inform any meaningful differentiation of the Strategy's effects on different stakeholders. The simpler public consultation questionnaire led to a higher response rate but its brevity and the nature of the questions only allow analysis of how different stakeholders perceive the effectiveness of various aspects of the Strategy's implementation (Sections 5.2.1 and 5.2.2) and not how it has affected stakeholders differentially.

There is a need for further work on the Strategy's performance indicators in order to measure its societal impact (currently not measured). The societal impact is difficult to measure in the short term but it is precisely for this reason that the new indicators could be important in the future, when the effects will be more measurable.

## 5.3 Efficiency

### 5.3.1 How adequate were the resources for the overall implementation of the EU Adaptation Strategy and how proportionate were those resources across its eight actions?

Summary

1. Administrative costs directly resulting from the Strategy are very low and mostly limited to the European Commission as costs for Member States are voluntary or negligible.
2. Costs for other stakeholders resulting from the Strategy are voluntary in the majority of cases and linked to access to EU funds.

3. Feedback was limited but suggests that stakeholders found the resources adequate for implementing the Strategy and proportionate across the actions.
4. Yet, there is not enough evidence to conclude if the resources have been truly sufficient to support the achievement of the Strategy's objectives.

Overall stakeholders felt the resources for implementation have been adequate, however, most are unaware of how much of their administrative burden has been distributed per action, and some stakeholder groups, e.g. NGOs, felt more resources were needed.

An understanding of the resources provided for the implementation of the Strategy is required to assess whether they were adequate. Table 5-1 provides a summary of resources spent on implementation with a focus on administrative costs of the actions of the Strategy. The figures are derived from a variety of sources and some assumptions and estimates are employed. It is important to note that the table summarises only the costs incurred as a direct result of the Strategy and its implementation, it does not include costs voluntarily incurred by stakeholders to benefit from instruments under the umbrella of the Strategy, e.g. match funding from participants in LIFE projects, is not included. Table 5-1 demonstrates that the Commission has expended the most significant resources and funding to implement the Strategy, although the resources provided by the Member State and private stakeholder groups especially for Actions 2 and 4 are likely higher in reality.

**Table 5-1 Summary of costs per year and action, € millions**

| Action | Resource inputs/ burdens | Prior to 2013 | 2013 | 2014 | 2015 | 2016 | 2017 | Total |
|---|---|---|---|---|---|---|---|---|
| **A1 Member State adaptation strategies** | EC | 0.04 | Unable to make clear estimate. | | | | | **0.0** |
| | MS | | Interviews suggest MS resources for scoreboard update are negligible. | | | | | **0.0** |
| **A2 LIFE funding** | EC | | | 38.6 | | 75.8 | 75.8 | **190.1** |
| | MS | | | Voluntary contributions as co-funding | | | | **0.0** |
| | Private | | | Voluntary contributions as co-funding | | | | **0.0** |
| **A3 Covenant of Mayors** | EC | 0.87 | 0.53 | 0.56 | 0.6 | 0.55 | 0.80 | **3.9** |
| | MS | | | | | | 2.2 | **2.2** |
| **A4 Knowledge gaps** | EC | | > 225.5 | | | | | **225.5** |
| | MS | | | | | | | |
| | Private | | | | | | | |
| **A5 Climate-ADAPT** | EC | | 0.60 | 0.49 | 0.60 | 0.47 | 0.52 | **2.7** |
| | MS | | No data available | | | | | **0.0** |
| | Private | | 0.10 | 0.03 | 0.00 | 0.01 | 0.00 | **0.1** |
| **A6 Climate proofing** | EC | 0.49 | | | | | | **0.5** |
| | MS | | No data available | | | | | **0.0** |
| **A7 Resilient infrastructure** | EC | 0.11 | | | | | | **0.1** |
| | Private | | | | | | | **0.0** |
| **A8 Insurance** | EC | | | | | | | **0.0** |
| **Total** | EC | | | | | | | **422.8** |

| Action | Resource inputs/ burdens | Prior to 2013 | 2013 | 2014 | 2015 | 2016 | 2017 | Total |
|---|---|---|---|---|---|---|---|---|
| | MS | | | | | | | **2.2** |
| | Private | | | | | | | **0.1** |

***Notes and sources:*** *Gaps in the table signify that no data was found for this specific item, although in reality there may still have been relevant costs incurred.*

*For Action 1 data was provided by DG CLIMA that indicated that a small study (€35,000) was commissioned by the Commission in 2011 to support the development of the guidance for preparation of national adaptation strategies, but this was prior to launch of the Strategy.*

*For Action 2, of the total funding of €190.1 million, specific annual data is known only for 2014 and 2015, the remaining total is split over 2016 and 2017 equally.*

*For Action 3, figures were provided by DG CLIMA and relate to four contracts implemented since 2011 to fund the Covenant of Mayors. For Member State (municipalities) costs, the Strategy's Impact Assessment estimated monitoring costs of up to €50,000 per city (average €25,000 cost assumed); the sum is estimated for 2017 based on 89 active cities providing monitoring reports. This number should continue to increase in future as more cities provide monitoring reports and join the Covenant. The figures also include the first year of a 3-year administrative arrangement between DG CLIMA and the JRC to fund the Covenant of Mayors for €400,000.*

*For Action 4, the figures are totals based on an analysis of specific adaptation-themed projects and contracts funded by H2020. Other projects funded by FP7, EEA, JRC, DG CLIMA were also identified but without accurate estimates of costs, therefore, whilst relevant these are not included, except for noting that the total will be greater than (>) the €225m in the table.*

*For Action 5, the figures are based on data provided by EEA, please also refer to the analysis presented in Section 5.2.3.5* [138]*.*

*For Action 6 and 7, the figures are based on data provided by DG CLIMA on single contracts issued by the Commission. For Action 6, costs of preparing guidelines for the CFP were not within the scope of the study to prepare guidelines for the CAP/EAFRD or of the Impact Assessment and are, therefore, excluded. For Action 7, the cost represents a contract to prepare the guidelines for project managers. No estimate for the Green Infrastructure Strategy is included, as this was not estimated in the Impact Assessment.*

*For Action 8, no costs are included as these were not estimated in the Impact Assessment. Although under this action a green paper on insurance was published, green papers are considered the core business of the Commission and, as such, no account is taken of the costs of their development.*

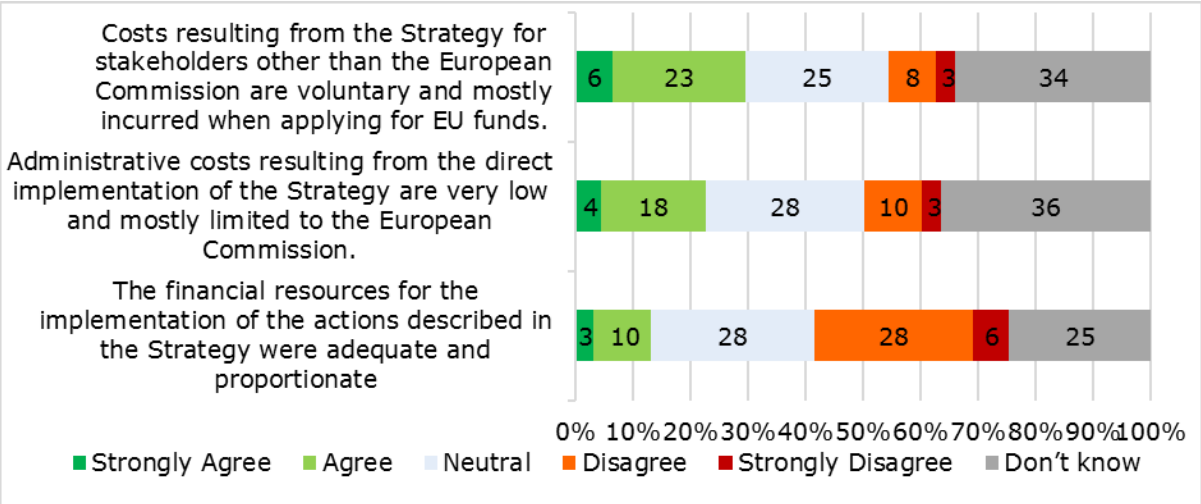
The Commission costs have been in funding projects under the relevant programmes for Actions 2 and 4 and in funding the Mayors Adapt initiative, and its later integration into the Covenant of Mayors for Climate and Energy, for Action 3. For the other actions, the main resources relevant to the assessment have been expended in the EU to provide: guidance and materials to other stakeholders to support the preparation of the national adaptation strategies and country fiches for the adaptation preparedness scoreboard (Action 1); guidelines to managing authorities of structural funds (Action 6); and guidance to developers for the promotion of resilient infrastructure (Action 7). The assessment of the adequacy of these funds rests on the assessment of effectiveness, i.e. were the funds adequate to achieve the Strategy's objectives and actions. We present below the key insights derived from the literature, targeted stakeholder survey, open public consultation and stakeholder feedback.

Stakeholder interviewees noted that the Strategy took a great deal of time to implement, due to the plethora of actors involved. They also noted that language issues (translation) could contribute to inefficiencies by posing a barrier to transboundary knowledge sharing, further delaying progress.

[138] Data provided by EEA included: a list of DG CLIMA funded contracts for Climate-ADAPT 2013-2017 for IT development, capacity building and knowledge assessments; and an assessment of annual EEA staff and financial resources, totalling 2 FTE (1 FTE = assumed to have €75,000 annual cost) and other annual resources for ETC/CCA.

The open public consultation sought to determine the level of agreement with three statements related to efficiency (Figure 5-25 below). In relation to the first statement, more than half of respondents were ambivalent and the remaining the remaining respondents tended to disagree. The strongest disagreement came from NGO stakeholders, while public authority stakeholders were more likely to agree with the statement. Around 60% of respondents were ambivalent with regard to the other two statements, highlighting the difficulty of giving opinions on these issues. Looking across all three statements, there was much greater agreement among those stakeholders who did give an opinion that costs are very low, limited to the Commission and incurred by other stakeholders mostly when voluntarily accessing EU funds.

**Figure 5-25 Responses to the following statements from the open public consultation.**




*Source: Results of the open public consultation survey. 159 respondents*

The evaluation question, "How adequate were the resources for the overall implementation of the EU Adaptation Strategy and how proportionate were those resources across its eight actions?", is also reviewed in relation to each of the Strategy's eight actions below.

For Action 1, the resources expended by the Commission are negligible, and as detailed in relation to effectiveness, the majority of Member States that did not have a national adaptation strategy prior to launch of the EU Strategy have now adopted one. Although the role of the Strategy is unclear, being one of multiple drivers, the increased number of strategies adopted and low costs point to a cost-efficient use of resources.

For Action 2, the LIFE Mid-Term Evaluation (Ecorys, 2017) provides the main source of information for assessment of the adequacy of the resources of the Programme. The MTE notes the "strong synergies between the different thematic objectives … [and that these] are mutually reinforcing. Especially strong synergies have been observed between projects in the areas of Nature & Biodiversity and Water & Marine environment, Nature & Biodiversity and Climate adaptation, as well as between Waste and Environment & Health". At the same time, many LIFE stakeholders believe the LIFE budget is not matched to the scale of the challenges posed by climate change. As the MTE does not focus closely on the adaptation theme and its adequacy, it is not possible to provide a more definitive conclusion. While the annual investment from LIFE is valuable, it is only likely to be a small part of what is needed. Although estimates of the need, as noted by the European Court of Auditors (European Court of Auditors, 2016), are much less developed for climate adaptation, where the focus remains on estimating damage costs, than they are for climate mitigation. One of the few syntheses (Trinomics, 2017) that has looked at this issue identified a very wide range of needs in Europe, from as little as USD 12 million per year to as high as USD 509 billion per year but with most estimates in the range of €1-20 billion per year, meaning that cumulatively hundreds of billions are needed. Compared to the figures in Table 5-1, it is clear that the Strategy alone is not mobilising anywhere near

these amounts, although it should also not be expected to do so, as the private sector and national stakeholders should provide the great majority of any needs. Indeed, it remains an important question, which stakeholders should pay for the required investments and how. In the case of infrastructure, the Strategy is playing an important influencing role for investments through the structural and cohesion funds, especially through Action 6.

For Action 3, the annual resource commitments from the Commission are relatively low at around €0.80 million per year, which includes €0.13 million per year for the work of the JRC. These resources appear to be adequate, given the increasing number of cities committing to the adaptation aspects of the Covenant of Mayors. One interviewee from Climate Alliance (part of the Covenant of Mayors Office) noted that without financial support from the Commission for managing the Covenant of Mayors office, support could not have been provided to the signatory cities. However, there was feedback from interviewees working on behalf of public authorities and supporting and facilitating cities with the Covenant of Mayors about the lack of adequate resources provided at national, regional and local level for their work. As these are voluntary, albeit encouraged, actions by the respective public authorities, the adequacy of associated resources is not directly part of the scope of this evaluation. Nevertheless, feedback suggests that greater staff and financial resources from public authorities would be beneficial in supporting municipalities to implement their adaptation action plans.

For Action 4, the findings on effectiveness suggest the total funding towards projects addressing knowledge gaps is adequate but that the research focus could have been better targeted across the four main knowledge gaps identified in the Strategy. One interviewee noted that their identification garnered adaptation-related information, enabled relevant decision making to take place, and presented new opportunities for actors to collaborate with a plethora of research institutes. The latter highlights that synergies were created to fill knowledge gaps efficiently.

For Action 5, the recorded growth in materials on Climate-ADAPT and visitor numbers in the last years suggest that the resources are having a positive impact. One research organisation suggested that decisions about Climate-ADAPT need to be made regarding the quality of content uptake, functionality, dissemination and networking. Although Climate-ADAPT has successfully expanded dissemination and networking, further work needs to be encouraged on content to keep-up with the ever-growing information available, which could imply more resources are needed. Further collaboration with Commission Services would help to improve overall efficiency in how knowledge inputs are collated on Climate-ADAPT. Overall, resources appear to be adequate at present but, to continue to grow the Climate-ADAPT user base and accommodate the ever-growing volume of content, the resources may need to increase in future, even if greater efficiency in collation can be achieved.

For Action 6, the Commission has facilitated the climate-proofing of the CAP, Cohesion Policy and the CFP by producing technical guidance, which was published in 2013 (see more in Section 3.3.1.1). This was later complemented by broader climate mainstreaming guidelines. The amount of resources spent on the preparation of these documents was €0.5 million. As it is not possible to reach a conclusion about the extent to which the guidelines have been used and have accelerated the climate proofing of these programmes, it is unclear if these resources were adequate. Yet the ex-ante conditionalities introduced in some of the relevant structural funds has proved effective at incentivising the adoption of national adaptation strategies (Action 1). The assessment of the Strategy's relevance indicates that there is still a need for the Commission to support Member States and their managing authorities to facilitate the climate-proofing of the affected policy areas. This suggests that the resources committed to date have been adequate to prepare the guidelines but not to ensure their use and fully achieve the goals of this action.

For Action 7, resources committed by the Commission were limited to funding (€0.1 million) the guidelines for project managers. Interviews were required to determine the

level of resources committed to this action by the standardisation bodies and the perception of their adequacy, given what has been achieved. The assessment of effectiveness suggests that the guidelines that have been developed as a result of this action are being used and are having a positive impact on supporting development of climate resilient infrastructure, although it remains early to draw such a conclusion. Interviewees reached similar conclusions, noting that the resource allocation has been sufficient, however, lack of future funding could deter ESO Technical Committees from continuing their revision of standards, as these are not financed by the Commission unlike the related coordination work.

For Action 8, specific resources were not allocated but time was spent by the Commission to progress this action as part of its core policy work. Interviews did not highlight whether Commission work was sufficiently distributed. However, the assessment of effectiveness suggests that the support of stakeholder meetings and the High-Level Expert Group has helped to drive action, culminating in the recent final report from the group and proposed EU strategy on sustainable finance, both of which address adaptation (see Section 3.3.3).

An ECA report on the size of EU commitments to climate action found that there was a serious risk that the 20% target would not be met (European Court of Auditors, 2016). Particular deficiencies were recognised in H2020, agricultural, rural development and fisheries funds. The implication of insufficient funding for H2020 was that knowledge gaps might not be adequately addressed. However, the report also noted that it is difficult to say anything definitive, as the division in expenditure between mitigation and adaptation is not currently tracked. ECA produced its own estimates of adaptation spending, which represented only 1% of total climate spending by ERDF and the Cohesion Fund for 2007-2013 and around 12% for 2014-2020. The Commission response to the ECA report, included in the same document, draws attention to this large increase in funding as a positive step in the right direction.

In summary, we can conclude that the cost of the Strategy is quite low and that for most of the actions an effective result is being delivered, which suggests implementation of the Strategy is cost-efficient. Yet the overall question about the adequacy of resources remains. ECA is critical of the level of expenditure in relation to the EU 20% mainstreaming target, although a significant increase in funds directed towards adaptation can be observed. If this increase is adequate, or indeed if 20% would be sufficient, is unclear, with some areas, such as LIFE+ and Climate-ADAPT, potentially benefitting from further funding for adaptation. The costs and benefits identified by this evaluation are presented in a summary table in Appendix 9.

