

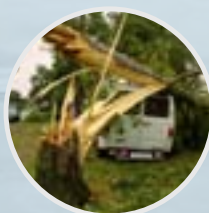


EUROSAI

Working Group on
Environmental Auditing

Adaptation to climate change – are governments prepared?

A cooperative audit



Joint report

Nine European Supreme Audit Institutions have been partners in this cooperative audit on adaptation to climate change:



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Content Overview

Message from Heads of Supreme Audit Institutions	2
Summary	4
Abbreviations	6
Report.....	8

Supreme Audit Institutions

The role of Supreme Audit Institutions (SAIs) is to conduct independent audits of governments’ activities. These assessments provide the national parliaments with objective information to help them examine their government’s public spending and performance. The International Organisation of Supreme Audit Institutions (INTOSAI) is the international umbrella organisation for Supreme Audit Institutions. The aim of the institutionalised framework is to promote development and transfer of knowledge, improve government auditing worldwide and enhance the professional capacities, standing and influence of member SAIs in their respective countries (INTOSAI, 2012). The regional organisation for Supreme Audit Institutions on the European level is EUROSAI. One of its working groups is the EUROSAI Working Group on Environmental Auditing (EUROSAI WGEA). The aim of the working group is to contribute to increasing the SAIs’ capacity in auditing governmental environmental policies, to promote cooperation and to exchange knowledge and experiences on the subject between SAIs.

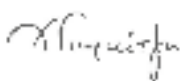
Message from Heads of Supreme Audit Institutions



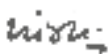
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*President,
Austrian Court of Audit*



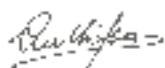
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The Supreme Audit Institutions are important actors overseeing national implementation of environmental policies, among other things, and have an important role in contributing to efficient and cost-effective policy implementation.

In Europe today, climate change is one of the major environmental concerns, and it is widely recognised that climate is changing throughout the region. Climate change will have an impact on the environment, the society and its citizens, as well as influencing Europe's economy. Adaptation to climate change is necessary in order to reduce these severe consequences.

In this cooperative audit, nine European Supreme Audit Institutions assessed their governments' preparedness for climate change and actions to adapt to it. The cooperative audit demonstrates some of the governmental barriers and challenges to climate change adaptation. Hence, the report raises awareness and contributes to new insight and knowledge on governments' responses to climate change adaptation. Hopefully, this understanding will be valuable to policy processes on national and international levels.

The cooperative audit has revealed that adaptation to climate change is not a priority area among national governments. Although most governments have provided knowledge about climate change impacts by developing risk and vulnerability assessments, up to the time of concluding the national audits, only two of the eight countries audited have developed a policy framework for adaptation and developed a comprehensive national strategy – with one further country adopting such a policy and strategy up to time of publishing this report. It is also evident that very few countries have started to implement actions or assessed future climate change implications for their national economies. Measures implemented are to a large extent a response to current climatic challenges, not adaptation actions seeking to meet future climate change.

The financial crisis in Europe and the long-term nature of climate change might be contributing factors to European countries not prioritising adaptation. Notwithstanding, there is a scientific consensus that timely and proportionate adaptation actions make economic, social and environmental sense and are likely to be far less costly than inaction.

The Supreme Audit Institutions recommend that their governments act in order to minimise the adverse effects of climate change on the environment, society and Europe’s economy, as well as to take advantage of any beneficial effects of climate change.



A black and white scan of a handwritten signature, likely belonging to Ms Saskia J. Stuiveling.

Ms Saskia J. Stuiveling
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The Netherlands Court
of Audit*

A black and white scan of a handwritten signature, likely belonging to Mr Jørgen Kosmo.

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Mr Roman Maguta
*Chairman,
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Ukraine*



Summary

The cooperative audit indicates that governments are not sufficiently prepared for the expected impacts of climate change and do not have adequate actions in place to deal with these unavoidable negative effects.

This cooperative audit is based on eight individual national audit reports from Austria, Bulgaria, Cyprus, Malta, the Netherlands, Norway, Russia and Ukraine, and a fact-finding study by the European Court of Auditors. Generally the national audits revealed that the countries assessed in this report are in an early stage in adapting to climate change. So far, adaptation activities are related to identifying risk and vulnerabilities and to some extent policy development. Actions identified in the national audits covered in this report are mainly a response to current challenges and not initiated due to anticipated medium-term and long-term climate change impacts.