### 5.3.2 How do the different stakeholders view the monitoring of the implementation of the EU Adaptation Strategy? Which aspects are perceived as an unnecessary burden, if any, and to what extent?

Summary

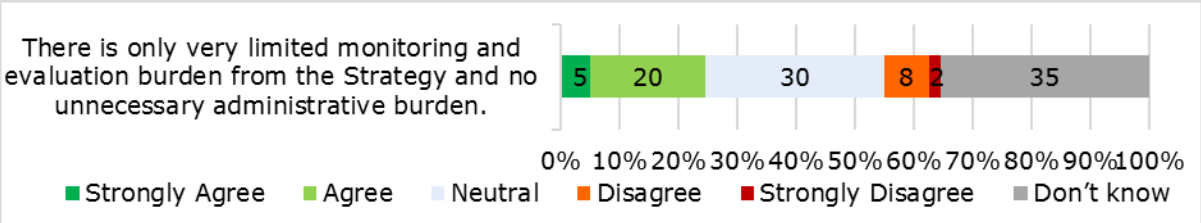
1. There is only a very limited monitoring and evaluation burden from the Strategy and no evidence of unnecessary burdens was found, although the costs could vary per stakeholder.

As introduced at the start of Section 5.3, the question of monitoring applies only to some parts of the Strategy and to some stakeholders. This was reflected by ECA noting that adaptation-related indicators for monitoring are rare (European Court of Auditors, 2016). Additionally, in 2017, ECA also noted that monitoring and auditing of adaptation is both more difficult and carried out far less than for mitigation (European Court of Auditors, 2016). Indeed, there was a mixed response to a statement in the targeted stakeholder survey about whether the Strategy was an important factor in encouraging monitoring and evaluation at Member State level (see Figure 5-26). It is, therefore, difficult to reach a general conclusion that the Strategy has significantly encouraged monitoring and evaluation efforts. It should also be noted that the Monitoring Mechanism Regulation (Art.

15) obliges Member States to report to the Commission on their "national adaptation planning and strategies, outlining their implemented or planned actions to facilitate adaptation to climate change" by 2015 and every four years thereafter, which is a stronger legal obligation than any under the Strategy itself. As noted in Section 3.2.2, this information is published on the country pages of Climate-ADAPT where Member States can provide interim voluntary updates, and these pages are among the most visited on Climate-ADAPT.

The open public consultation also tested a provisional conclusion that the monitoring and administrative burden of the Strategy was very limited. While 65% of respondents were ambivalent, most of the remainder agreed or strongly agreed with the statement (Figure 5-26).

**Figure 5-26 Responses to the statement "There is only very limited monitoring and administrative burden from the Strategy and no unnecessary administrative burden"**




*Source: Results of the open public consultation survey. 159 respondents*

Drilling down into the actions themselves, Actions 1, 2 and 3 are the most relevant actions to evaluate in relation to how different stakeholders view the monitoring of the Strategy's implementation. These actions have the most relevant monitoring obligations, which are largely lacking from the other actions and for which either programme specific monitoring is carried out (Actions 4, 5 and 6) or no monitoring is in place (Actions 7 and 8).

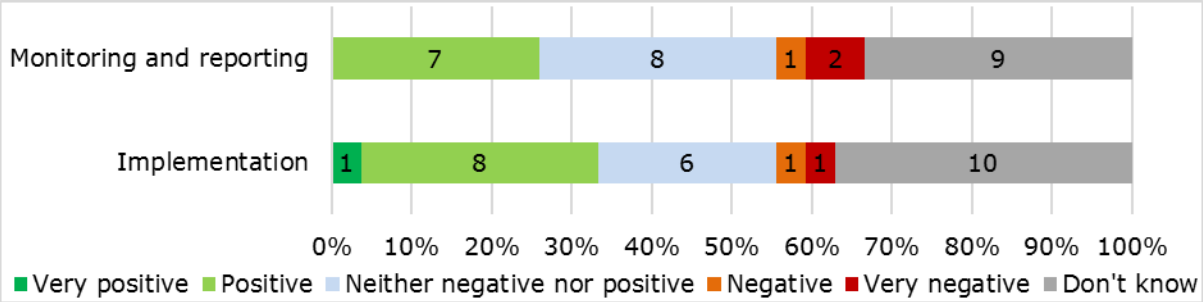
Implementation of Action 1 is primarily monitored through use of the adaptation scoreboard. This process began around 2015 with the development by the Commission of a draft scoreboard and discussion and refinement of the structure and indicators based on feedback from Member States. Subsequently, in 2016, Member States completed a pilot scoreboard for their country. The scoreboard structure and the pilot country fiches have been reviewed and revised in 2017, as part of this evaluation study. The country fiches were published alongside the launch of the public consultation. One respondent to the targeted stakeholder survey welcomed the adaptation scoreboard as a means of evaluating Member State progress. They noted that it would be useful to know something about the quality of Member State adaptation plans and how their implementation is proceeding. As such, they suggested a need to establish targets for the monitoring and reporting requirements similar to those required for climate mitigation.

The monitoring mechanisms for LIFE were partially updated due to Action 2 but no useful feedback or comment was secured about them through the interviews or survey.

For Action 3, the monitoring of adaptation under the Covenant of Mayors has resulted in costs being incurred by the managing office, which is funded by the Commission's JRC and voluntarily by the cities themselves. The Covenant of Mayors requires signatories to submit a progress report monitoring implementation every two years following submission of their action plans. The template for Sustainable Energy and Climate Action Plans (SECAP) contains an adaptation scoreboard that enables cities to conduct a self-assessment of their adaptation status. As inclusion of adaptation within the Covenant of Mayors has happened relatively recently, signatories do not yet have an in-depth experience of these arrangements under the Covenant of Mayors, as compared to Mayors Adapt. One respondent to the targeted stakeholder survey from a municipal government noted that the Covenant of Mayors had helped to bridge a knowledge gap on monitoring and policy making. The survey asked about the influence of the Covenant of Mayors on the monitoring and reporting of cities adaptation strategies. This produced quite a mixed response (Figure

5-27), perhaps because none of the respondents were from the municipal/city government stakeholder group.

**Figure 5-27 Responses to the statement "The Covenant of Mayors has had the following influence on cities' adaptation strategies in relation to"**




*Source: Results of the targeted stakeholder survey. 27 respondents.*

We have not assessed any administrative burden on signatories to the Covenant of Mayors or with regard to provision of support by national offices, as both are voluntary commitments. However, it was estimated in the Impact Assessment that associated costs of the commitments for each city would be up to around €50 000 per year, excluding their implementation.

The monitoring requirements of Actions 4 to 8 are minimal and most are only relevant for Commission stakeholders. Interviewees from the Commission stated that the main concern was in relation to Action 5 and the difficulties surrounding the sheer volume of data to absorb, refine and share with relevant audiences.

For Action 6, managing authorities are required to provide financial information to the Commission on the amount allocated to climate objectives and subsequent expenditure. The methodology for financial reporting differs between the ERDF/CF, the EAFRD and the EMFF (see more on tracking methodology in Section 3.3.1); it does not apply to the EAGF. The respective Directorates-General aggregate the figures, which are then reported to DG BUDGET. They are published in the annual EU budgetary documentations, specifically in the working document on programme statements of operational expenditure accompanying the draft general budget, and the statement of estimates for the financial year ahead. Nevertheless, the methodology currently does not differentiate between allocations for climate mitigation and adaptation. As such, the aggregated figures cannot fully reflect on the extent to which climate adaptation has been integrated into the investment decisions made under the CAP, Cohesion Policy and the CFP. Furthermore, the accuracy of the aggregated figures varies between the different funds. A respondent to the targeted stakeholder survey highlighted that more robust monitoring methodologies and mechanisms are needed, and that this should include separating mitigation and adaptation in CAP funding in order to better assess the agricultural sector's efforts in these areas. Feedback from the Commission suggests that differentiating between CAP expenditure on mitigation and adaptation would be impractical.

## 5.4 Coherence

### 5.4.1 How well does the Adaptation Strategy fit together with other relevant EU legislation and policies, or similar initiatives at international, national or regional level? Are there any gaps or inconsistencies between policies? Are there components to be further developed or added to increase coherence of actions?

Summary

1. Policy coherence has long been recognised by the Commission as an essential element in tackling climate resilience through the mainstreaming of adaptation into other policy areas.
2. Progress has been made in integrating adaptation concerns into a wide range of other EU policy areas, both those cited in the Strategy and others, and thereby in achieving greater coherence.
3. However, further progress in identifying and exploiting synergies could have been achieved in some policy areas, particularly external policy areas that were not addressed in the Strategy, and in climate mitigation policy.
4. There might have been greater coherence had there been more centralised management of the 20% climate mainstreaming target for the 2014-2020 EU budget with greater separate attention to adaptation, as recommended by the ECA (European Court of Auditors, 2016).
5. Coherence with action at the international level, while it has not been pursued by the Strategy, nevertheless broadly exists, particularly in relation to key agreements, such as the Paris Agreement, the Cancun Adaptation Framework, the Convention on Biological Diversity and the UN Sustainable Development Goals.
6. However, synergies between EU internal adaptation action and external action, and the impact of external climate impacts on the EU's own resilience have not been pursued.
7. Developments in international policy strongly suggest that international climate adaptation issues (e.g. adaptation as part of the Paris Agreement, UN Sustainable Development Goal 13 and CBD Aichi Target 10 and 15) require action by the EU.
8. The Strategy does not conflict with action at national and sub-national levels, although there is some evidence of gaps in coherence within and between Member States.
9. We have not found evidence of conflicts between the actions set out in the Strategy, although these seem largely to have been developed and implemented separately from each other. Some synergistic links have emerged and our hypothesis is that more systematic identification and pursuit of synergies would have been valuable.
10. There is potential for:
    a. Further exploitation of internal coherence between actions in the Strategy, including greater links between risk management under agriculture policy and EU policy on insurance mechanisms
    b. Improved understanding of the knowledge gaps that impede further progress in adaptation policy at Member State level and concerted action to address them

c. Greater coherence between action at city level, encouraged through the Covenant of Mayors, and action to improve national-level adaptation activity, and
d. Greater coherence between disaster risk reduction and climate change adaptation policies, practices and knowledge.

The summary of evidence is presented at four levels: coherence with (i) other EU policies and initiative, (ii) international policies and initiatives, and (iii) national and regional policies and initiatives. Finally, we present reflections on the Strategy's internal coherence.

**Coherence with other EU policies and initiatives**

The extent of the impact of a changing climate across all areas of human activity, and across all policy areas, means that (even more than with climate mitigation) it requires a cross cutting and multi-sectoral approach. The challenge of adaptation is not something that climate policy experts can tackle themselves. It requires willing integration of climate resilience objectives by policymakers in other sectors, and by individuals and organisations throughout society. This has long been recognised in the Commission's approach to climate adaptation. For example, when DG CLIMA was established in November 2009, taking forward an already developed field of climate policy, the new climate Commissioner Hedegaard was instructed by President Barroso (Barroso, 27 November 2009) to take on "a cross cutting responsibility for developing adaptation to climate change inside the EU and for working with other Commissioners to ensure that an appropriate climate dimension is present in all Community policies". As such, coherence with other policy areas is hard-wired into adaptation action; adaptation-coherent sectoral policies are those where climate adaptation mainstreaming has been successful. This is reflected by the nature of the Strategy. In addition to the adaptation-specific objectives of promoting action by Member States and developing the evidence base necessary for taking effective action, the Strategy has a separate objective and specific actions on climate-proofing EU action in other policy areas. This third objective serves as a driving force to ensure greater coherence in sectoral EU policies and initiatives. The evidence on coherence from the literature review is scarce but focuses on this third objective. However, the stakeholder interviews provided more in-depth insights.

Mainstreaming has taken place in a broad range of relevant policy areas. Our assessment of the Commission's adaptation mainstreaming activity is that in broad terms it focuses the resources available on the policy areas that have the greatest potential to deliver adaptation outcomes. However, gaining influence over major areas of economic or external policy has proved more challenging. For example, there are strong arguments for including an explicit climate risk and adaptation element in the EU's Global Strategy on Foreign and Security Policy, which notes climate impacts on threats and vulnerabilities without proposing a significant adaptation response (see more in the assessment of coherence with international policies below). Similarly, the European Defence Action Plan is silent on the subject of climate threats. While climate mitigation has been an element in the Europe 2020 and semester process, adaptation has been largely ignored.

There may be other areas where further engagement could be useful. Examples we have identified include: identifying long-term climate change impacts relevant to the EU's trade policy; more explicit inclusion of adaptation risks in policies relevant to broader resilience, including cyber resilience; and in relation to food security, animal and plant health. There are also areas of environmental policy (e.g. the potential contribution of adaptation investments to implementation of nature legislation) where the potential synergies (and in some cases, conflicts) may have been under-emphasised, and where further analysis could be beneficial; an issue raised by stakeholders in the second stakeholder workshop.

Finally, one important area for increased attention on policy coherence is within climate policy, between adaptation and mitigation action. This is particularly relevant in areas such as energy efficiency, including the energy costs of cooling buildings during summer heat peaks. It is also relevant for the forestry and land use sector, given the need to ensure

both improved carbon sequestration and reduced fire forest fire risks; different planting and management choices to deliver carbon sequestration goals can have different fire risk impacts.

The interviews, particularly those with Commission Services and Member State governmental organisations, shed light on policy areas where the mainstreaming of adaptation has already taken place, as well as on areas where further work is considered to be still required. Overall, numerous stakeholders highlighted the cross-cutting nature of adaptation and, thus, agreed that mainstreaming of adaptation objectives into sectoral policies is a necessity. A recurring policy area where coherence with adaptation was seen as essential is disaster risk reduction. An interview with Commission Services highlighted that the inclusion of risk prevention and management in the adaptation-relevant TO5 of the ESIF has helped to better exploit the close link between adaptation and risk management actions. At the same time, an interviewee from an organisation with responsibilities as a national focal point on EU adaptation and on coordination of the national strategy emphasised that, even though at the theoretical level the synergies between disaster risk reduction and adaptation are increasingly recognised, challenges on the ground remain. The interviewee commented that they saw disaster risk reduction always being much more reliant on response and recovery rather than on prevention.

A case study has been prepared on fire preparedness and prevention for this evaluation (Box 3). The stakeholders who contributed to this case study identified a need to further enhance coherence between climate change adaptation and disaster risk reduction across all levels of governance (global, European, national levels) via closer vertical and horizontal, cross-border and transnational coordination and collaboration. In particular, while the EU supports Member States through existing platforms (e.g. Climate-ADAPT), EU-wide conferences and research (e.g. LIFE, H2020) to capture and disseminate relevant experiences, lessons and approaches, the stakeholders felt that the EU Adaptation Strategy could seek to strengthen joined-up thinking in this regard.

**Box 3. Case study on fire preparedness and climate change adaptation**

This case study provides evidence about forest fire preparedness and coherence with adaptation at an EU level and within and between Member States. A representative of a national authority in Spain and representatives of the Provincial Council of Barcelona, Catalonia, input to this case study. In addition to describing the overall approach to forest fire preparedness and climate change adaptation in the Province, the latter also described the LIFE Monserrat project, as an example of best practice.

Spain has been proactive in seeking to integrate disaster risk reduction and climate change adaptation planning at the national level[139], as well as at the provincial and local levels. The EU Adaptation Strategy has been a useful guide in preparing strategies and plans where the needs of disaster risk reduction and climate change adaptation coincide. For example, the Provincial Council of Barcelona has followed EU and national-level guidance in supporting local administrations to develop supra-municipal strategies for forest fire preparedness; identifying and coordinating all actors in the territory. Importantly, in downscaling EU and national strategies, sub-national responses have been tailored to local circumstances.

The Provincial Council of Barcelona has learnt that planning and monitoring is essential to forest fire preparedness. A comprehensive stakeholder engagement plan is a critical part of this process. Engaging key actors (e.g. forest owners, the fire service, local authorities and the Catalan Government) minimises barriers to preventing forest fires. The Provincial Council adopts a holistic approach to forest fire preparedness through plans in relation to land, forest management, fire prevention and surveillance, fire management (i.e. if a fire occurs) and land restoration. The Provincial Council encourages and actively supports dissemination of lessons, project-level actions and

[139] See: http://www.adaptecca.es/sites/default/files/editor_documentos/infoadapt_memoria_final_proyecto.pdf

success stories at the regional level and networking with other national and community projects.

The LIFE Monserrat project[140] in Spain provides evidence of ongoing adaptation actions in relation to fire risks. The Provincial Council reports that an increase in the frequency of wildfires in the Monserrat Mountain region is attributable to changes in land use and socioeconomic activities, and that climate change may have made fires more intense and severe. Increased development has led to a decline in traditional rural activities in the region while forest and scrubland areas with increased fuel load have expanded. The project is seeking to address the high fire risk in the region through nature-based solutions (e.g. sustainable forest management and livestock grazing) and increasing public awareness of the risks. The project provides additional co-benefits through conserving and restoring wildlife habitats, habitat connectivity and associated ecosystem services for people. The recent wildfires at the end of 2017 suggest that the Life Montserrat project is a model that is worth replicating across the Mediterranean area, i.e. creating large managed areas to prevent widespread forest fires by combining extensive forest management with extensive grazing and restoring a traditional mosaic landscape.

The Floods Directive was mentioned as a positive example by two separate national stakeholders who highlighted that the links between the national flood risk management plans and the national adaptation strategies are established and very useful. This was also confirmed by an interviewee from Commission Services who indicated that there is a specific Working Group on floods where Member States discuss the implementation of the Floods Directive with Commission Services. Earlier this year a workshop organised under the remit of the Working Group was specifically dedicated to the link between adaptation and flood management. In contrast to the success of the Floods Directive, the need to put more emphasis on droughts was highlighted by an interviewee from national governmental organisation.

One comment emerging from the second stakeholder workshop was that it was important to ensure greater coherence between Commission action to encourage Member State strategies, on the one hand, and deployment of EU funding, on the other. The open public consultation suggested a high level of agreement with the statement that "progress has been made in integrating adaptation concerns into a wide range of EU policy areas'"; 56% agreed, although a significant minority (19%) disagreed, with particularly high levels of disagreement among NGOs (31%) and private sector respondents (29%).

The specific areas selected for attention in Actions 6, 7 and 8, under the Strategy's "Climate-proofing EU action" objective, are focused on key areas of the EU's budget. They show a high level of coherence between adaptation priorities and the relevant policy areas.

Under Action 6 (climate-proofing the CAP, CFP, and Cohesion Policy), the literature review suggested that Commission action linked to the Strategy (e.g. the separate commitment to spend at least 20% of the EU budget in the 2014-2020 MFF on the delivery of climate objectives) had achieved a significant impact in integrating climate adaptation into Cohesion Policy and agricultural policy. In this sense, Action 6 complements (and is reinforced by) the high-level political commitment to spend at least 20% of the EU budget on climate objectives, given that the CAP, Cohesion Policy and the CFP make up around 70% of the total EU budget. However, current work on the mainstreaming process in relation to the EU budget suggests that the absence of a coordinating mechanism to focus the 20% of expenditure on the priorities most likely to deliver climate outcomes, and the lack of a distinction between mitigation and adaptation investment, limits the impact of the 20% commitment (Ricardo Energy & Environment, IEEP, Trinomics, 2017).

The limitations linked to not separately tracking adaptation-related EU expenditure were highlighted by an interview with an NGO. They noted that there is a need to better track

[140] http://lifemontserrat.eu/en/

expenditure under the CAP and Cohesion Policy that delivers real adaptation benefits. The interviewee expressed the view that while there is a tendency to simply assume that CAP and Cohesion Policy expenditure is relevant to adaptation, the Strategy needs to dictate, for example, how CAP spending should contribute to resilience. Regarding the CAP, a national stakeholder indicated that coherence between adaptation and the CAP needs improvement, both to avoid counterproductive funding, and to maximise the contribution from rural development. The interviewee felt that it was difficult to include good adaptation measures in rural development programmes because the Commission had not included enough scope in the menu of options.

In terms of coherence between the different actions of the Strategy, two interviewees noted the importance of the use of ex ante conditionalities in the process of developing programmes under the ESIF. They stated that this had been more influential in persuading some Member States to develop a national adaptation strategy than softer mechanisms, including the provision of guidance, under Action 1.

In relation to Actions 7 and 8, the literature review provided very limited evidence on coherence, either internal or external, and evidence from the stakeholder interviews was also scarce.

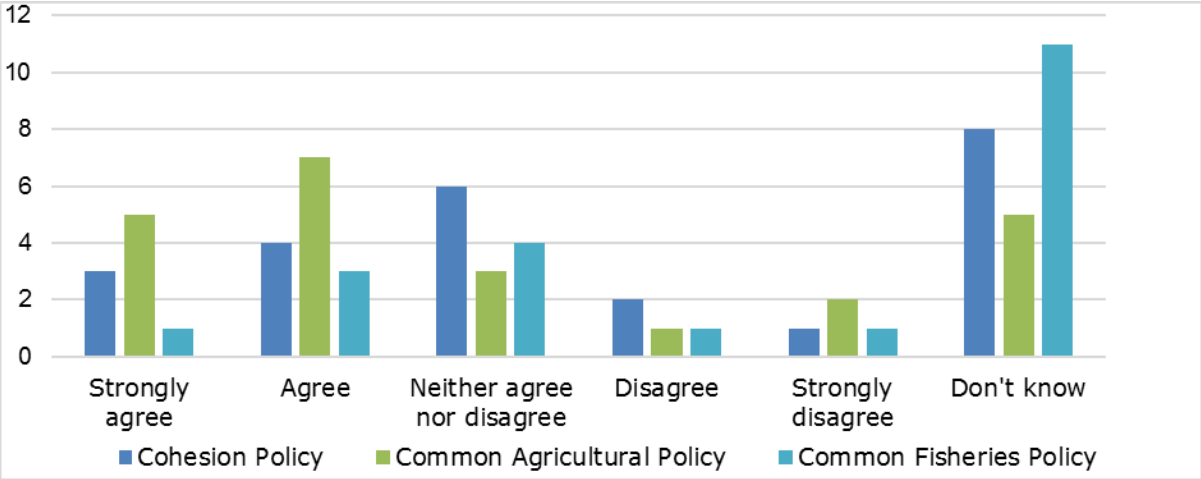
Action 7 (ensuring more resilient infrastructure) is translated into a set of guidelines, which have clear potential to improve coherence in practice. The literature review did not address in detail the evaluation question on coherence, and interviews only provided very limited evidence. One interviewee suggested that efforts have been coherent, partly because this is a very specific area. At the same time, a national stakeholder highlighted that ensuring coherence between adaptation and new infrastructure at the EU level is a complicated task, given the potential long-term lock-in effects.

The literature review for Action 8 (promoting insurance and other financial products) has not identified significant evidence on the coherence of policy on insurance and other financial products with other EU policies. However, some positive observations can be made based on our understanding of areas where market penetration can be seen as a priority. For example, significant emphasis was placed on risk management instruments in the development of proposals for the EAFRD in the 2014-2020 period, including both public and private sector instruments, with explicit reference to climate risk. This suggests, as noted in the internal coherence section below, a good degree of alignment between activity under Action 8 and Action 6. As with Action 7, the interviews only provided limited evidence on coherence. An interviewee from Commission Services confirmed that overall efforts in this field have been coherent but suggested a more strategic approach to cooperation between DG ECHO and DG CLIMA in the future could be worthwhile.

In addition to the literature review and the stakeholder interviews, limited evidence on coherence with other policy areas has also emerged from the responses to the stakeholder survey. Again, most evidence relates to Action 6 (see

Figure 5-28). In the case of the CAP, seven out of 23 respondents agreed and five out of 23 strongly agreed with the statement that there is complementarity between climate-proofing of the CAP, as required by the Strategy, and other EU legislation and policies. There was less agreement in relation to Cohesion Policy and the CFP. At the same time, respondents also expressed concerns that CAP funding is not sufficiently used to integrate adaptation (and mitigation) measures and that a more robust methodology for tracking the CAP's climate contribution is needed. However, there was a large share of undecided responses ("don't know"), which suggests that the strength of opinion on this issue is less pronounced.

**Figure 5-28: Responses to the stakeholder survey question on whether there is complementarity between climate-proofing of the Cohesion Policy, Common Agriculture Policy and the Common Fisheries Policy, as promoted under the Adaptation Strategy and other EU legislation and policies***




*Source: Results of the targeted stakeholder survey. Cohesion Policy – 24 respondents, Common Agriculture Policy – 23 respondents, Common Fisheries Policy – 21 respondents.*

### Coherence with international policies and initiatives

Strong evidence on the coherence of the Strategy with international policies and initiatives does not emerge from the literature review and the stakeholder survey; nevertheless, interviews with Commission officials working in the external field gave further insights.

The UNFCCC's Cancun Adaptation Framework (UNFCCC, 2010), adopted in 2010, seeks to enhance cooperation and supports adaptation action in developing countries. It requires developed countries to provide developing countries "with long-term, scaled-up, predictable, new and additional finance, technology, and capacity-building to implement adaptation actions, plans, programmes and projects at local, national, sub-regional and regional levels, including activities under the Cancun Adaptation Framework". The recently adopted Paris Agreement has also created greater parity between mitigation and adaptation actions, with the inclusion of the global goal on adaptation of enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change. Each Party to the Paris Agreement is required to prepare, communicate and maintain successive nationally determined contributions (NDCs) that they are intending to achieve. The EU's intended NDC, which was submitted in 2015, focuses solely on mitigation actions, unlike the NDCs of developing countries, which cover both mitigation and adaptation. A separate submission to the UN was provided on "EU undertakings in adaptation planning" (Latvian Presidency of the Council of the European Union, 2015).

In 2015, the UN's 17 Sustainable Development Goals (SDGs)[141] for 2030 were adopted, many of which are either directly or indirectly relevant for climate change adaptation (e.g. SDG13 on climate action). As part of the post-2015 development agenda, the Sendai Framework for Disaster Risk Reduction 2015-2030[142] was created with seven targets and four priorities of action. In July 2016, the Commission published an Action Plan (European Comission, 2016a) on the implementation of the Sendai Framework. In the international policy field, the Global Strategy for the European Union's Foreign and Security Policy (European Union Global Strategy, 2016), which was published in July 2016, also aims to provide a comprehensive overview of the EU's core principles and direction on security issues for the coming years.

[141] https://sustainabledevelopment.un.org/
[142] http://www.unisdr.org/we/coordinate/sendai-framework

The EU Adaptation Strategy does not make reference to any international policies or initiatives, nor does it emphasise the role of the EU's external policies in supporting adaptation actions in non-EU countries. This decision was clearly outlined in the Impact Assessment, which stated that "contrary to the White Paper, the EU Adaptation Strategy will not consider international issues, that is, climate change adaptation in the rest of the world, as this is covered under the development and cooperation policy and through the UNFCCC negotiations".

While the Strategy's focus on domestic adaptation is a valid choice, it potentially risks failing to identify and address areas where there is potential for cooperation between the EU and other economies. This has particular relevance now, as since the adoption of the Strategy significant developments have taken place in the international sphere (e.g. the Paris Agreement, the SDGs and the Sendai Framework). This was also recognised by an interviewee from Commission Services for this study who indicated that it would be timely to update the Strategy and reflect these developments. While recognising the legitimacy of the Strategy's exclusive focus on domestic issues, another interviewee from a national governmental organisation stated that the Strategy could be better contextualized as the domestic facet of the EU's overall focus on adaptation. They noted that, otherwise, it may give a false sense that the EU will be protected from the impacts of climate change, so long as it addresses them in the EU. It should also be noted that the CBD's Aichi Targets, adopted under the Nagoya Protocol, particularly Targets 10 and 15, emphasise climate impacts and resilience, and that action under the Strategy contributes towards their delivery.

Work carried out since the Strategy's publication has emphasised the extent to which climate vulnerabilities are shared internationally, through spill-over effects and highly integrated trade networks. The EEA report on climate change, impacts and vulnerability in Europe 2016 (European Environment Agency, 2017), for example, explains that:

"International trade, travel, telecommunications and other aspects of globalisation increase the likelihood that climate change impacts have consequences beyond the regions or nations in which they occur. Such cross-border effects of climate change (sometimes also referred to as indirect effects, trans-boundary effects or spill-over effects) are highly relevant for European adaptation policy, as they may significantly influence climate change vulnerability of and risks to regions, sectors and people. The effects are, for example, felt in the increasingly complex global value chains of European products, which are often linked to distant geographical areas… The overall global economic losses are estimated to be much larger than in previous assessments, and this would unavoidably lead to repercussions in Europe."

Finally, the EEA report mentions the inherent complexities involved in creating truly "Europeanised" adaptation action at the EU level, which result from the local and domestic nature of climate change adaptation, where Member States might consider actions to be wholly within their own competences, and from the lack of specific overarching adaptation objectives.

**Coherence with national and regional policies and initiatives**

The Strategy's coherence with national and regional policies and initiatives is more difficult for the Commission to ensure. With EU policies and legislation, the Commission has significant influence as the guardian of their implementation, and as the EU institution with the right of initiative, enabling it to take or initiate action to correct any imbalances. Coherence with national priorities needs to address both the wide range of different situations and priorities among the 28 Member States, and to recognise the Commission's lower level of influence in areas of policy without detailed EU legislation. The design of the Strategy, by relying on voluntary measures at national and sub-national level, clearly helps to avoid incoherence in the sense of conflict between legal requirements. EU-level legislation adopted on an economy-wide issue like climate adaptation, at a relatively early stage of Member States' understanding of the policy area, would risk introducing

inappropriate prescription. This could have reduced the effectiveness of the policy or directed Member States' action to areas of less relevance.

The Commission's guidance on the preparation of national adaptation strategies, and the adaptation scoreboard developed under Action 1, include several areas which reflect on the level of coherence within national and sub-national policies.

Table 5-2 below draws out some of the scoreboard's relevant criteria and identifies Member State performance against them (as assessed in the draft Member State country fiches).

Table 5-2 suggests that while most Member States have developed generic mechanisms for horizontal coordination, these mechanisms have not yet had sufficient impact on coherence in practice. Moreover, a number of Member States show evidence of having introduced coordination mechanisms but having then allowed those mechanisms to fall into disuse, for example, because of a change of administration, or a reduction in the resources available to climate adaptation policy.

**Table 5-2 Overview of Member State progress on Member State scoreboard indicators relevant to the issue of "Coherence"**

| Criterion | Yes | In progress | No |
|---|---|---|---|
| 1b: Horizontal coordination | 21 | 7 | 0 |
| 6c: Coordination with disaster risk management | 9 | 11 | 8 |
| 8a: Adaptation included in EIA framework | 19 | 0 | 9 |
| 8b: Disaster risk plans reflect climate change risks | 3 | 0 | 25 |
| 8c: Land use planning | 12 | 0 | 16 |
| 8d: Adaptation at sector level | 7 | 19 | 2 |
| 9c: Impact of CC on major projects | 11 | 0 | 17 |

*Source: analysis of draft scoreboards published in conjunction with the open public consultation on evaluation of the EU Adaptation Strategy, December 2017[143]. Acronyms are included in the list on page iii.*

Evidence from the first stakeholder workshop[144] suggests that the Strategy has had a helpful impact on improving coherence between climate adaptation and other policies at national level. In particular, it was suggested that the Strategy had helped to emphasise the importance of cooperation and of exchanging best practices. It was noted that coherence had, in part, been facilitated by the mainstreaming of adaptation in EU policy in a range of sectors and that sectoral coherence benefitted from an EU-wide approach. The introduction of TO5 in programming for the ESIF also sparked interest in adaptation among stakeholders.

Interviewees noted the potential value of enhanced discussion on regional-level adaptation challenges facing a number of neighbouring Member States. It can be observed (see the scoreboard summary in Figure 3-1) that while most Member States have plans in place for transboundary cooperation (Criterion 2b), performance on identification and addressing of transboundary risks (Criterion 3d) is significantly weaker, with only four Member States identified as having accounted for transboundary risks in their strategy (three of which are participants in the macro-regional strategy for the Danube River). Case

[143] Available at: https://ec.europa.eu/clima/consultations/evaluation-eus-strategy-adaptation-climate-change_en (Accessed 5 March 2018)
[144] See: Notes from stakeholder workshop: Evaluation of the EU's Strategy on Adaptation to Climate Change, 5 April 2017 https://ec.europa.eu/clima/sites/clima/files/adaptation/what/docs/summary_workshop_report_20170405_en.pdf

study 3 (Appendix 8 and Box 4) looks at the impact of macro-regional strategies on adaptation coordination, using the Danube strategy as an example.

**Box 4. Case study: The Danube macro-regional strategy and its contribution to adaptation action**

The assessment of Member State adaptation strategies and action carried out under this project shows that while most Member States have made substantial progress, transboundary cooperation remains a relatively weak area. One mechanism that the EU has developed over recent years to facilitate such cooperation is the macro-regional strategy. It is defined in the Common Provisions Regulation (1303/2013) for the European Structural and Investment Funds (ESIF) as an integrated framework, potentially supported by ESIF, to address common challenges in geographical areas which "would benefit from strengthened cooperation contributing to achievement of economic, social and territorial cohesion". Macro-regional strategies are developed in close consultation with the countries involved, are endorsed by the European Council, and establish rolling action plans to tackle the priorities identified. Our case study examined whether the 2010 EU Strategy for the Danube Region (EUSDR), had been successful in improving transboundary cooperation on adaptation.

The EUSDR defines broad pillars for cooperation, and under each pillar priority areas for action are defined. The main area of focus for climate adaption is in Priority Area 5 (environmental risks), although other priority areas were also relevant, including Priority Area 4 (water quality). The EUSDR benefited from the prior existence of the International Commission for the Protection of the Danube River (ICPDR). However, stakeholders we spoke to explained that it had added new and more effective means of securing cooperation and the exchange of information at working level. While the EUSDR did not have its own funds to deploy, it had been effective in using letters of recommendation to facilitate access to funding for projects which were aligned with its action plans. Successful work had included the adoption of shared guidelines on risk assessment, improved shared understanding of the education and training challenges around flood risk management, and cross-border projects for improved joint monitoring and flood management.