The national audits revealed that most countries have prepared risk and vulnerability assessments of sufficient quality. Up to the time of concluding the national audits, only two of the eight countries had developed a comprehensive adaptation strategy. In most countries, weaknesses in coordination of adaptation are identified. There is also a general lack of cost estimates of impacts of climate change or adaptation measures in policy documents. This increases the risk that climate change and adaptation issues are not being sufficiently addressed in decision-making processes.

It is recommended that

- countries use adequate risk and vulnerability assessments for policy-making and consider the impacts of likely climate change scenarios with higher expected temperature increases than the 2-degrees scenario
- adaptation strategies and action plans should be developed and implemented at the government level
- the strategies should clearly specify the time-frame for implementation and the roles and responsibilities of all the parties involved
- governments should ensure coordinated adaptation policy and its implementation
- governments should provide knowledge, to the extent possible and meaningful, of the costs and benefits of climate change impacts and adaptation measures to ensure cost-effective implementation

Objective: Are governments prepared for climate change?

Due to its anticipated severe consequences on the environment, economy and society, climate change is one of the major environmental challenges in Europe today. Climate change is expected to have severe impacts on sectors like energy, agriculture and forestry, and major impact on infrastructure such as transport and water supply. The aim of this cooperative audit has been to assess how adaptation policies and actions are implemented on national levels across Europe, identify governments' challenges related to climate change adaptation and provide common conclusions and recommendations. Moreover, the aim of the cooperative audit is to inspire and pass knowledge to other SAIs.

The scope of the cooperative audit

Supreme Audit Institutions (SAIs) play an important role in contributing to efficient and cost-effective policy implementation by conducting independent audits of governments' activities.

In order to collect and assess comparable information on national governments' actions, the partner SAIs prepared a common framework to set the audit issues and corresponding audit questions to be addressed in the national audits. Five major issues were identified by the SAIs as important for assessing governments' actions on adaptation to climate change, namely risk and vulnerability assessments, strategic documents, coordination, governments' implementation of adaptation actions, and potential results and impacts of adaptation policies and measures.



Abbreviations

CAP	Common Agricultural Policy
Climate-ADAPT	The European Climate Adaptation Platform
EC	European Commission
ECA	European Court of Auditors
EEA	European Environment Agency
EUROSAI	European Organisation of Supreme Audit Institutions
EUROSAI WGEA	EUROSAI Working Group on Environmental Auditing
INTOSAI	International Organisation of Supreme Audit Institutions
INTOSAI WGEA	INTOSAI Working Group on Environmental Auditing
IPCC	The Intergovernmental Panel on Climate Change
JAP	Joint Action Plan
NAS	National Adaptation Strategy
RVAs	Risk and Vulnerability Assessments
SAI	Supreme Audit Institutions
UNFCCC	United Nations Framework Convention on Climate Change
UNISDR	United Nations International Strategy for Disaster Reduction



Topografia

Table of Contents

1 Background.....	11
1.1 Climate change and adaptation	11
1.2 National and international adaptation policies.....	14
1.3 Scope of the cooperative audit.....	14
1.4 Scope of the national audits	16
1.5 Data collection for the cooperative audit.....	18
1.6 Audit methods	18
2 Findings.....	19
2.1 Risk and Vulnerability Assessments.....	19
2.2 Strategies.....	23
2.3 Coordination	27
2.4 Implementation, results and impacts	31
2.5 Costs and benefits of climate change	36
3 Conclusions and recommendations	40
4 Lessons learned	42
5 Acknowledgements	43
6 Abstracts of the audits and fact-finding study	44
7 Audit matrix.....	64
8 Partners	66
9 References.....	67



1 Background

1.1 Climate change and adaptation

The climate is changing and will continue to do so in the years and decades to come (EEA, 2010a; IPCC, 2007a). Climate change is widely recognised as one of the most prominent challenges facing humankind (EEA, 2010a), and will change the environment, impact society and its citizens, affect biodiversity and ecosystems, and influence the European economy. European governments and citizens need to act in order to minimise the adverse impacts of climate change, as well as to increase Europe's resilience.