The EUSDR appears to have raised the profile of transboundary climate adaptation challenges in the region, and fostered a cooperative approach to responding to those challenges. While it works within existing EU structures (ESIF, shared River Basin Management Plans and Flood Management Plans under relevant EU directives) it has maximised the coherence in practice of those structures. Transboundary risks appear to be better addressed in some of the region's national adaptation strategies than is generally the case across the EU Member States.

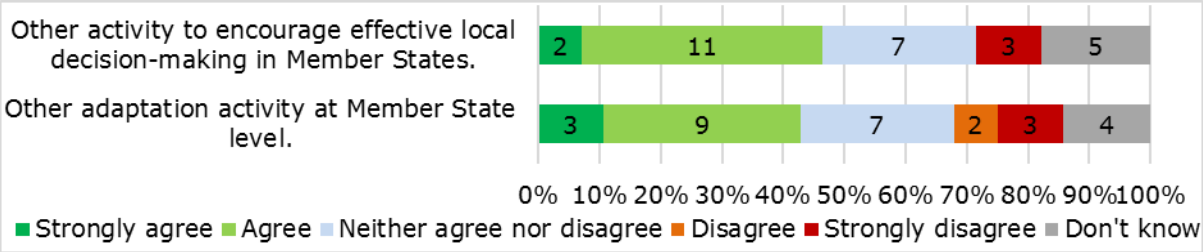
Areas for potentially fruitful future development include a greater focus on sharing experience at the local level. Lessons for future macro-regional strategies, or similar transboundary efforts to improve cooperation on climate adaptation, are that: a high level of shared interest in action is necessary for ensuring full participation; and particular attention was needed to encourage the participation of relevant non-Member-State partner countries.

Assessing coherence at sub-national level is more complicated. There was some evidence from the stakeholder workshop that national-level strategies or partnership agreements for ESIF expenditure had reflected adaptation challenges adequately. However, the evidence also suggested that it had proved more difficult, in practice, to ensure uptake of adaptation activity at regional and local level and, thus, coherence with national adaptation policies. There is significant ad hoc adaptation activity in a number of cities and regions, in part, as a result of the Covenant of Mayors effort under Action 3 of the Strategy.

Evidence from the stakeholder survey is equivocal on the question of the coherence of Covenant of Mayors activity and other Member State action. For example, in the targeted

stakeholder survey responses about complementarity between Covenant activity and other adaptation activity to encourage effective local decision-making in Member States, only 13 out of 28 respondents agreed or strongly agreed (see Figure 5-29).

**Figure 5-29: Responses to the stakeholder survey question on whether there is complementarity between the Covenant of Mayors activity on climate adaptation and the following***




*Source: Results of targeted stakeholder survey. 28 respondents.*

The Commission's guidelines for Member States preparation of adaptation strategies place emphasis on coherence with other areas of policy, but only in specific areas. Step 4b (Assess cross-cutting issues, trade-offs and synergies of adaptation options) suggests that:

"Individual policy areas/sectors might follow different objectives leading to proposals for adaptive actions that could potentially create negative side effects for another policy area/sector if not coordinated. Likewise, adaptation responses in distinct policy areas can potentially deliver synergies when mutually designed. There is, therefore, a clear need for coordination across a wide range of political, legal and institutional settings, as well as different information-management approaches and financial arrangements."

These principles are sound and the precise requirements for policy coordination to avoid conflicts and maximise synergies will vary between Member States. However, the lack of coordination within Member States suggests that there is a need for further action to help administrations overcome behavioural and other barriers to coordination.

**Internal coherence**

While internal coherence is not emphasised in the evaluation question it is also important to assess:

- Whether the approaches taken in the different actions involve appropriately similar levels of effort from the different sectors of policy
- Whether the areas of policy chosen for attention in the Strategy are those which can offer the most effective contributions to the implementation of adaptation policy, and
- Whether the potential synergies of addressing a number of separate actions under the Strategy were realised.

In the literature review, we identified several examples where there is strong evidence of coherence between the various actions within the Strategy. The outstanding example is the interrelation between Action 5 (Climate-ADAPT) and other actions. As Climate-ADAPT seeks to serve as a "one-stop shop" for presenting information on adaptation action in the EU, it also offers information linked to several other actions, such as Action 4 on knowledge gaps and Action 3 on the Covenant of Mayors. Another example is the coherence between Action 2 on LIFE and Action 1 on Member State action. The literature review found that since 2007, nine LIFE projects have supported the development of climate adaptation strategies or plans (total budget: €16 million). These include one project to develop a national adaptation strategy (for Cyprus), that was recently completed in April 2017. The coherence between efforts under Action 6, through the use of ex ante conditionalities in the ESIF and the encouragement of national adaptation strategies under Action 1 has already been noted. Similarly, there is significant coherence between the development of

risk management tools under the CAP 2014-2020 and the broader insurance objective of Action 8.

The identification of synergies between actions was not emphasised in the Strategy itself. For example, the coherence between Action 6 and Action 1, and between CAP elements of Action 6 and Action 8, was not identified in the Strategy. This suggests that the individual elements of the Strategy were developed separately on their own merits. A more comprehensive identification of links between actions could have improved coherence in practice. We have not, however, identified significant conflicts or lack of coherence between the actions in the Strategy. Thus, for example, the focus on local action under Action 3 could be regarded as not being coherent with the national-level focus under Action 1. However, in practice, action at both levels is essential. Nevertheless, increased coherence could possibly have been achieved if the action at local level had been more explicitly linked to action at national level, in particular, if the Covenant of Mayors activity had included an objective of using the momentum of activity at the local level to trigger greater focus on adaptation at national level, and vice versa.

## 5.5 EU added value

### 5.5.1 What is the added value of addressing climate adaptation at EU level, in addition to the vertical and horizontal cooperation at national level?

Summary

1. Most elements of the Strategy appear to add value, compared with horizontal and vertical actions at Member State level
2. Elements where the literature and stakeholders indicate there is greatest added value include:
    a. Areas where the EU is responsible for integrating adaptation into its own policies (Action 6)
    b. Areas where the EU is encouraging identification and bridging of knowledge gaps and EU wide research (Objective 2 – Actions 4 and 5, and also Action 2)
3. Only in relation to Action 8 is the evidence not strong enough to confirm whether the Strategy adds value. This may reflect a relatively low level of activity with regard to this action.
4. The EU added value is greatest where the Strategy is addressing "gaps" in policies that need further mainstreaming or in encouraging action in Member States or sectors that have received less attention. There is less added value where action was already underway prior to the Strategy.

In this section, evidence from the targeted stakeholder survey is initially summarised in relation to the added value of addressing adaptation at EU level. This is compared with other evidence for the actions under the Strategy. A short section then summarises unsolicited comments on the Strategy's added value in relation to the Paris Agreement.

In the targeted stakeholder survey (Appendix 2B), stakeholders were asked for their level of agreement with statements of the type: "In the absence of action by the Commission to encourage the development of national adaptation strategies, equivalent encouragement would have been applied by other institutions e.g. at national level" (relating to Action 1); and "In the absence of the EU Adaptation Strategy, an equivalent amount of progress would have been made in climate proofing EU policies" (relating to Action 6). Overall, a greater number of stakeholders disagreed than agreed that equivalent progress would have been taken in the absence of the Strategy, for Actions 3 to 6, i.e. on

Covenant of Mayors, bridging the knowledge gap, Climate-ADAPT, and climate proofing of the CAP, Cohesion Policy and CFP. The majority view on these actions was, therefore, that the Strategy added value.

In relation to the actions on encouraging all Member States to adopt comprehensive adaptation strategies (Action 1), ensuring more resilient infrastructure (Action 7) and promoting insurance and other financial products for resilient investment and business decisions (Action 8), the views of stakeholders were more evenly balanced. Therefore, the EU added value was clear for some stakeholders but not for others.

The literature review, stakeholder interviews, open public consultation and feedback at the first stakeholder workshop provide some further evidence on the added value arising from the Strategy. Some examples are given in the next three sections and compared with the results of the targeted stakeholder survey.

Panellists at the second stakeholder workshop spoke of the value added by the Strategy, including that it had been helpful in:

- Putting adaptation on people's agendas
- Highlighting the need to focus on adaptation as well as mitigation
- Building momentum and raising ambition, and
- Providing some inspiration.

#### 5.5.1.1 Objective 1, Actions 1-3

**Action 1.** There is limited evidence in the literature that we have reviewed on the direct causal impact of the Strategy in prompting action at Member State level. For example, the EEA's 2014 study on 'National adaptation policy processes in European Countries' (European Environment Agency (EEA), 2014) does not analyse the impact in detail. A 2016 evaluation of national adaptation approaches (ONERC, 2016) also focuses mainly on adaptation strategies in Member States that had begun addressing the challenge of climate adaptation some time before the Strategy was published.

The EEA report did, however, note that 19 of the European countries surveyed identified "EU policies" as a driver for adaptation action, second only to extreme weather events (28 countries). It is less clear whether this can be attributed to Action 1, to other actions in the Strategy (particularly integration of climate objectives into the ESIF) or to other policy drivers. It seems likely that the process of discussing the Strategy, and entering into the commitments set out in the 2013 Council conclusions, had an impact on the political salience of the subject. It is also noteworthy that, from the initial level of implementation of national strategies and plans that gave rise to concern from the Economic and Social Committee (Section 3.1.1), effectively full coverage of national strategies has now been achieved.

One further area of added value stems from the positive reinforcement of national strategies, particularly those which identify the need for cross-border cooperation, by simultaneous implementation of adaptation policies in neighbouring countries. An example is in the EU Strategy for the Danube Region (EUSDR) (See Box 4 and Appendix 8) where interviewees were clear that the EUSDR had helped participating countries identify and respond to transboundary adaptation challenges, particularly through improved dialogue and exchange of information. In addition, CAN Europe, in a position paper submitted to the open public consultation consider that the EU added value associated with national adaptation plans is in identifying and addressing transboundary risks.

While it might be argued that the voluntary nature of national adaptation strategies could lead to a sub-optimal level of implementation at national level, it makes it possible for Member States to develop a mechanism that suits their national administrative systems and national preferences. For example, Sweden has decided to implement adaptation action through regional and local strategies, rather than a process led by a central government coordinator.

The variety of responses to the targeted stakeholder survey is mirrored in the interviews. Some Member State representatives noted that they already had a national adaptation strategy in place prior to 2013, which was, therefore, not fostered by the EU Adaptation Strategy. One respondent working in an organisation with responsibilities as a national focal point on EU adaptation noted that their country considered that the EU was very important to progress at many levels. In addition, a respondent from a research institute in Ireland suggested that while there can been a flurry of activity after extreme weather events, the issue of impacts would soon fade away unless something like the Strategy keeps it there and that is why it is important and should be strengthened. More specific feedback on the nature of the added value was received from an official working at a Ministry of the Environment who considered that the Strategy's added value is in providing space for learning and exchange of practices, which is very important for adaptation policy. This latter point was also reflected by feedback from Commission interviewees.

There was strong support from the open public consultation for 'The Strategy adds value to the adaptation actions at national and sub-national level' and for 'The greatest added value of EU action is: promoting EU-wide action. Both of these statements relate to action at Member State level. One mechanism for this added value is through guidelines prepared by the Commission for NAS development. There was strong agreement from the targeted stakeholder survey that these guidelines are useful, but a more equivocal response to whether they have been followed. The latter may reflect that many Member States had a NAS in place when the EU Strategy was launched.

Feedback given at the first stakeholder workshop also varied: in some Member States, the EU Adaptation Strategy had been the key inspiration for development of national adaptation strategies and plans, in others it had been less relevant, although the availability of EU funding linked to the Strategy (particularly through the ESIF) was important. Combined with the survey results it is considered that there is some evidence for EU added value for Action 1 in promoting development of adaptation strategies. The evidence also indicates that for some Member States the added value may have been strong.

**Action 2.** The LIFE MTE evaluation (Ecorys, 2017) reports that stakeholders largely acknowledged (95%) the catalytic role that LIFE is playing for better solidarity and responsibility-sharing in preserving the common good of the EU's environment and climate, leading to less costly implementation of environmental and climate change policies. Notably, the added value of LIFE lies in the EU co-funding that enables project beneficiaries to deliver results that in most cases would either not be realised at national, regional and/or at local level, or would be pursued at slower pace and on a lesser scale. This is especially so for Member States that have fewer financial mechanisms in place or when these mechanisms are difficult to access. The consultation also highlighted that the main consequences of stopping or withdrawing the existing LIFE interventions would be mostly negative. It would reduce Member States' capacity, and in some cases commitment, to pursue the EU's objectives on environmental protection and climate change and would also negatively affecting employment and economic growth.

According to monitoring experts for the LIFE programme, about 30% of climate change adaptation projects would have been implemented anyway, leaving around 70% that would not have been implemented without LIFE support.

Interviewees gave mixed feedback about LIFE. One interviewee noted that their Member State had a low approval rate for LIFE projects and that the Programme's relatively small budget, as compared with ESIF, means that it does not meet the needs of adaptation. An interviewee from EASME considered the Programme's added value was in providing funding for adaptation at a local level for which local authorities may have difficulty in finding other sources. EASME also pointed to an integrated project on adaptation in Denmark that has the possibility to mobilise hundreds of millions of Euros of complementary funding, assisting implementation of the relevant adaptation strategy.

Combined with the targeted stakeholder survey results it is considered that there is some reasonable evidence for added value from action at EU level for Action 2.

**Action 3.** Interviews generally supported the positive views from the targeted stakeholder survey on EU added value of the Covenant of Mayors. One stakeholder from the City of Munich appreciated the support both in expert exchange meetings and at the policy level. The Provincial Council of Barcelona considered that very few municipalities, especially those of medium and smaller size, would have acted by themselves and that the Covenant of Mayors had fostered action in municipalities of all sizes. The Covenant of Mayors Office added that, although there would certainly have been cities working independently on adaptation without the Covenant of Mayors, there would neither have been equivalent progress nor a collective approach without its encouragement.

#### 5.5.1.2 Objective 2 Actions 4-5

**Action 4.** Results from the targeted stakeholder survey strongly support that there is added value in H2020 and work undertaken by the JRC in addressing adaptation knowledge gaps. This was supported by an interviewee from a research institute in Ireland who pointed to the availability of EU funding to support significant research calls. A more neutral approach was taken by an interviewee from Commission Services dealing with research who pointed out that climate change is a global problem and there is global work ongoing. However, the contribution of European researchers to the Intergovernmental Panel on Climate Change (IPCC) reports is important. In addition, many climate change impacts are continent wide (e.g. the last major floods in Europe covered four or five countries), so the interviewee doubted that there would have been an equivalent level of progress without Commission action to address knowledge gaps through H2020 and work at the JRC.

Overall, in combination, the targeted stakeholder survey, literature and interviews provide good evidence of strong added value from the work on knowledge gaps at EU level. There is also a continuing need for assessment reports from EEA, which compile research results in an understandable way for policymakers, e.g. (European Environment Agency, 2017a). Over 85% of 157 respondents to the open public consultation agreed or strongly agreed, and only one respondent disagreed, that one of the areas of greatest added value of acting at EU level is in bridging knowledge gaps.

**Action 5.** An ongoing evaluation by EEA of Climate-ADAPT (European Environment Agency, 2018, forthcoming) notes that Climate-ADAPT adds value by providing an EU reference point for the state-of-the-art of adaptation in Europe. This is achieved through supporting peer-to-peer learning and by increasing the coherence of approaches in EU countries through better informed decision making. This view was supported, for instance, by an interviewee for our study from the Federal Public Health Service, Belgium who considered Climate-ADAPT is very useful for provision of background information and as a source of inspiration. The Climate-ADAPT website is used both nationally and vertically in Belgium. Looking forward, a researcher from a national research institute in Greece, considered that Climate-ADAPT should continue to develop at an EU level but split information sectorally while also retaining country-level information. These interview responses broadly support the results from the targeted stakeholder survey in agreeing that the development of Climate-ADAPT has led to better development and implementation of adaptation strategies and actions.

Combining literature, targeted stakeholder survey and interview evidence, it is considered that there is good evidence of added value from Action 5 through provision of background information, peer-to-peer learning and a source of inspiration. There is an indication that this may be more notable at transnational and national scale, than at sub-national or city scale.

#### 5.5.1.3 Objective 3 Actions 6-8

**Action 6.** It is appropriate for climate-proofing of the CAP, the Cohesion Policy and the CFP to be undertaken at EU level and, hence, the question of EU added value may be self-

evident. Nevertheless, some additional points were raised in interviews. At a national level, an interviewee considered that some national guidance within their national strategy already considered climate proofing without the EU Adaptation Strategy. Considering the operation of Cohesion Policy, an interviewee from DG REGIO noted that the scope for direction is very limited, as it is under shared management. In this situation, the Strategy serves as a driving force for incorporation of adaptation. The interviewee also considered that the Strategy fostered the introduction of TO5 (promoting climate change adaptation, risk prevention and management) into Cohesion Policy. In other policy areas, an interviewee from DG ENV suggested that the Strategy has helped to move flood risk management higher on the Member State's agenda. An interviewee from DG AGRI noted that, in relation to CAP, there is scope for shared learning on adaptation practices between Member States irrespective of the diversity of climatic zones in the EU.