Temperatures are increasing and Europe has warmed more than the global average (EEA, 2008). It is estimated that the global mean temperature will increase by between 1.8 and 4 °C¹ during this century, and the temperature increase in Europe is anticipated to be higher than the estimated global average (EEA, 2010a; IPCC, 2007a). Increased temperatures are associated with changes in precipitation patterns, melting of glaciers and reduced snow cover, as well as changes in sea levels. Water resources, terrestrial and aquatic ecosystems and biodiversity, including agriculture and forestry, will be affected by these changes (EEA, 2008; EEA, 2010 a; EEA, 2010 b).

Furthermore, a changing climate influences extreme weather events like storms, floods, droughts and heat waves (IPCC, 2007a; IPCC, 2011). Extreme weather events have a major impact on society and contribute to economic losses. Recent estimates from IPCC (2011) indicate that some of these extreme weather events may occur with a higher frequency and/or with an increased intensity.










The European environment – state and outlook 2010 emphasises four sets of key environmental challenges: climate change, biodiversity loss, growing material resource use and continuing concerns related to environment, health and quality of life (EEA, 2010c).

1 The 1.8-4 °C is the best estimate. However, projections indicate a likely temperature range from 1.1 to 6.4 °C (IPCC, 2007a).



Figure 1: Key past and projected impacts and effects on sectors for the main biogeographic regions of Europe (EEA, 2010b).

-  **Arctic:** Decrease in Arctic sea ice coverage. Greenland ice sheet loss. Higher risk of biodiversity loss.
-  **Northern Europe (boreal region):** Less snow, lake and river ice cover. Northward movement of species. More energy by hydropower. Lower energy consumption for heating. Higher risk of damages by winter storms. Increased river flows. Higher forest growth. Higher crop yields. More (summer) tourism.
-  **North-western Europe:** Increase in winter precipitation. Increase in river flow. Northward movement of freshwater species. Higher risk of coastal flooding.
-  **Mountain areas:** High temperature increase. Less glacier mass. Less mountain permafrost. Higher risk of rock falls. Upwards shift of plants and animals. Less ski tourism in winter. Higher soil erosion risk. High risk of species extinction.
-  **Coastal zones and regional seas:** Sea-level rise. Higher sea surface temperatures. Northward movement of species. Increase in phytoplankton biomass. Higher risk for fish stocks.
-  **Central and eastern Europe:** More temperature extremes. Less summer precipitation. More river floods in winter. Higher water temperature. Higher crop yield variability. Increased forest fire danger. Lower forest stability.
-  **Mediterranean region:** Decrease in annual precipitation. Decrease in annual river flow. Increasing water demand for agriculture. Lower crop yields. More forest fires. Less energy by hydropower. More deaths by heat waves. More vector-borne diseases. Less summer tourism. Higher risk of biodiversity loss. Higher risk for desertification.

Vulnerable regions and sectors vary considerably across Europe (Figure 1), and pronounced impacts are expected to occur in the Mediterranean basin, north-western and central-eastern Europe and the Arctic (EEA, 2010b).

Despite the national and international actions taken by governments during the last two decades to mitigate anthropogenic emissions of greenhouse gases and limit the associated increase in temperature, some unavoidable climate changes are projected to take place in the future.

Europe's ambition is to limit global greenhouse gas emissions to keep the global mean temperature increase since the pre-industrial era below 2 °C (EEA, 2010a). However, even an increase in the global temperature of 2 °C is associated with several adverse impacts on society, the ecosystem and the economy. Recent emission scenarios and the corresponding increase in global temperature indicate, however, that the target of two degrees will likely not be reached (EEA, 2010a).



Adaptation is defined by the IPCC as the adjustment of natural or human systems to actual or expected climate change or its effects in order to moderate harm or exploit beneficial opportunities (IPCC, 2007b).

An effective adaptation policy thus is crucial in order to reduce current and future negative impacts of climate change. As the consequences of climate change are expected to vary considerably across the different regions of Europe, effective adaptation measures need to be tailored to local and regional needs, and to specific challenges (EEA, 2010b). Sectors such as energy, forestry, agriculture and tourism will be highly affected by climate change (EEA, 2008; EEA, 2010a). Furthermore, climate change will have major impacts on crucial infrastructure such as transport and water supply, as well as having consequences for vulnerable societal groups.

Studies have shown that adequate adaptation is economically, socially and environmentally sustainable, and is likely to be far less costly than inaction (EEA 2010b). An integrated economic assessment study of the EU countries² estimated the annual GDP loss to be 20 to 65 billion Euros for temperature increases of 2.5 °C and 5.4 °C respectively, without any adaptation to climate change (Ciscar et al., 2009). Corresponding losses in welfare were estimated to be between 0.2 % and 1 %.

Adaptation policies and actions are highly challenging tasks for governments and policy-makers due to the complexity of adverse impacts of climate change, as well as the implications it has for all economic sectors, levels of government and society as a whole.

.....
2 The assessment covers all EU countries, with the exception of Luxemburg, Malta and Cyprus (Ciscar et al., 2009).

1.2 National and international adaptation policies

Climate change issues and corresponding intergovernmental efforts are addressed globally through the United Nations Framework Convention on Climate Change (UNFCCC). This global framework commits countries to implement programmes to mitigate greenhouse gas emissions, and to prepare for and facilitate adequate adaptation to climate change (UNFCCC, 1992). Furthermore, the framework also sets obligations related to the development and transfer of technologies, scientific research and funding relevant for climate change issues.

In the EU, under the framework of the European Union, the European Commission published a White Paper in 2009 on adaptation to climate change (EC, 2009). The White Paper highlights the need to implement adaptation to climate change in all key EU policies, to develop a knowledgebase, and to establish the European Climate Adaptation Platform (Climate-ADAPT)³ to provide information about climate change impacts, vulnerability and adaptation. The aim of the White Paper is to support Europe in adapting to climate change, to ensure efficient and cost-effective adaptation actions and to contribute to a sustainable future. The EU Commission is currently preparing a European adaptation strategy, which is planned to be launched by 2013.

National governments across Europe have to varying degrees started to prepare for climate change. So far, twelve⁴ EU Member States have adopted national adaptation strategies (EEA, 2012a). Nonetheless, countries have in recent years and to an increased extent addressed adaptation issues in vulnerable policy sectors like water management, coastal zone management and agriculture (Mickwitz et al., 2009).

1.3 Scope of the cooperative audit

The aim of the cooperative audit is to contribute to knowledge on how adaptation policies are implemented on national levels. This report is based on eight individual national audit reports⁵ from Austria, Bulgaria, Cyprus, Malta, the Netherlands, Norway, Russia and Ukraine, and a fact-finding study⁶ by the European Court of Auditors⁷ (ECA) (Figure 2). Based on the national findings and the fact-finding study, the cooperative audit identifies governments' challenges related to climate change

.....
3 The platform was launched in March 2012 (<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/12/309&> and <http://www.eea.europa.eu/highlights/major-new-website-to-assist>)

4 By the time the individual national audits were reported, 11 Member States, namely Belgium, Denmark, Finland, France, Germany, Hungary, Netherlands, Portugal, Spain, Sweden and United Kingdom, have adopted a national adaptation strategy. The Maltese National Climate Change Adaptation Strategy was adopted by Parliament in May 2012, after the national audit was concluded.

5 The Office of the Auditor General of Norway based its reporting on *The Office of the Auditor General's investigation into the efforts of the authorities to limit flood and landslide hazards (Document 3:4 (2009–2010))* supplemented with a fact-finding study.

6 A study in order to collect information, reviewed by the Commission and the European Environment Agency, but without audit verification

7 The European Court of Auditors (ECA) is EU's external auditor and carries out audits of EU finances.

adaptation. This report highlights these challenges and provides common conclusions and recommendations.

In order to identify governments’ actions to climate change adaptation, five important audit areas were identified: risk and vulnerability assessment, strategy, coordination, implementation and results and impacts.

With the purpose of evaluating whether governments have assessed the countries’ vulnerabilities to climate change, the cooperative audit addresses whether Risk and Vulnerability Assessments (RVAs) are carried out and applied in policy-making. RVA is the analysis of the expected impacts, risks and adaptive capacity⁸ of a region or sector to the effects of climate change (the European Climate Adaptation Platform, 2012). Furthermore, the report looks into whether the governments have established a framework for adaptation actions and addressed adaptation to climate change in strategic documents. In light of the complexity of climate change and its cross-sectoral impacts at national, regional and local levels, issues on how coordination is ensured on governmental level are included in the analyses. Moreover, the audit addresses governments’ implementation of actions to adapt to climate change. The study also evaluates potential results and impacts of the policies. In this cooperative audit, only domestic adaptation issues have been addressed. Individual countries’ commitments in supporting developing countries in adapting to climate change are not covered.