There are few interview responses from outside the Commission and this is a limitation. As such the interviews for this study do not provide a basis for changing the evidence from the targeted stakeholder survey that without the Strategy, an equivalent amount of progress would not have been made in climate proofing EU policies. This is strongly supported by the open public consultation. Almost 90% of 157 respondents agreed or strongly agreed that one area of greatest additional value by action at an EU level is where the integration of adaptation into EU policies. In addition, in free text contributions to the open public consultation, several stakeholders considered that the added value from the Strategy at EU level is intrinsically linked to its structural funds.

**Action 7.** Respondents to the targeted stakeholder survey neither agreed nor disagreed, on balance, that in the absence of the Strategy's Action 7 an equivalent amount of progress would have been made in considering climate adaptation in infrastructure projects. CEN-CENELEC present a more positive picture and consider that, although they had started considering standards, the process would have been much slower and would not have been so coordinated without the Strategy. Participants in the first stakeholder workshop also noted that the development of technical standards had helped to raise awareness, although further work was needed on how to use data and scenarios, and on data quality. These responses, including from the organisation at the heart of the standardisation activity, suggest that there is some added value from the Strategy's action on resilient infrastructure, in contrast to the results of the targeted stakeholder survey. The added value has resulted from encouraging development that may not otherwise have happened and the standards raising awareness.

Considering the ways in which the Commission's involvement could add additional value, an interviewee from JASPERS (Joint Assistance to Support Projects in European Regions) suggested that there is scope to extend the requirements of major infrastructure projects to other funds. They also suggested that further mainstreaming of climate change into commission guidance and directives could be useful. An interviewee from CEN-CENELEC suggested broadening the scope of the current work to look at more sectors, in addition to infrastructure, that are impacted by climate change. An interviewee from ICLEI suggested that one area that could benefit from further support is financing. They pointed out that the Strategy foresaw that LIFE (and new instruments such as the NCFF) would be used more for adaptation projects but that support is still needed to understand how to improve financing, and to mainstream adaptation into city budgets and other sectors of city administrations.

**Action 8.** Respondents to the targeted stakeholder survey neither agreed nor disagreed, on balance, that in the absence of the Strategy, an equivalent amount of progress would have been made in promoting insurance and other financial products for resilient investment and business decisions. An interviewee from DG ECHO responded along similar lines. They noted demand from the insurance industry, possible signalling of Commission interest through the Green Paper and that more Member States are developing loss databases but concluded it is difficult to say what was triggered by the Strategy and what would have happened anyway. An interviewee from the Federation of European Risk Management Associations (FERMA) stated that they were unaware of engagement with

the risk management profession since the Green Paper. Workshop participants shared information on national experience, illustrating added value from the Strategy. None of the items of evidence is particularly strong and this suggests that EU added value from Action 8 cannot currently be confirmed. There is an indication that the level of activity on this action may have been relatively limited in comparison to the other actions, and the main added value arose from the convening influence of the Strategy.

Considering how the Commission could have added more value in Action 8, an interviewee from DG ECHO noted that, in future, even more evidence will be needed and that the Commission could add value producing it, which could in turn convince more Member States of the value of insurance. The interviewee from FERMA suggested that the Commission's involvement could add value on two fronts by ensuring that: companies' risk management/prevention efforts are reflected in insurance premiums; and there is a consistent EU-wide approach to the way natural disasters are qualified and handled by authorities, so that companies can resume activities as quickly as possible.

#### 5.5.1.4 Adaptation and the Paris Agreement

Two Commission interviewees considered that the Strategy helped to give adaptation parity with mitigation in the Paris Agreement. They also conceded that it may have happened anyway without an EU Adaptation Strategy but that it helped to focus the Commission's contribution to COP21.

# 6 Conclusions

It should be noted that these conclusions are provided in the context that, although there is a baseline (Section 2.3) and points of comparison (Sections 2.2.2 and 2.2.3), no assessment is available of the position in absence of the EU Adaptation Strategy (Section 4.2).

## 6.1 Relevance

The EU Adaptation Strategy was designed to respond to an overarching need to increase the resilience of EU Member States, and thereby limit the economic, environmental and social costs of unavoidable climate impacts in Europe. There is strong evidence from the literature that economic, social and environmental costs of those impacts in Europe are significant and the need for adaptation action remains. The general objective of the Strategy, to contribute effectively to a more climate resilient Europe, also remains relevant as a result of international policy developments since 2013, notably the Paris Agreement, the Sendai Framework for Disaster Risk Reduction, the Convention on Biological Diversity (CBD) Aichi targets, and the Sustainable Development Goals.

The Strategy aims to respond to more operational needs: to adapt at all governance levels, to act in key vulnerable sectors, and to take adaptation into account in relevant decision making. The stakeholder interviews and the public consultation identified that there was still a need for an EU Adaptation Strategy that stimulates Member States to develop national adaptation strategies. Likewise, evidence from stakeholder interviews, the public consultation and from the literature suggests there is a continuing need for adaptation actions to be supported at regional and local levels, as that is primarily where they have to be implemented.

Climate-proofing of EU policies continues to be very relevant. Providing guidance will remain challenging, as adaptation is a moving target. The technical guidance on integrating adaptation into Cohesion Policy is a positive example. With respect to the key vulnerable sectors, the stakeholder interviews and literature identified several areas where greater focus on adaptation effort is required at EU level. These specifically include on water and drought, local and urban adaptation, agriculture policy, and climate finance, insurance and business. In addition, issues that have arisen since the launch of the Strategy require consideration, such as:

- Relations between the EU and the rest of the world, concerning trade, development and the potential risks of indirect impacts of climate change on other countries that may have substantive implications for trade, security and migration into the EU, and biodiversity.
- 'High-end climate change' (i.e. "global warming exceeding 2°C relative to pre-industrial", as defined by three ongoing Commission-funded projects: HELIX, IMPRESSIONS and RISES_AM[145]) and associated extreme events and adaptation requirements.
- Implementation practices; adaptation technologies (e.g., nature-based solutions) and their effectiveness; financial and legal consequences of adaptation; cooperation in society and multifunctional design of adaptation measures.
- Alignment of adaptation and disaster risk reduction.

Supporting the integration of adaptation in infrastructural sectors such as energy, transport, water, waste and ICT is still very important. The process of engaging the sectors is only just starting and it is clear that huge benefits are possible with relatively low

[145] HELIX – High-End Impacts and Extreme; IMPRESSIONS – Impacts and Responses from High-End Scenarios: Strategies for Innovative Solutions; RISES-AM – Responses to Coastal Climate Change: Innovative Strategies for High-End Scenarios – Adaptation and Mitigation; http://highendclimateresearch.eu/

investments, when measures are taken in the construction phase instead of during the lifetime of existing infrastructure.

Promoting insurance and financial products for resilient investment and business decisions may be a good way to involve the private sector in adaptation. However, the approach to insurance of climate risks is very different in each EU Member State, so clarity is needed on the approach adopted in each Member State in relation to public versus private insurance mechanisms to assess where insurance can make a real contribution. The field of insurance and financial products is closely related to disaster risk reduction.

## 6.2 Effectiveness

Lack of a counterfactual means that it is not possible to determine with certainty whether the EU Adaptation Strategy has been effective. It is conceivable that other policy drivers, most notably the Paris Agreement, and many other factors (particularly experience of extreme weather events) may have promoted delivery of the Strategy's outcomes regardless of its existence. However, taking these uncertainties into account, evidence suggests that the Strategy has played an important role and been effective in progressing delivery of its objectives and associated actions. The only exception may be with regard to Action 8 where evidence is equivocal as to whether the Strategy has been effective in promoting insurance and other financial products for resilient investment and business decisions.

It may be inferred from the fact that 25 Member States have now adopted national adaptation strategies and the remainder are developing them that the voluntary nature of the Strategy has been effective in encouraging adoption of national adaptation strategies. Indeed, this conclusion is supported by interviews and the targeted stakeholder survey. However, use of ex ante conditionalities linked to adaptation in the ESIF also seems to have been an important encouragement. The Commission's guidelines have been used to develop new national adaptation strategies and to review or translate existing strategies into national, sectoral or local adaptation plans. Information to assess the effectiveness of the Strategy in promoting regional and local strategies, more generally, is not readily available and would require assessment of where it is "appropriate" for national strategies to be complemented in this way. To date, the adaptation preparedness scoreboard and other evidence suggests that the Strategy has been more effective in encouraging preparatory activities and less effective in promoting implementation and review.

Stakeholder feedback suggests that LIFE is acting as an effective catalyst, providing and disseminating solutions and best practices, however, monitoring is project-centric and is ineffective in assessing the programme's role in knowledge transfer and capacity-building across the EU.

A large number of cities and local authorities are now signatories to the Covenant of Mayors and committed to develop, implement and report on adaptation plans. The effectiveness of cities' membership of the Covenant of Mayors is supported by robust analyses demonstrating that it is the most important factor that has a positive influence on the development of adaptation plans. However, limited feedback indicates some uncertainty as to whether it has yet had a positive impact on various aspects of cities' adaptation strategies.

Identification of key knowledge gaps in the Strategy has been effective in targeting research activity to reduce them. Most effort has been focused on addressing the knowledge gaps in regional and local-level analyses and risk assessments, and on frameworks, models and tools to support decision making. The EEA provided a valuable analysis of the remaining knowledge gaps in 2017, which map onto those identified in the Strategy (i.e. where they are yet to be fully addressed). The conclusions of PESETA III, which may be released in 2018, could provide an up-to-date indication of knowledge gaps in relation to climate change adaptation. The Strategy has been effective in supporting continued development of Climate-ADAPT and visitor numbers have increased steadily.

EEA's ongoing evaluation of Climate-ADAPT has identified that it has been an effective source of knowledge for feeding into a variety of policy processes, primarily to inform development of supporting documents but also, more directly, to inform the development of adaptation plans and strategies. In these ways, the evidence suggests that it has been used to support decision making at all stages of the adaptation policy cycle across Europe, mostly by governmental decision makers but also by sectoral experts to a lesser extent. However, an increasing number of other means of knowledge exchange (including various other EU knowledge platforms, such as on climate services and disaster risk reduction, and national adaptation platforms) as well as language barriers make it necessary that Climate-ADAPT further develops more as a 'first-stop-shop' rather than a 'one-stop shop'.

The Commission's guidance has led to progress but has not yet proved effective in promoting comprehensive and consistent mainstreaming of adaptation, and most notably to different extents in the CAP, the Cohesion Policy and the CFP. Adaptation seems to play the largest role in the CAP, as the EAFRD is the only ESIF where there seems to be a greater focus on adaptation, as actions compared to mitigation, objectives. Under the Cohesion Policy, both the ERDF and the CF provide contributions to climate adaptation objectives in many sectors and particularly for infrastructure investments. However, the EMFF for the CFP seems to have a minor focus on adaptation, and the ESF for the Cohesion Policy has less potential to be climate-proofed, as it targets social and employment actions.

The Strategy has been effective in encouraging steps towards ensuring resilient infrastructure insofar as the 'Guide for addressing climate change adaptation in standards' was developed by CEN-CENELEC and relevant existing standards have now been screened and prioritised. Work on revising the 13 standards in the resultant short list began in early 2017 and will take about four years. The highly technical language of 'The European Commission Non-paper Guidelines for project managers: making vulnerable investment climate resilient' may limit their use by project developers. The brochure on "Climate Change and Major Projects" developed by JASPERS following a Networking Platform has been helpful in explaining the requirements.

## 6.3 Efficiency

Administrative costs resulting from the Strategy are very low and mostly limited to the Commission. No significant administrative burdens resulting from the Strategy were identified, although the costs could vary per stakeholder. For example, Member States without a national adaptation strategy at the time that the EU Adaptation Strategy was launched or that had a relatively low adaptation capacity would have required more resources to (voluntarily) develop a national adaptation strategy.

Costs for other stakeholders (i.e. regional, local or municipal government, private sector or other organisations) resulting from the Strategy are voluntary in the majority of cases and linked to access to EU funds. The Commission is the main stakeholder funding relevant actions under the Strategy, with few or no mandatory costs imposed on others. Member State and private sector stakeholders would encounter costs (and benefits) if they voluntarily choose to apply for EU funding, use EU guidelines or otherwise become involved with the actions.

Feedback was limited but suggests that stakeholders found the resources adequate for implementation of the Strategy and proportionate across the actions. However, there was some feedback that resources could be better aligned to objectives, e.g. for LIFE, Climate-ADAPT. While this may not necessarily correspond to the current resources being inadequate, in the opinion of the evaluator Actions 2 and 5 would benefit from greater resources in future. Some stakeholders (primarily NGOs, but also organisations facilitating action at regional and local level) felt more broadly that greater resources were needed to achieve the actions under the Strategy; this was not a majority view.

Work by the European Court of Auditors (ECA) was critical of the adequacy of the resources available in the context of the EU's own 20% target for mainstreaming of climate action.

However, the ECA was unable to comment in depth on adaptation due to a lack of distinction between mitigation and adaptation in tracking of expenditure, which the Commission suggests is impractical in specific budget areas, such as agriculture. There was little reflection by any source on whether the available resources were adequate to actually address the overarching need and challenge of making the EU more climate resilient. Indeed, the size of this challenge, in terms of investment needs, remains poorly understood, except that needs are likely to run into multiple billions of euros each year. The role for the Strategy in supporting these needs is not defined.

There is only a very limited monitoring and evaluation burden from the Strategy and no evidence of unnecessary burdens was found. The most prominent monitoring burden is for the Commission and Member States in updating the adaptation preparedness scoreboard but feedback suggests this burden was negligible. Other monitoring burdens were driven by other regulations (e.g. MMR) or relate to the specific funds or programmes (e.g. LIFE) rather than the Strategy itself. In general, there is a lack of adaptation-related indicators that the scoreboard may go some way to addressing.

## 6.4 Coherence

In general, there is a strong level of coherence among EU policies included in the Strategy, in particular, in relation to the mainstreaming of adaptation in the EU budget (by its nature, a cross-cutting activity). The process of developing partnership agreements for the ESIF that address climate impacts also appears to have had benefits in terms of coherence at national and sub-national level (although coherence between the national and sub-national levels remains patchy). However, there might have been greater benefits for coherence had there been more coordinated planning of the implementation of the 20% climate mainstreaming target, with greater separate attention paid to the overall contribution to adaptation goals.

In other respects, there are limits to the extent to which the Commission can influence coherence at national and sub-national level through voluntary measures. We note that the guidance for Member States on the development of adaptation strategies did not include significant detail on areas where coherence should be achieved. However, other than in specific areas, such as disaster risk management, there are strong messages on the importance of ensuring coherence through horizontal and vertical coordination mechanisms. Evidence from the draft assessments of Member State performance against the adaptation scoreboard suggests that there is significant scope for further improvement of coherence at national and sub-national level. The stakeholder interviews also highlighted the complexities in ensuring coherence between national and sub-national level adaptation action, which suggests that this issue may prove resistant to EU-level guidance.

The Strategy focused on EU domestic adaptation activity and did not address broader international climate adaptation issues. While the focus on domestic adaptation is a valid choice, it risks failing to identify and address: areas where there is potential for cooperation between the EU and other economies; and EU vulnerability to climate impacts elsewhere in the global economy (migration risks, risks to global value chains, security risks). The subsequent developments in international policy strongly suggest that international climate adaptation issues require further consideration by the EU. These developments have included adoption of the Paris Agreement (with its emphasis on adaptation), the adoption of the UN Sustainable Development Goals (including specific climate and resilience objectives), and the establishment of the Sendai Framework for Disaster Risk Reduction 2015-2030.

Finally, evidence suggests that there is strong internal coherence between some of the specific actions of the Strategy, in particular, between Action 1 ("Encourage all Member States to adopt comprehensive adaptation strategies") and Action 6 ("Facilitate the climate-proofing of the CAP, the Cohesion Policy and the CFP"), between Action 5 ("Further develop Climate-ADAPT as the 'one-stop shop' for adaptation information in Europe) and

Actions 3 ("Introduce adaptation in the Covenant of Mayors framework") and 4 ("Bridge the knowledge gap"), and between Action 6 and Action 7. There has been limited focus on internal coherence between actions in the Strategy, despite potential for:

- Greater links between risk management under agriculture policy and EU policy on insurance mechanisms
- Improved understanding of the knowledge gaps that impede further progress in adaptation policy at Member State level and concerted action to address them, and
- Greater coherence between action at city level (encouraged through the Covenant of Mayors) and action to improve national-level adaptation activity.

## 6.5 EU added value

Most of the elements of the Strategy appear to be adding value, compared with horizontal and vertical actions at Member State level. Elements where the literature and stakeholders indicate there is greatest added value are:

- Areas where the EU is responsible for integrating adaptation into its own policies (Action 6)
- Areas where the EU is encouraging identification and bridging of knowledge gaps and EU-wide research (Objective 2 – Actions 4 and 5, and also Action 2)
- Some of the areas where the EU is promoting action covering the whole of the EU (Actions 1, 3 and 7).

Only in relation to Action 8 is the evidence not strong enough to confirm whether the Strategy is adding value. This may reflect a relatively low level of activity regarding this action.