As climate change impacts differ highly across Europe, the national audits cover various sectors based on risk assessments of the individual SAIs of their national government’s actions and the most vulnerable sectors of their country. Hence, the national audits are limited to some adaptation issues and relevant sectors. Some SAIs have looked into their national government’s adaptation actions in general.

The SAIs have carried out thorough analyses of national actions within the scope of the national audits. Thus, this report is based on a qualitative analysis of the levels of actions, implementations and corresponding results of adaptation policies



Figure 2:
 ■ Countries included in the study.

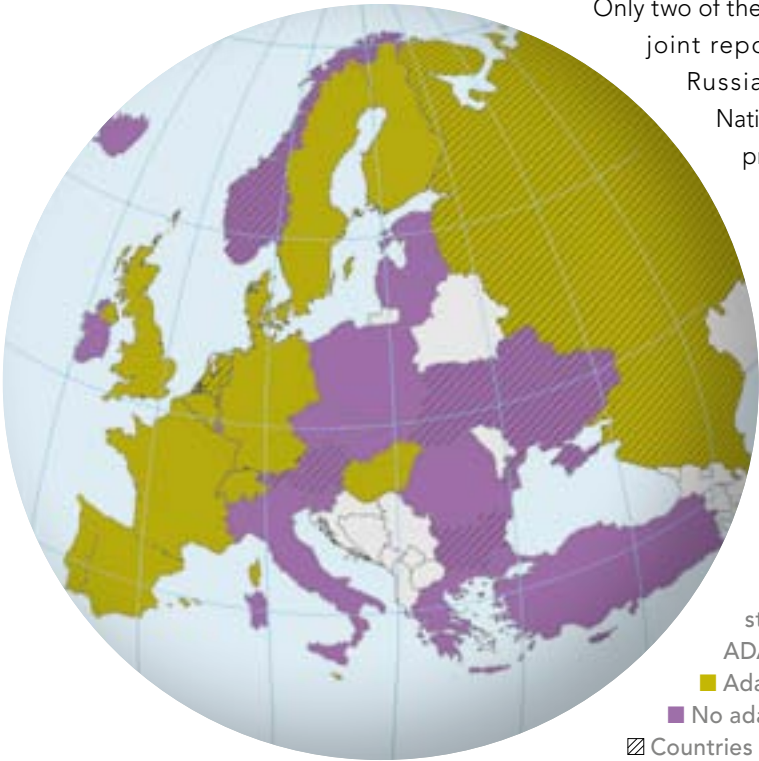
8 Adaptive capacity is the ability or potential of a system to respond successfully to climate variability and change, and includes adjustments of behaviour, resources and technologies (INTOSAI WGEA, 2010).

addressed in the national audits. The joint report highlights good practices, weaknesses and challenges observed. Since the coordinated audit is limited by the scope of the national audits included, findings are only representative for the countries addressed and the areas covered in the national audits. As this is a qualitative study, the results cannot be generalised, but the findings might be indications on conditions relevant for other sectors in the respective countries or for other countries that are not a part of this analysis.

1.4 Scope of the national audits

As the SAIs have audited various sectors and assessed several types of sources, an overview of the national audits’ approaches is given in Table 1. The national audits cover time periods ranging between 1995 to 2012 (6).

Risk and Vulnerability Assessments (RVAs) have been assessed for all countries covered in this report. Austria, the Netherlands and Norway have based their assessment on the RVAs of most of the relevant sectors (Table 1). Furthermore, the European Court of Auditors has assessed the overall RVAs on the EU level. In the other countries, only some crucial sector-specific RVAs have been evaluated. This is due to either a lack of overall RVAs, or to the scope of the national audit.



Only two of the eight countries⁹ covered in this joint report, the Netherlands and the Russian Federation, had adopted National Adaptation Strategies (NAS) prior to the commencement of the national audits (Figure 3). Both SAIs have assessed these strategies in their national audits. In addition, the SAI of Russia has reported results based on the assessment of one vulnerable sector, agriculture. ECA, based on its

Figure 3:
Status on national adaptation strategies in Europe (Climate-ADAPT, 2012).

- Adaptation strategy adopted
- No adaptation strategy adopted
- ▨ Countries included in the study































9 The Maltese National Climate Change Adaptation Strategy was adopted by Parliament in May 2012, after the national audit was concluded.

fact-finding study, has reported on the EU’s actions in preparing the European Adaptation Strategy. For the remaining countries, where NASs were not in place, the findings are based on assessments of strategies, plans and programmes for a selection of the vulnerable sectors (Table 1).

Furthermore, the national audits investigate whether roles and responsibilities are clearly defined, and whether the coordination of adaptation to climate change is managed in a satisfactory manner. This issue is addressed in the audits on several levels: in strategies, plans and programmes, as well as how they are carried out in government agencies.

Additionally, evaluations of the implementation of adaptation actions and measures, including potential results and impacts, are addressed in the sectors audited (Table 1).

Table 1: National Adaptation Strategies, Risk and Vulnerability Assessments and sectors assessed in the national audits.

	Assessed in the national audits								
	Compre- hensive National Adaptation Strategy	Risk and Vulnerability Assessments		Sector strategies, plans, programmes and measures					
		General	Sectoral	Adaptation in general	Water	Forestry	Tourism	Spatial planning	Agriculture
Austria									
Bulgaria									
Cyprus									
Malta ^a									
Netherlands ^b									
Norway									
Russia ^c									
Ukraine									
ECA									

^{a)} Sectoral strategy ^{b)} The NAS was adopted in 2008 ^{c)} The NAS was adopted in 2009

1.5 Data collection for the cooperative audit

Common audit questions were made in order to collect comparable information on national governments' actions within the five identified major areas (risk and vulnerability assessment, strategy, coordination, implementation, and results and impacts). The audit questions address various issues relevant to the five areas and are organised in an audit matrix (7). With the purpose of giving guidance on how these audit questions could be addressed in the national audits, references were made to the INTOSAI WGEA guide on auditing climate change (INTOSAI WGEA, 2010).

Because the various national audits did not address all the issues covered in the audit matrix, individual SAs have only answered questions that are relevant to their audit and context. This means that an individual SA only responded to a selection of the questions in the audit matrix. As a consequence, the data coverage varies from question to question.

1.6 Audit methods

Coordinated audit

The overall findings, conclusions and recommendations, as well as the case studies, in this report are based on analyses of the SAs' answers to the audit questions (7), and on the abstracts of the national audits and the fact-finding study (6). Supplementary information has been provided by SAs when requested.

The interpretation and incorporation of the individual national findings in the cooperative audit's findings, conclusions and recommendations are quality-controlled by each individual SA.

National audits

The national audits' approaches, including audit criteria, methodology, quality control and publication of the national results, have been carried out in accordance with the countries' standard procedures. The audit criteria applied in the national audits are based on national criteria and potential international commitments. Furthermore, standard auditing methodologies such as interviews, document analysis, spot checks and questionnaires have been applied. In one case, GIS¹⁰ analysis is applied as one of the major auditing methods.

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10 A Geographic Information System (GIS) is a system designed to capture, analyse, manage and display geographical data. In the simplest terms, GIS is a merging of cartography, statistical analysis and data-base technology.

2 Findings

The findings are presented according to the areas addressed in the cooperative audit, i.e. risk and vulnerability assessments, strategy, coordination and implementation. The findings related to results and impacts are integrated in the section on implementation. The various aspects related to adaptation costs are presented in a separate section. Furthermore, the findings are illustrated with case studies from the national audits. The conclusions and recommendations are summarised in chapter 3 of this report.

2.1 Risk and Vulnerability Assessments

Most countries have prepared RVAs

A prerequisite for governments' ability to develop policies and actions on adapting to climate change is knowledge of the various effects of climate change on particular sectors and regions. Necessary knowledge of climate change impacts is provided through risk and vulnerability assessments (RVAs). Most countries have identified sectors vulnerable to climate change.

Three of the countries have performed comprehensive assessments (Case 1). Some countries have carried out RVAs for a limited number of vulnerable sectors or sectors where climatic conditions are an existing challenge.

Among the countries assessed, one country has not carried out any national risk and vulnerability assessments for known vulnerable sectors, but bases its activities on risks assessed by the European Commission and UNFCCC (Case 2).

At the European level, the European Environment Agency (EEA) provides comprehensive scientific information on climate change and its impacts, vulnerable regions and sectors (Case 3). The European Commission has set up a knowledgebase on impacts and consequences of climate change on the EU level. However, the European Commission does not have mandate to request development of national RVAs due to a lack of legal framework.