These conclusions were tested with stakeholders in the open public consultation. The general and three more specific conclusions, broadly associated with the three objectives of the Strategy, all received agreement/ strong agreement from at least 75% of all respondents (N=157-160). Support was strong across all stakeholder groups[146] with at least 66% agreement/strong agreement from each major stakeholder group for each statement.

## 6.6 Overview

Our overall assessment of the Strategy is that it has delivered its individual objectives, with progress recorded against each of the individual actions. The nature of a strategy based on voluntary action makes it difficult to point to a counterfactual case of what would have happened in the absence of a strategy. However, the evidence suggests it is likely that the Strategy has enhanced the political focus on adaptation issues, and increased awareness among a broad range of EU, Member State, and sub-national policymakers of the need for action. It is possible that other policy drivers, most notably the Paris Agreement, and other factors (especially extreme weather events) may have promoted delivery of the Strategy's outcomes regardless of its existence.

The largely voluntary approach underpinning the Strategy appears to have been an appropriate response to the early stage of understanding of adaptation action, to the wide range of Member State situations and priorities, and to the need for policy experimentation. A wide range of stakeholders, including officials at EU and national level, now see a need for a step change in the urgency of adaptation action; international developments point to the need for greater collective action on resilience; and there is further evidence of risks from the direct and indirect impacts of high-end climate change. This suggests the need for an intensification and extension of the scope of action.

[146] This is only assessed for stakeholder groups with approximately 20 or more respondents. There were 10-15 responses from regional government/ administrations and from local authorities and these were combined, for this exercise, to give a "Sub-national" group

# 7 Recommendations

Evidence gathered during the evaluation of the EU Adaptation Strategy can inform recommendations for future activities under the Strategy.

## 7.1 Continue promoting action by Member States

Despite some uncertainties about the importance of the Strategy relative to other drivers, evidence suggests that it has been influential and effective in progressing delivery of its objectives and associated actions. Nevertheless, much more still needs to be achieved (Sections 5.2.1).

**Recommendation 1**: There is a continuing need for the European Commission to promote action by Member States to develop a more climate-resilient Europe.

Specific recommendations are as follows.

**1.1**. While nearly all Member States have adopted national adaptation strategies; and the remaining Member States are in the process of doing so evidence suggests that there are still significant gaps in the effectiveness of Member States' implementation of their strategies (cf. Sections 3.1.1, 5.2.2.1 and 5.2.3.1).
**Recommendation 1.1:** Further EU action following the voluntary approach to the preparation of national adaptation strategies could focus on tools:
**(i)** To encourage Member States to maintain and adapt their strategies, including through the energy and climate governance reporting arrangements, and the continued use of ex ante conditionalities for ESIF expenditure, and
**(ii)** To facilitate action, including through provision of enhanced opportunities for transboundary cooperation.

**1.2.** It appears that there may be a lack of awareness as to the extent to which the Covenant of Mayors has encouraged adaptation action (Sections 3.1.3 and 5.2.2.3).
**Recommendation 1.2:** The Covenant of Mayors should encourage equal emphasis on adaptation and mitigation, for example, not only focusing dissemination of information on commitments to adaptation but also on implementation and monitoring of adaptation strategies and plans.

**1.3.** Transboundary coordination in respect of national adaptation strategies has been patchy (Section 3.1.1, Figure 3-1); but is an important element in the EU added value of the Strategy (Section 5.5.1). European Territorial Cooperation programmes have included a prominent focus on climate adaptation action (Section 3.3.1).

**Recommendation 1.3**: Building on experience from the European Territorial Cooperation Operational Programmes, the Commission should identify areas where transboundary adaptation cooperation could help increase Member States' readiness to climate change impacts.

## 7.2 Continue promoting better-informed decision making

With regard to the knowledge gaps identified in the Strategy, most effort has been focused on addressing regional and local-level analyses and risk assessments, and on frameworks, models and tools to support decision making (5.2.2.4). It is very difficult to substantiate whether further development of Climate-ADAPT has led to better-informed decision making under the Strategy but EEA's own ongoing evaluation may provide greater certainty (5.2.2.5).

**Recommendation 2**: There is a continuing need for the European Commission to work with Member States to close existing adaptation knowledge gaps, address new ones as

they emerge and promote knowledge exchange between scientists, policymakers and practitioners.

Specific recommendations are as follows.

**2.1.** Adaptation is seen as a science-led issue and insufficient interactions between scientists, policymakers and practitioners is a barrier to bridging the knowledge gap and use of research results in decision-making.
**Recommendation 2.1:** The European Commission should further analyse knowledge gaps and encourage the practical application of results on adaptation from H2020 projects, further closing the gap between scientists and users (Sections 3.2.1 and 5.2.3.4).

**2.2** New knowledge gaps have emerged since the Strategy was launched that now need to be addressed as a matter of some urgency (Section 5.1.2).
**Recommendation 2.2:** The European Commission should foster research to close newly emergent knowledge gaps, particularly: successful methods to move towards implementation of adaptation measures, adaptation to high-end climate change, and the risks to the EU from climate impacts elsewhere, particularly in neighbouring countries.

**2.3** There is evidence of the potential benefits of deeper sharing of experience and discussion among Member States (Section 5.5.1, and interviews with Member State representatives).
**Recommendation 2.3:** A community of practice (going beyond the Climate-Adapt mechanism, and including seminars and workshops) should be established to share good practice examples of adaptation actions among Member State authorities and across sectors. This would be particularly useful and relevant if experience of successful adaptation measures could be identified for groupings of Member States that share common or similar impacts.

**2.4.** In addition to Climate-ADAPT, there is an increasing number of other means of knowledge exchange, as well as national platforms and language barriers, which indicate that it should continue to develop as a 'first-stop-shop' instead of a 'one-stop shop'. It is now more valued as a starting point towards more information. (Section 5.2.2.5). EEA's evaluation identified five core content elements of Climate-ADAPT that should remain a focus for future developments of the platform.
**Recommendation 2.4:** Climate-ADAPT should focus further development of its core content on EU-level information and transboundary cooperation. The development of national platforms that better link to Climate-ADAPT should be encouraged through sharing experience and learning from existing national platforms.

## 7.3 Ensuring that EU funding plays a catalytic role

Funding under the LIFE programme has been identified as playing an important catalytic role (Section 5.5.1; and Section 5.2.2.2); and the areas of the EU budget identified as priorities for adaptation mainstreaming (CAP and Cohesion Policy) have the potential to make a more targeted contribution to adaptation (Section 3.3.1.3).

**Recommendation 3**: In developing proposals for the next financial framework, it will be important to address the potential contribution of a range of programmes to climate adaptation. In doing so, the added value of EU expenditure should be clearly identified, either in the form of a catalytic contribution (LIFE), or through the importance of using major EU budget instruments to address shared EU policy priorities (CAP, cohesion).

Specific recommendations are as follows.

**3.1.** The LIFE programme puts a strong focus on measurable impacts but does not monitor if projects are leading to knowledge transfer and capacity-building across the EU (Section 5.2.2.2).

**Recommendation 3.1:** While it is compulsory for LIFE projects to demonstrate potential for transferability, monitoring appears to be focused on the LIFE projects themselves and new emphasis should be given to monitoring the extent to which they are leading to knowledge transfer and capacity-building across the EU.

**3.2.** The 2016 Court of Auditors report (European Court of Auditors, 2016) recommends that spending on climate mitigation and climate adaptation should be separately identified, and the Council conclusions of 21 March 2017 (Council of the European Union (European Court of Auditors), 2017) recommend consideration of this option (see also Section 5.4.1).
**Recommendation 3.2:** The Commission should investigate the potential for separately tracking spending on climate mitigation and climate adaptation in the next financial framework, to provide clearer information on the overall EU budget contribution to improved climate resilience, while also aiming to promote synergies between mitigation and adaptation, and encourage those actions that deliver co-benefits in both areas.

**3.3.** Expenditure under the European Agricultural Fund for Rural Development addresses adaptation objectives, but concerns have been raised that the expenditure tracking methodology leads to over-estimation of the climate-related expenditure (Section 3.3.1.3), and adaptation impacts are not separately tracked (Section 5.4.1).
**Recommendation 3.3:** Future programming and monitoring requirements for the EAFRD could enhance the effectiveness and relevance of expenditure by:
**(i)** More clearly distinguishing between mitigation and adaptation objectives
**(ii)** Clearer definition of the objectives for improved resilience, including more clearly distinguishing between action that enhances the resilience of participating land-use businesses and action that enhances broader societal resilience.

**3.4.** The "greening" of direct payments under the European Agricultural Guidance Fund (EAGF) has been justified primarily by reference to climate mitigation benefits, rather than adaptation benefits. Nevertheless, there are aspects of the obligations placed on recipients of direct payments that have clear adaptation benefits (e.g. elements of Ecological Focus Areas, and elements of the cross-compliance requirements) (Section 3.3.1).
**Recommendation 3.4**: The European Commission should consider options for improving the future impact of EAGF with respect to adaptation including:
**(i)** Action to optimise farm business choices in Ecological Focus Areas from the perspective of flood risk and water resource management (e.g. through guidance or allowing some limited modification of coefficients[147] in relevant areas).
**(ii)** More active use of Good Agricultural and Environmental Condition requirements for soils to improve water management and flood risk management.

**3.5.** The Commission has developed three guidance documents supporting the climate proofing of the Common Agriculture Policy, the Cohesion Policy and the Common Fisheries Policy. Although this action fulfils the call of Action 6 of the Strategy there is a need to better understand how these documents are being used by the Member States. Based on the programme documentation that we have studied, our assessment is that managing authorities have not relied on the guidance documents significantly in the preparation of their programmes (Sections 3.3.1.1, 5.2.2.6 and 5.2.3.6).
**Recommendation 3.5:** The promotion of a greater use of the adaptation technical guidance could help stimulate awareness within the managing authorities. This promotion should be based on: an assessment of the extent to which the EC guidance documents on climate proofing the CAP, Cohesion Policy and the CFP were used in

[147] Farmers with arable areas exceeding 15 ha must ensure that at least 5% of that land is an 'ecological focus area'. A range of types of feature can quality; their contribution to meeting a farm's overall 5% requirement is determined by weighting coefficients.

practice by managing authorities; and the use of this assessment to guide preparation of materials for the preparations of the post-2020 programming period.

**3.6.** Neither the European Social Fund (ESF), nor the European Maritime and Fisheries Fund (EMFF), has a direct focus on climate adaptation, reflecting the low relevance of adaptation objectives compared to other European Structural and Investment Funds (Section 3.1.1, Section 5.2.2.6). Nevertheless, there is potential for a contribution from both to adaptation outcomes.
**Recommendation 3.6**: The Commission should identify proportionate approaches to improving the adaptation impact of both funds, including through an identification of skills gaps in relation to adaptation investments, and through measures such as protection and restoration of marine biodiversity.

## 7.4 Linking disaster risk reduction and adaptation

This recommendation is based on findings regarding the relevance of the current adaptation actions (Section 5.1.1.3), as well as the coherence of the current adaptation activities (Section 5.4.1) for linking adaptation with disaster risk reduction policies. Both policy areas work towards similar overarching objectives. However, the review of the current state-of-play and stakeholder views revealed that currently both policy areas are mainstreamed (in parallel) into key EU policies and strategies, including those for critical infrastructure protection, environmental protection, financial instruments of the Cohesion Policy and the EU Structural and Investment Funds (ESIF), agriculture, food and nutrition security, and integrated coastal management. Hence, there is still a need to foster further coherence between disaster risk reduction and climate change adaptation policies, practices and knowledge, particularly in relation to ecosystem based approaches, cooperation with third countries, and insurers working more closely with specific vulnerable groups, such as farmers.

**Recommendation 4**: The coherence between climate change adaptation and disaster risk reduction should be further enhanced across all levels of governance (global, European, national levels) via closer vertical and horizontal, cross-border and transnational coordination and collaboration.

Specific recommendations are as follows.

**4.1.** Greater standardisation of vulnerability assessments and other approaches to management and governance would help to bring disaster risk reduction and adaptation closer together
**Recommendation 4.1:** Look at ways in which the EU can support the standardisation of vulnerability assessments and other methodological approaches, for example, through enhancing the use of climate change projections within disaster risk assessments or establishing common indicators to assess progress on both adaptation and disaster risk prevention.

## 7.5 Mainstreaming ecosystem-based adaptation

In general, mainstreaming has been effective in focusing on areas of Commission activity where there is a need to follow through on commitments made in the EU Adaptation Strategy, however, there appears to have been notably less effort to integrate ecosystem-based approaches to adaptation (Section 3.3.2.3 and Appendix 5).

**Recommendation 5**: The EU Adaptation Strategy recognised that ecosystem-based adaptation is cost-effective, easily accessible and provides multiple benefits, so greater efforts should be made to mainstream ecosystem-based approaches across all areas of Commission activity.

Specific recommendations are as follows.

**5.1.** Although the Covenant of Mayors already promotes cities' consideration of climate-related green infrastructure (e.g. through its inclusion in the Urban Adaptation Support Tool) more needs to be done to raise its profile.
**Recommendation 5.1:** The scope of the Covenant of Mayors should be explicitly extended to promote cities' consideration of climate-related green infrastructure.

**5.2.** The guidance on the mobilisation of ecosystem-based approaches to adaptation referred to in Action 7 of the EU Adaptation Strategy has not yet been issued (Section 3.3.2.3).
**Recommendation 5.2**: The mobilisation and market uptake of green infrastructure and ecosystem-based approaches to adaptation should be further promoted.

## 7.6 Ensuring greater coherence between adaptation and mitigation

Better integration of, and the reinforcement of synergies between, adaptation and mitigation action is seen as an important objective by many stakeholders; and can help to improve the effectiveness of adaptation action (Sections 5.2.2.3, 5.2.2.6, 5.4.1). Stakeholders appear broadly supportive of the need for further efforts to improve coherence[148], while noting[149] that adaptation and mitigation action can involve different communities of interest; and expressing concern about the risk of adaptation being insufficiently prioritised unless it has specific mechanisms to support it.

Specific recommendations are as follows.

**6.1.** There is some evidence that the potential for greater coherence between adaptation and mitigation policy is not fully exploited (Sections 3.3.1, 5.2.2.3, and Appendix 5).
**Recommendation 6.1:** Efforts should be renewed to identify actions that mutually reinforce adaptation and mitigation in the European context, drawing on work at UNFCCC level[150], as a first step to ensuring greater coherence between mitigation and adaptation objectives and actions.

## 7.7 Ensuring more resilient economic sectors

Climate-proofing EU action through adaptation in key vulnerable sectors is an important goal of the Strategy and is important to prevent economic, social and environmental costs. Some progress has been made in ensuring that EU funding goes to projects that include climate resilience, that guidance is available to the private sector and that financial and insurance markets develop to support it (Sections 3.3 and 5.2.1.7), but stakeholders feel strongly that more can and should be done. There is a particular need for action to increase the resilience of the transport, construction and energy sectors (Section 5.2.1.7). The Commission Action Plan on Sustainable Finance announced in March 2018 aims to address many relevant issues (including the standardisation of terminology e.g. what is a climate resilient investment) and its successful implementation will be important.

**Recommendation 7**: The EU should ensure more resilient economic sectors and infrastructure by expanding and deepening efforts to include climate resilience, particularly in the energy, transport and construction sectors, and including through the implementation of the Action Plan on Sustainable Finance.

Specific recommendations are as follows.

**7.1.** The inclusion of climate risk assessment requirements in EU-funded major projects has been useful, incentivising beneficiaries to incorporate adaptation considerations in project development (Section 5.2.3.7). Yet some beneficiaries may

[148] See Appendix 2E
[149] See Appendix 2D
[150] See: http://unfccc.int/resource/climateaction2020/media/1281/unfccc_spm_2016.pdf

apply for smaller projects or other funds rather than major projects to circumvent the climate-proofing requirements.
**Recommendation 7.1:** To ensure consistency across EU-financed projects and further promote the climate-proofing of vulnerable investments, the requirements for climate risk assessment should be extended from EU-funded major projects to all EU-funded infrastructure projects.

**7.2.** The Non-paper on "Guidelines for Project Managers: Making vulnerable investments climate resilient" uses highly technical language and is, thus, difficult for beneficiaries that are not adaptation experts (e.g. infrastructure developers, energy providers, road companies) to understand (Section 5.2.2.7). The approach to combining guidance from DG CLIMA, DG REGIO, JASPERS and EUFIWACC has achieved good results for the major projects funded by ERDF/CF in the period 2014-2020.
**Recommendation 7.2:** With a view to further developing the climate proofing of infrastructure, the Commission should enhance and consolidate the existing guidance and apply the approach more widely to EU-funded infrastructure. The Commission should consider enhancing the approach as a tool to help ensure the climate resilience of the built environment.

**7.3.** DG ECHO and CLIMA have been promoting the use of disaster insurance through dialogue and stakeholder meetings with Member States and stakeholders, including the insurance sector. Whilst the activities undertaken to date by the Commission in this area have been useful, there is a need to further increase climate risk awareness, as a means of indirectly promoting insurance and risk prevention (Section 5.2.2.8).
**Recommendation 7.3:** The Commission should continue to support development and sharing of disaster loss and damage data, as a means to increase awareness of climate risks (and their cost), as well as dialogue with Member States and stakeholders (through expert groups and stakeholder meetings) on disaster-risk insurance.

## 7.8 Addressing the EU's vulnerability to climate impacts taking place outside Europe and cooperating with non-EU countries

The current EU Adaptation Strategy focuses solely on domestic action and does not address broader international climate change adaptation issues (Section 3.3.1, 5.4.1, and the reference in the Impact Assessment to the Strategy). There are examples of Commission policy documents identifying external climate risks and resilience challenges, although these generally address the impacts from a development policy perspective. Some stakeholders have pointed to a risk of not sufficiently recognising and addressing the EU's own vulnerability to climate impacts taking place outside Europe, and of missing the potential opportunities for cooperation with non-EU countries and regions; and analytical work carried out since the adoption of the Strategy has emphasised the extent to which economic vulnerabilities, particularly to global value chains and commodity markets, are shared geographically (Section 5.4.1).

**Recommendation 8**: The Commission should consider external aspects of climate vulnerability, including the impact on EU resilience, and the potential for synergies between EU domestic adaptation activity and the adaptation needs of other economies.

Specific recommendations are as follows.

**8.1**: The current EU Adaptation Strategy focuses on domestic action and as such it risks failing to identify and address areas where there is potential for cooperation between the EU and other parts of the world. This has particular relevance now as, since the adoption of the Strategy, significant developments have taken place in the international sphere (Sections 3.3, 5.1.1 and 5.4.1).

**Recommendation 8.1**: In line with the latest developments in the international adaptation framework, including the Paris Agreement, the Sustainable Development Goals and the Sendai Framework for DRR, the revised EU Strategy should address the links between EU and non-EU adaptation actions, including:
**(i)** The scope for EU experience and climate modelling to be shared more widely, particularly with developing countries and vulnerable regions, and
**(ii)** The identification of risks to the EU arising from the impacts of climate change on other economies (spill-over effects), particularly in neighbouring countries and regions, and commensurate actions required to improve the resilience of the EU accordingly.

**8.2:** The EU has made a submission to the UN on its undertakings in adaptation planning which is separate from its intended Nationally Determined Contribution (NDC). As a result, the EU's NDC focuses solely on mitigation actions, unlike the NDCs of a majority of parties (particularly developing countries) which cover both mitigation and adaptation (Section 5.4.1).
**Recommendation 8.2:** Rather than providing a separate submission to the UN on EU undertakings in adaptation planning, it would be better to include adaptation in the Nationally Determined Contribution (NDC). This would send a stronger signal to other countries about the balance of efforts being made by the EU in relation to mitigation and adaptation.

## 7.9 Internal coherence of the EU Adaptation Strategy

The internal coherence of the Adaptation Strategy is largely dependent on the absence of conflicts between its actions; however, limited effort appears to have been spent on exploiting synergies between the actions (see Section 5.4.1).

**Recommendation 9**: The current internal coherence should be maintained and further consideration given to how to enhance it further.

The specific recommendation is:

**Recommendation 9.1**: Internal coherence of the EU Adaptation Strategy should be enhanced, for instance, by considering:
**(i)** Greater links between risk management under agriculture policy and EU policy on insurance mechanisms.
**(ii)** Improved understanding of the knowledge gaps that impede further progress in adaptation policy at Member State level and concerted action to address them.
**(iii)** Greater coherence between action at city level (encouraged through the Covenant of Mayors) and action to improve national-level adaptation activity. This could be encouraged through: emphasising, in future guidance on Member State strategies, the need to make maximum use of the innovative ideas and examples emerging at local and regional level; and an increased emphasis in Climate-ADAPT and Covenant of Mayors information on how local action fits within, and contributes to the delivery of, national strategies.

# 8 References


AMEC. (2013). *Assessing the spillover effects in the EU of the adverse effects of climate change in the rest of the world, in particular the EU's Neighbourhood countries – Summary for policy makers.* AMEC Environment & Infrastructure UK limited in partnership with Bio Intelligence Service, Cambridge Econometrics and Milieu Ltd. Report to European Commission DG CLIMA.

Barroso, J. (27 November 2009). *Letter from President Barroso to Connie Hedegaard outlining the role and portfolio of the Commissioner for Climate Action.* Brussels: European Commission. Retrieved from http://ec.europa.eu/archives/commission_2010-2014/hedegaard/about/docs/letter_en.pdf

Bertoldi, P., Bornas Cavuela, D., Monni, S., & Piers De Raveschoot, R. (2010). *How to develop a Sustainable Energy Action Plan (SEAP) - Guidebook, EUR 24360.* Luxembourg: Publication Office of the European Union.

Bouwer, L. M. (2013). Projections of Future Extreme Weather Losses under Changing Climate Exposure. *Risk Analysis, 33*(5), 915 - 930.

Breil, M., & Swart, R. (2015). *National Action supporting Urban Adaptation in EEA Member States.* Bologna, IT: ETC/CCA. Retrieved May 25, 2017, from http://cca.eionet.europa.eu/reports/Urban%20Adaptation%202016

Camarsa, G., Toland, J., Eldridge, J., & et al. (2015). *LIFE and Climate Change Adaptation.* Luxembourg: European Union. Retrieved from http://ec.europa.eu/environment/life/publications/lifepublications/lifefocus/documents/climatechangeadaptation.pdf

Comission, E. (2017a). *Evaluation of the EU's Strategy on Adaptation to Climate Change.* doi:https://ec.europa.eu/clima/consultations/evaluation-eus-strategy-adaptation-climate-change_en

Committee of the Regions. (2017a). *Opinion Factsheet: Mid-term evaluation of the Programme for the Environment and Climate Action (LIFE) 2014-2020, CDR 4126/2016.* Committee of the Regions. Retrieved from http://cor.europa.eu/en/activities/opinions/pages/opinion-factsheet.aspx?OpinionNumber=CDR%204126/2016

Committee of the Regions. (2017b). *Opinion Factsheet: Towards a new EU climate change adaptation strategy – taking an integrated approach, CDR 2430/2016.* Committee of the Regions. Retrieved from http://cor.europa.eu/en/activities/opinions/pages/opinion-factsheet.aspx?OpinionNumber=CDR%202430/2016

Council of the European Union (European Court of Auditors). (2017). *'Spending at least one euro in every five from the EU budget on climate action: ambitious work underway, but serious risk of falling short.* Brussels: Council of the European Union, special report no. 31. Retrieved from http://data.consilium.europa.eu/doc/document/ST-7495-2017-INIT/en/pdf

Council of the European Union. (2013). *An EU strategy on adaptation to climate change - Council Conclusions - 11151/13.* Brussels: Council of the European Union. Retrieved from http://register.consilium.europa.eu/doc/srv?l=EN&f=ST%2011151%202013%20INIT

Council of the European Union; European Parliament. (2013). *Regulation (EU) No 525/2013 of the European Parliament and of the Council on a mechanism for monitoring and reporting greenhouse gas emissions and for reporting other*

*information at national and Union level relevant to climate change and repealing Decisio.* Brussels: Council of the European Union; European Parliament.

Covenant of Mayors & Mayors Adapt Offices. (2016). *The Covenant of Mayors for Climate Change and Energy Reporting Guidelines.* Covenant of Mayors & Mayors Adapt Offices and the Joint Research Centre of the European Commission. Retrieved from http://www.covenantofmayors.eu/IMG/pdf/Covenant_ReportingGuidelines.pdf

Covenant of Mayors & Mayors Adapt Offices. (2017). *Covenant of Mayors for Energy & Climate: Covenant community's needs for SE(C)AP design and implementation.* Covenant of Mayors & Mayors Adapt Offices. Retrieved from https://www.covenantofmayors.eu/support/library.html

COWI. (2016). *Mainstreaming of climate action into ESI Funds.* Brussels: European Commission. Retrieved from https://ec.europa.eu/clima/sites/clima/files/budget/docs/report_mainstreaming_of_climate_action_en.pdf

COWI. (2017). *Mainstreaming of adaptation into the ESIF 2014-2020.* Brussels: European Commission. Retrieved from https://ec.europa.eu/clima/sites/clima/files/budget/docs/report_maindtreaming_adaptation_en.pdf

Dige, G., Eichler, L., Vermeulen, J., Rademaekers, K., & Adriaenssens, V. (2016, forthcoming). *'Green Infrastructure and Flood Management. Promoting cost-efficient flood risk reduction via green infrastructure solutions'.*

Ecofys. (2016). *Implementation of the urban adaptation initiative within the framework of the 'Covenant of Mayors' - CONFIDENTIAL.*

Ecorys. (2014). *Innovative financing and positioning of the water sector.* Netherlands Water Partnership, Netherlands Enterprise Agency. Retrieved from https://www.traidwheel.nl/media/files/rev%202017%2005%2016%20NL203-28455_Eindrapp.pdf

Ecorys. (2017). *Support for an external and independent LIFE Mid Term Evaluation Report.* Brussels: European Union. Retrieved from https://publications.europa.eu/en/publication-detail/-/publication/7861fb60-1e7a-11e7-aeb3-01aa75ed71a1/language-en

Ercin A.E, C. D. (2016). *Dependencies of Europe's economy on other parts of the world in terms of water resources.* Horizon2020 - IMPREX project, Technical Report D12.1, Water Footprint Network.

EU High-Level Expert Group on Sustainable Finance. (2017). *Financing a Sustainable European Economy: Interim Report.* European Commission. Retrieved from https://ec.europa.eu/info/sites/info/files/170713-sustainable-finance-report_en.pdf

EUFIWACC. (2016). *Integrating Climate Change Information and Adaptation in Project Development: Emerging Experience from Practitioners.* EUFIWACC. Retrieved from http://econadapt.eu/sites/default/files/2016-11/EUFIWACC_Adaptation_Note_Version_1.0_ENGLISH_FINAL_20160601%5B1%5D.pdf

European Academies Science Advisory Council. (2018). *Extreme weather events in Europe. Preparing for climate change adaptation: an update on EASAC's 2013 study.* Retrieved from https://easac.eu/fileadmin/PDF_s/reports_statements/Extreme_Weather/EASAC_Extreme_Weather_2018_web.pdf

European Comission. (2013a). *Non-paper guidines for Project Managers: Making vulnerable investment climate resilient.* Brussels: European Comission. Retrieved from http://climate-adapt.eea.europa.eu/metadata/guidances/non-paper-

guidelines-for-project-managers-making-vulnerable-investments-climate-resilient/guidelines-for-project-managers.pdf

European Comission. (2016a). *Action Plan on the Sendai Framework for Disaster Risk Reduction 2015-2030.* Brussels: European Comission. Retrieved from http://ec.europa.eu/echo/sites/echo-site/files/1_en_document_travail_service_part1_v2.pdf

European Comission. (2017). *Agriculture and Rural Development*. Retrieved from http://ec.europa.eu/agriculture/cap-post-2013/legal-proposals/index_en.htm

European Commission. (2011b). *Proposal for a Regulation of the European Parliament and the Council establishing the Connecting Europe Facility. COM (2011) 665/3.* Brussels: European Commission.

European Commission. (2011c). *Proposal for a Decision of the European Parliament and of the Council on a Union Civil Protection Mechanism. COM (2011) 934 final.* Brussels: European Commission.

European Commission. (2011d). *Proposal for a regulation of the European Parliament and of the Council on Union guidelines for the development of the Trans-European Transport Network. COM (2011) 650/2.* Brussels: European Commission.

European Commission. (2012). *The Multifunctionality of Green Infrastructure. Science for Environment Policy. In-depth Report.* European Commission. Retrieved from http://ec.europa.eu/environment/nature/ecosystems/docs/Green_Infrastructure.pdf

European Commission. (2012b). *Directive of the European Parliament and of the Council amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment. COM (2012) 628 final.* Brussels: European Commission. Retrieved from http://www.europarl.europa.eu/meetdocs/

European Commission. (2013a). *Communication from the Commission to the European Parliament, The Council, The European Economic and Social Committee and the Committee of the Regions: An EU Strategy on adaptation to climate change, COM (2013) 216 final.* Brussels: European Union . Retrieved from http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52013DC0216&from=EN

European Commission. (2013b). *COMMISSION STAFF WORKING DOCUMENT: Impact Assessment: Part 1, SWD (2013) 132 final.* Brussels: European Union. Retrieved from https://ec.europa.eu/clima/sites/clima/files/adaptation/what/docs/swd_2013_132_en.pdf

European Commission. (2013c). *COMMISSION STAFF WORKING DOCUMENT: Climate change adaptation, coastal and marine issues, SWD(2013) 133 final.* Brussels: European Union. Retrieved from https://ec.europa.eu/clima/sites/clima/files/adaptation/what/docs/swd_2013_133_en.pdf

European Commission. (2013d). *COMMISSION STAFF WORKING DOCUMENT: Adaptation to climate change impacts on human, animal and plant health, SWD(2013) 136 final.* Brussels: European Union. Retrieved from https://ec.europa.eu/clima/sites/clima/files/adaptation/what/docs/swd_2013_136_en.pdf

European Commission. (2013e). *COMMISSION STAFF WORKING DOCUMENT: Adapting infrastructure to climate change, SEC (2013) 137 final.* Brussels: European Union. Retrieved from https://ec.europa.eu/clima/sites/clima/files/adaptation/what/docs/swd_2013_137_en.pdf

European Commission. (2013f). *COMMISSION STAFF WORKING DOCUMENT: Climate change, environmental degradation, and migration, SWD(2013) 138 final.* Brussels: European Union. Retrieved from https://ec.europa.eu/clima/sites/clima/files/adaptation/what/docs/swd_2013_138_en.pdf

European Commission. (2013g). *COMMISSION STAFF WORKING DOCUMENT: Technical guidance on integrating climate change adaptation in programmes and investments of Cohesion Policy, SWD(2013) 135 final.* Brussels: European Union. Retrieved from https://ec.europa.eu/clima/sites/clima/files/adaptation/what/docs/swd_2013_135_en.pdf

European Commission. (2013h). *COMMISSION STAFF WORKING DOCUMENT: Principles and recommendations for integrating climate change adaptation considerations under the 2014-2020 rural development programmes. SEC (2013) 139 Final.* Brussels: European Commission. Retrieved from https://ec.europa.eu/clima/sites/clima/files/adaptation/what/docs/swd_2013_139_en.pdf

European Commission. (2013i). *COMMISSION STAFF WORKING DOCUMENT: Guidelines on developing adaptation strategies, SWD (2013) 134 final.* Brussels: European Commission. Retrieved from European Commission: https://ec.europa.eu/clima/sites/clima/files/adaptation/what/docs/swd_2013_134_en.pdf

European Commission. (2013j). *Green Paper on the insurance of natural and man-made disasters, COM(2013) 213 final.* Strasbourg: European Commission. Retrieved from http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52013DC0213&from=EN

European Commission. (2013k). *Non-paper Guidelines for project managers: making vulnerable investment climate resilient.* European Commission.

European Commission. (2013l). *Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (EIA).* European Commission. Retrieved from http://ec.europa.eu/environment/eia/pdf/EIA%20Guidance.pdf

European Commission. (2013m). *Guidance on Integrating Climate Change and Biodiversity into Strategic Environmental Assessment (SEA).* European Commission. Retrieved from http://ec.europa.eu/environment/eia/pdf/SEA%20Guidance.pdf

European Commission. (2013n). *Factsheet: Horizon 2020.* European Commission. Retrieved from https://ec.europa.eu/research/horizon2020/pdf/press/fact_sheet_on_horizon2020_budget.pdf

European Commission. (2013o). *Green Infrastructure (GI) — Enhancing Europe's Natural Capital, COM(2013) 249 final.* Brussels: European Commission. Retrieved from http://ec.europa.eu/environment/nature/ecosystems/docs/green_infrastructures/1_EN_ACT_part1_v5.pdf

European Commission. (2013p). *Commission Staff Working Document. Principles and recommendations for integrating climate change adaptation considerations under the 2014-2020 European Maritime and Fisheries Fund operational programmes, SWD (2013) 299.* Brussels: European Commission.

European Commission. (2013q). *Proposal for a Directive of the European Parliament and of the Council: Establishing a framework for maritime spatial planning and integrated coastal management. COM (2013) 133 final.* Brussels: European Commission.

European Commission. (2014). *COMMISSION IMPLEMENTING DECISION of 28.5.2014, C(2014) 3451 final.* Brussels: European Commission. Retrieved from http://ec.europa.eu/transparency/regdoc/rep/3/2014/EN/3-2014-3451-EN-F1-1.Pdf

European Commission. (2014a). *European Commission Guide to Cost-Benefit Analysis of Investment Projects. Luxembourg: Publications Office of the European Union.* Brussels: European Commission.