Vulnerability assessment is the analysis of the expected impacts, risks and adaptive capacity of a region or sector to the effects of climate change. Vulnerability assessment encompasses more than simple measurement of the potential harm caused by events resulting from climate change: it includes an assessment of a region's or sector's ability to adapt. Within the context of climate change, the IPCC defines vulnerability to climate change as the degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes (the European Climate Adaptation Platform, 2012).

CASE 1: Comprehensive assessment of risks and vulnerabilities in Austria, the Netherlands and Norway

The risk and vulnerability assessments that were previously carried out in Austria, the Netherlands and Norway on the initiative of their central governments have common characteristics. They took all the sectors into account that are vulnerable to climate change, looked ahead to at least 2100 and addressed positive as well as negative aspects of climate change. Furthermore, these assessments have involved qualified research and were scientifically reviewed or went through a public consultation process. They were or are also used for policy-making. In their assessments, Austria paid attention to i.a. the interdependencies of the key sectors that are vulnerable to climate change, the Netherlands to the costs and benefits of climate change and Norway to the challenges for governance.



CASE 2: Risk and Vulnerability Assessments under preparation – the CYPADAPT project

In order to address the lack of national risk and vulnerability assessments, as well as adaptation strategies, the CYPADAPT project, which is co-financed by the European Union, was launched in 2011. The project’s main aim is to increase the capacity of Cyprus to adapt to climate change impacts through the preparation of risk and vulnerability assessments, and the development of a national adaptation strategy. The project is expected to be completed by March 2014.



CASE 3: The European Environment Agency provides scientific information on climate change and its impact in Europe

The European Environment Agency (EEA) provides information on expected climate change and its impact in Europe, including the vulnerability of regions and sectors. The agency has defined a set of more than 40 indicators that are considered useful for monitoring the situation, measuring the impact of climate change on various natural and societal systems, and for risk and vulnerability analysis.

Each year, the EEA organises a workshop for the benefit of its 32 member countries, including the 27 EU Member States. These workshops are focused on sharing information and knowledge about climate change. At these occasions, approaches to defining national, regional and local strategies for adapting to climate change are scrutinised.

The quality of the RVAs is assessed to be sufficient

The majority of the RVAs are conducted by national experts and scientific institutions commissioned by national governments. Except in the case where RVAs were not based on national assessments, the qualities of the RVAs are in general assessed to be satisfactory. Qualitative or quantitative uncertainties have, as rule of thumb, been addressed in the RVAs, and the time periods covered for estimating future impacts extend up to the year 2100. In some cases, the RVAs have also been reviewed in public consultation processes or by scientific reviews. Hence, the RVAs are evaluated to be a good basis for developing adaptation strategies, plans and measures.

However, weaknesses have been identified. In one case, there were some limitations in data used for climate change scenarios (Case 4). In another case, the audit identified an absence of periodic reviews of the RVAs.

CASE 4: Limitations in the scientific data used for RVAs

In Malta, limitations were found in the scientific data used for the climate change scenarios due to weaknesses in time series data and complexities related to Malta's small territorial size and its closeness to the sea. However, the RVAs mitigated such limitations by also considering the uncertainty in the data. Despite these limitations, the ensuing projections were deemed by various authoritative bodies as quite reliable and they recommended their use in vulnerability and adaptation studies for the Maltese Islands.

Limitations in RVAs used for developing policies and strategies

A majority of the RVAs provide the basis for developing governments' strategies, plans and programmes. However, in some cases, the RVAs conducted on the national level are based on temperature scenarios close to the politically committed climate change goal. The EU climate change goal is to limit the anticipated increase in temperature since the pre-industrial era to 2 °C. As there are indications that the 2 degree target will not be met (EEA, 2010a), it is expected that the countries might be more vulnerable than they estimate in their RVAs.

The European Commission aims to fill knowledge gaps and to provide research through EU funded programmes and in addition guidance on assessing climate change impacts and vulnerabilities (Case 3). In relation to this, the European Commission and the EEA have recently launched a website, the European Climate Adaptation Platform. This website aims to support European countries in adapting to climate change by promoting greater coordination and information-sharing between its members, and by ensuring that adaptation considerations are addressed in all relevant EU policies.

2.2 Strategies

Adaptation is a complex policy area, involving both public and private players as well as many levels of government. It also combines short-term and long-term activities. An adaptation strategy is thus regarded as a good starting point for adaptation actions (INTOSAI WGEA, 2010; Swart et al., 2009).