European Commission. (2015). *Climate Action – LIFE Projects 2014.* Brussels: European Commission. Retrieved from http://ec.europa.eu/environment/life/publications/lifepublications/compilations/documents/climacompilation14.pdf

European Commission. (2015b). *Climate action in ESIF: Introduction to the series of Fact Sheets on the potential for mainstreaming of climate action and the assessment hereof.* Brussels: European Commission. Retrieved from https://ec.europa.eu/clima/sites/clima/files/docs/01-climate_mainstreaming_fact_sheet-esif_introduction_en.pdf

European Commission. (2015c). *Potential for climate action - Examples of how to mainstream climate action and the potential for doing so - ERDF - European Regional Development Fund – 2014-2020.* Brussels: European Commission. Retrieved from https://ec.europa.eu/clima/sites/clima/files/docs/02-climate_mainstreaming_fact_sheet-erdf_en.pdf

European Commission. (2015d). *Assessment of climate action. How to assess the mainstreaming of climate action in Operational Programmes ERDF and CF European Regional Development Fund and Cohesion Fund2014-2020.* Brussels: European Commission. Retrieved from https://ec.europa.eu/clima/sites/clima/files/docs/09-climate_assessment_fact_sheet-erdf_cf_en.pdf

European Commission. (2016a). *Climate Action - LIFE Projects 2015.* Brussels: European Commission. Retrieved from http://ec.europa.eu/environment/life/publications/lifepublications/compilations/documents/clima_compilation2015.pdf

European Commission. (2016b). *Climate Change and Major Projects. Outline of the climate change related requirements and guidance for major projects in the 2014-2020 programming period. Ensuring resilience to the adverse impacts of climate change and reducing the emission of greenhouse.* European Commission . Retrieved from https://ec.europa.eu/clima/sites/clima/files/docs/major_projects_en.pdf

European Commission. (2016c). *Proposal for a Regulation on the Governance of the Energy Union, COM(2016) 759 final.* European Commission. Retrieved from https://ec.europa.eu/energy/sites/ener/files/documents/1_en_act_part1_v9_759.pdf

European Commission. (2016d). *Commission Staff Working Document. Accompanying Communication from the Commission to the European Parliament and the Council Mid -term review/revision of the multiannual financial framework 2014-2020. An EU budget focused on results, SWD(2016)299.* Brussels: European Commission. Retrieved from http://ec.europa.eu/budget/mff/lib/COM-2016-603/SWD-2016-299_en.pdf

European Commission. (2016e). *Tracking climate expenditure: The common methodology for tracking and monitoring climate expenditure under the European Structural and Investment Funds (2014-2020).* Brussels: European Commission. Retrieved from https://ec.europa.eu/clima/sites/clima/files/docs/tracking_climate_expenditure_en.pdf

European Commission. (2017). *Insurance of weather and climate-related disaster risk: inventory and analysis of mechanisms to support damage prevention in the EU, Final Report.* Brussels: European Commission.

European Commission. (2017, forthcoming). *Insurance of weather and climate-related disaster risk: inventory and analysis of mechanisms to support damage prevention in the EU, Final Report.* Brussels: European Commission.

European Commission. (2017a). *Better Regulation Guidelines, SWD (2017) 350 final.* Brussels: European Union. Retrieved from https://ec.europa.eu/transparency/regdoc/rep/10102/2017/EN/SWD-2017-350-F1-EN-MAIN-PART-1.PDF

European Commission. (2017b). *Joint Communication to the European Parliament and the Council. A strategic approach to resilience in the EU's external action.* Brussels: European Commission. Retrieved from https://eeas.europa.eu/headquarters/headquarters-homepage_en/27711/A%20Strategic%20Approach%20to%20Resilience%20in%20the%20EU%27s%20External%20Action

European Commission. (2017c). *ESIF Data*. Retrieved July 11, 2017, from https://cohesiondata.ec.europa.eu/

European Commission. (2017d). *Joint Communication to the European Parliament and the Council. A strategic approach to resilience in the EU's external action. MEMO/17/1555.* Brussels: European Commission. Retrieved from http://europa.eu/rapid/press-release_MEMO-17-1555_en.htm

European Court of Auditors. (2016). *Special Report on 'Spending at least one euro in every five from the EU budget on climate action: ambitious work underway, but at serious risk of falling short'.* European Court of Auditors. Retrieved from http://www.eca.europa.eu/Lists/ECADocuments/SR16_31/SR_CLIMATE_EN.pdf

European Court of Auditors. (2017). *Landscape review. EU action on energy and climate change.* Luxembourg: European Union.

European Economic and Social Committee. (2013). *Opinion of the European Economic and Social Committee on the 'Communication from the European Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on COM (2013) 216 final.* European Economic and Social Committee.

European Economic and Social Committee. (2017). *Exploratory Opinion: Mid-term evaluation of the LIFE programme, NAT/689-EESC-2016.* European Economic and Social Committee. Retrieved from http://www.eesc.europa.eu/en/our-work/opinions-information-reports/opinions/mid-term-evaluation-life-programme

European Environment Agency (EEA). (2014). *National adaptation policy processes in European Countries - 2014 .* Luxembourg: European Environment Agency. Retrieved May 25, 2017, from https://www.eea.europa.eu/publications/national-adaptation-policy-processes

European Environment Agency. (2015). *Exploring nature-based solutions: The role of green infrastructure in mitigating the impacts of weather- and climate change-related natural hazards. EEA Technical report No 12/2015.* European Environment Agency.

European Environment Agency. (2016). *Urban adaptation to climate change in Europe 2016 — Transforming cities in a changing climate.* Denmark: European Environment Agency. Retrieved April 20, 2017, from https://www.eea.europa.eu/publications/urban-adaptation-2016

European Environment Agency. (2017). *Climate change, impacts and vulnerability in Europe 2016: An indicator based report, No 1/2017.* Luxembourg: Publications

Office of the European Union. Retrieved from https://www.eea.europa.eu/publications/climate-change-impacts-and-vulnerability-2016

European Environment Agency. (2017a). *Climate change, impacts and vulnerability in Europe 2016: An indicator based report, No 1/2017.* Luxembourg: Publications Office of the European Union. Retrieved from https://www.eea.europa.eu/publications/climate-change-impacts-and-vulnerability-2016

European Environment Agency. (2017b, May 25). *EEA and EC case studies on urban adaptation*. Retrieved from Climate-ADAPT - sharing adaptation information across Europe: http://climate-adapt.eea.europa.eu/data-and-downloads#searchtype=ACTION&b_start=0&sectors=URBAN

European Environment Agency. (2017c). *Climate change, impacts and vulnerability in Europe 2016: An indicator-based report. EEA Report No.1 .* Luxembourg: Publications Office of the European Union. Retrieved from https://www.eea.europa.eu/publications/climate-change-impacts-and-vulnerability-2016

European Environment Agency. (2017d). *Key findings - Climate change, impacts and vulnerability in Europe 2016.* European Environment Agency. Retrieved from https://www.eea.europa.eu/publications/climate-change-impacts-and-vulnerability-2016/key-findings

European Environment Agency. (2018, April 9). *European Climate Adaptation Platform: Country Information*. Retrieved from European Climate Adaptation Platform: http://climate-adapt.eea.europa.eu/countries-regions/countries

European Environment Agency. (2018, forthcoming). *Evaluation of Climate-ADAPT.* Publications Office of the European Union.

European Environment Agency. (2018, Forthcoming). *Sharing adaptation information across Europe: Evaluation of the European Climate Adaptation Platform – Climate-ADAPT'.* European Environment Agency.

European Environment Agency. (2018b). *Economic losses from climate-related extremes.* European Environment Agency. Retrieved from https://www.eea.europa.eu/data-and-maps/indicators/direct-losses-from-weather-disasters-3/assessment-1

European Investment Bank. (2013). *Environmental and Social Handbook.* Retrieved from http://www.eib.org/attachments/strategies/environmental_and_social_practices_handbook_en.pdf

European Union. (2013). Regulation (EU) No. 1305/2013 of the European Parliament and of the Council of 17 December 2013 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD) and repealing Council Regulation (EC) No 1698/2005. *Official Journal of the European Union*, 487-548.

European Union. (2016). *Shared Vision, Common Action: A Global Strategy for the European Union's Foreign And Security Policy.* Brussels: European Union. Retrieved from https://eeas.europa.eu/archives/docs/top_stories/pdf/eugs_review_web.pdf

European Union Global Strategy. (2016). *Shared Vision, Common Action: A Stronger Europe.* Retrieved from https://europa.eu/globalstrategy/sites/globalstrategy/files/regions/files/eugs_review_web_0.pdf

Financing the Future Consortium. (2015). *Shifting private finance towards climate-friendly investments.* European Commission. Retrieved from https://www.climatebonds.net/files/files/climate-friendly_investments_en.pdf

Foresight. (2011). *The future of food and farming. Final project report.* London: The Government Office for Science. Retrieved from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/288329/11-546-future-of-food-and-farming-report.pdf

Forzieri, G., Bianchi, A., Marin Herrera, M. A., Batista E Silva, F., Feyen, L., & Lavalle, C. (2016). *Resilience of large investments and critical infrastructures in Europe to climate change.* Luxembourg: Joint Research Centre. Retrieved May 25, 2017, from https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/resilience-large-investments-and-critical-infrastructures-europe-climate-change

Hendel-Blackford, S., Salb, C., Brand, K., Oonk, R., Creazzo, L., Guri, D., . . . Stern, I. (2017). *Implementation of 'Mayors Adapt' 2015 - 2017: Final Report.*

Joint Research Centre. (2013). *Overview of Disaster Risks that the EU faces.* Luxembourg: European Union. Retrieved May 25, 2017, from http://publications.jrc.ec.europa.eu/repository/bitstream/111111111/29598/1/lb-na-25822-en-n.pdf

Joint Research Centre. (2014). *Climate Impacts in Europe. The JRC PESETA II project.* JRC.

Joint Research Centre. (2015). *Risk assessment methodologies for critical infrastructure protection. Part II: A new approach. Report EUR 27332 EN.*

Kona, A., Melica, G., Iancu, A., Koffi, B., Zancanella, P., Calvete, S. R., . . . Monforti-Ferrario, F. (2016). *Covenant of Mayors: Greenhouse Gas Emissions Achievements and Projections, EUR 28155.* Luxembourg: Publications Office of the European Union.

Latvian Presidency of the Council of the European Union. (2015). *Submission by Latvia and the European Commission on behalf of the.* Retrieved from https://unfccc.int/files/focus/adaptation/undertakings_in_adaptation_planning/application/pdf/20150602_eu.pdf

Lo, V. (2016). *Synthesis Report on Experiences with Ecosystem-Based Approaches to Climate Change Adaptation and Disaster Risk Reduction.* Montreal: (c) Secretariat of the Convention on Biological Diversity. Retrieved from https://www.cbd.int/doc/publications/cbd-ts-85-en.pdf

Local Governments for Sustainability, European Secretariat (ICLEI) and CEPS (Centre for European Policy Studies). (2013). *Climate change adaptation: Empowerment of local and regional authorities, with a focus on their involvement in monitoring and policy design.* Luxembourg: Committee of the Regions, European Union. Retrieved from http://cor.europa.eu/en/documentation/studies/Documents/climate-change-adaptation.pdf

Lukat, E., Tröltzsch, J., Cazzola, G., Zoritza, K., Blobel, D., Terenzi, A., . . . Hjerp, P. (2016). *Regional and Local Adaptation in the EU since the adoption of the EU Adaptation Strategy in 2013.* Luxembourg: Committe of the Regions, European Union. Retrieved May 25, 2017, from http://cor.europa.eu/en/documentation/studies/Documents/Local%20and%20regional%20adaptation.pdf

Mabey, N. C. (2014). *Underfunded, underprepared, underwater? Cities at risk.* London: E3G. Retrieved from http://www.e3g.org/docs/E3G_Underfunded,_underprepared,_underwater._Cities_at_risk.pdf.

McCallum, S., Dworak, T., Prutsch, A., Kent, N., Mysiak, J., Bosello, F., . . . Horrocks, L. (2013). *Support to the development of the EU Strategy for Adaptation to Climate Change: Background report to the Impact Assessment, Part I – Problem definition,*

*policy context and assessment of policy options.* Vienna: Environment Agency Austria. Retrieved from https://ec.europa.eu/clima/sites/clima/files/adaptation/what/docs/background_report_part1_en.pdf

Milieu. (2016). *Mid-term evaluation of the urban adaptation initiative within the framework of the Covenant of Mayors: Final Report.* Luxembourg: European Union. Retrieved May 25, 2017, from http://bookshop.europa.eu/en/mid-term-evaluation-of-the-urban-adaptation-initiative-within-the-framework-of-the-covenant-of-mayors-pbML0116212/?CatalogCategoryID=h2YKABstrXcAAAEjXJEY4e5L

Naumann, S. A. (2011). *Assessment of the potential of ecosystem-based approaches to climate change adaptation and mitigation in Europe. Final report to the European Commission, DG Environment, Contract no. 070307/2010/580412/SER/B2.* Oxford: Ecologic institute and Environmental Change Institute Oxford University Centre for the Environment. Retrieved from http://ec.europa.eu/environment/nature/climatechange/pdf/EbA_EBM_CC_FinalReport.pdf

Naumann, S. K. (2014). *Nature-based approaches to climate change mitigation and adaptation. BFN and Ecologic Insitute. Retrieved from https://www.bfn.de/fileadmin/BfN/biologischevielfalt/Dokumente/BfN_Nature-based-solution_brochuere.pdf.* Bonn: German Federal Agency for Nature Conservation.

Nesbit, M., Paquel, K., & Illes, A. (2017). *Research for REGI Committee – Cohesion Policy and Paris Agreement Targets.* Brussels: European Parliament. Retrieved from https://ieep.eu/uploads/articles/attachments/c6717f0c-98bc-4ede-a662-edd0ce418a8b/Cohesion%20Policy%20and%20Paris%20Agreement%20targets%20report.pdf?v=63667241874

ONERC. (2016). *Adaptation au changement climatique: Évaluations de la démarche nationale et recommandations.* Observatoire National sur les effets du réchauffement climatique. Retrieved from https://www.ecologique-solidaire.gouv.fr/sites/default/files/ONERC_Rapport_2016_EvaluationPnacc_WEB_0.pdf

Reckien, D. F. (2015). The influence of drivers and barriers on urban adaptation and mitigation plans — An empirical analysis of European cities. *PLoS ONE*, 10(8): e0135597. doi:10.1371/journal.pone.0135597

Ricardo Energy & Environment, IEEP, Trinomics. (2017). *Climate mainstreaming in the EU Budget: preparing for the next MFF. Final report.* Brussels: European Commission.

Ricardo-AEA. (2013). *Adaptation Strategies for European Cities Final Report.* Luxembourg: European Commission. Retrieved May 25, 2017, from http://climate-adapt.eea.europa.eu/repository/11156095.pdf/view

Romanovska, L., Dworak, T., Hendel-Blackford, S., & Forster, S. (2016). *Maytors Adapt Knowledge Base Strategy: Urban adaptation knowledge gaps in Europe: Excutive Summary.* European Commission. Retrieved from http://www.covenantofmayors.eu/IMG/pdf/MA_KnowledgeBaseStrat_ExecSummaryFinal.pdf

Triconomics. (2015). *Shifting Private Finance towards Climate-Friendly investment.* Retrieved from https://www.climatebonds.net/files/files/climate-friendly_investments_en.pdf

Trinomics. (2017). *Assessing the state-of-play of climate finance tracking in Europe.* Amsterdam: Trinomics.

Trinomics. (2017). *State of Play of Climate Finance Tracking in Europe.* European Environment Agency. Retrieved from http://trinomics.eu/wp-

content/uploads/2017/07/State-of-play-of-European-climate-finance-tracking-published-6-July-2017.pdf

Trinomics et al. (2013). *Green Infrastructure and Climate Adaptation.* Retrieved from http://ec.europa.eu/environment/nature/ecosystems/pdf/Green%20Infrastructure/GI_climate_adaptation.pdf

Triple E (Trinomics), TNO and Ricardo-AEA. (2014). *Assessing the implications of climate change adaptation on employment in the EU. Final Report to the European Commission under contract CLIMA.C.3/ETU/2013/0013.*

UNFCCC. (2010). *The Cancun Adaptation Framework.* Retrieved from https://unfccc.int/resource/docs/2010/cop16/eng/07a01.pdf

UNFCCC. (2015). *Paris Agreement.* Bonn: UNFCCC . Retrieved from https://unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreement.pdf

Wamsler, C., & Pauleit, S. (2016). Making headway in climate policy mainstreaming and ecosystem-based adaptation: two pioneering countries, different pathways, one goal. *Climatic Change, 137*, 71. Retrieved May 25, 2017, from https://link.springer.com/article/10.1007/s10584-016-1660-y

# Appendices

Appendix 1: Procedural information concerning the process to prepare the evaluation

Appendix 2: Stakeholder consultation

- Appendix 2A – Stakeholder consultation – synopsis report
- Appendix 2B – Results of targeted stakeholder survey
- Appendix 2C – Stakeholder interviews: Scripts and respondents
- Appendix 2D – Results of stakeholder workshops
- Appendix 2E – Results of open public consultation

Appendix 3: Methods

Appendix 4: Evaluation matrix

Appendix 5: Mainstreaming adaptation into EU policies

Appendix 6: NDC fiches

Appendix 7: Literature review

Appendix 8: Case studies

Appendix 9: Summary of costs and benefits table– to support Impact Assessment SWD

All Appendices are in a single document apart from Appendices 2A, 2B, 2C and 2E which are in separate documents.

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