Characteristics of an adaptation strategy are that it:

- identifies objectives for adaptation measures
- is a political commitment by the government
- has a long-term perspective
- should prioritise among vulnerabilities identified
- should assign responsibilities

A strategy shall result in a plan for its technical implementation, time frames and allocation of resources. Whereas a strategy typically is adopted by the government, a plan is more often adopted by the entity that has implementation responsibility, possibly with involvement from entities with shared responsibilities.

Most countries are still in the process of developing adaptation strategies

Only two of the eight countries covered in this cooperative audit, the Netherlands and Russia (Case 5), had developed comprehensive national adaptation strategies at the time the audits were carried out. Although the two national adaptation strategies' scope and content are quite different, both audits found the strategies to be of sufficient quality.

However, several countries are in the process of preparing comprehensive national adaptation strategies. One of the countries assessed does not have a national adaptation strategy and is not in the process of developing one. In addition, the European Commission has adopted a White Paper on adaptation issues, with a comprehensive EU strategy planned for 2013.

The ECA fact-finding study concludes that "it appears clear that ... the implementation and development of national strategies are at very different levels in different Member States, preventing a comprehensive assessment by the Member States, the Commission and the European Environment Agency." Furthermore, the Commission currently has no legal basis to request that Member States have their own national or regional adaptation strategy and thus it has no mandate to verify the actions on adaptation and vulnerability assessments in Member States. Rather, the Member States report back to the Commission on their progress on a voluntary basis. The Member States are, however, responsible for maintaining their country pages on the European Climate Adaptation Platform.

The lack of comprehensive national adaptation strategies does not mean that adaptation efforts are not taking place. Adaptation issues have been incorporated into several sector policies. One example of this is the water sector in Malta. Even though the National Climate Change Adaptation Strategy¹¹ was still under development, climate change issues were still being handled under the Water Catchment Management Plan (Case 6). Another example is adaptation actions taken at the city level in Norway (Case 7). Similarly, the audits show that adaptation issues are in many cases handled at sector levels.

All adaptation strategies are anchored at a high level, both those that have been adopted and those that are under preparation. The strategies are typically prepared by governments and then adopted by the legislatures.



"An adaptation strategy is defined as a general plan of action for addressing the impacts of climate change, including climate variability and extremes. It will include a mix of policies and measures with the overarching objective of reducing the country's vulnerability. Depending on the circumstances, the strategy can be comprehensive at a national level, addressing adaptation across sectors, regions and vulnerable populations, or it can be more limited, focusing on just one or two sectors." (UNDP 2005, quoted in Swart et al., 2009)

11 The Maltese National Climate Change Adaptation Strategy was adopted by Parliament in May 2012.

CASE 5: Climate doctrine of the Russian Federation

The strategic goal of the Doctrine, dated 17 December 2009 and confirmed by the President, is to achieve secure and sustainable development of the Russian Federation in the context of changing climate and emerging challenges.

The Doctrine presents an overview of the goal, principles, substance and manners of implementation of a unified public climate policy. It is based on assessments of the past and current states of the climate system and of the security and vulnerability of ecological systems, the economy, the population, government institutions and infrastructure as regards climate change, and the existing means to adapt to it, as well as forecasts for climate change and its impact.

One of the main objectives of the climate policy is to develop and implement immediate and long-term measures to adapt to climate change, as well as to mitigate the man-made impact on the climate.

Federal authorities will be the executors of the climate policy.

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CASE 6: Malta's sectoral water strategy adequately addresses adaptation to climate change

In addition to the recent Parliamentary approval of the National Climate Change Adaptation Strategy, implementation of climate change adaptation measures was carried out in accordance with a sectoral strategy relating to water sustainability. This was published in March 2011 as an EU and national requirement. The measures which were included in the Water Catchment Management Plan for the Maltese Islands were subjected to climate change checks. These checks identified those measures best-suited for strengthening Malta's capacity to adapt to climate change and those that would be less effective. The operationalisation of the water sustainability strategy is mainly progressing well through the development and formal approval of project-specific plans, task implementation by the responsible entities and overall monitoring by an inter-ministerial committee.

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CASE 7: Adaptation to climate change is taking place at city level in Norway

Norway has integrated considerations involving adaptation to climate change into the programme “Cities of the Future,” a cooperation programme between the government and the 13 largest cities in Norway. The participating cities have prepared action plans for how they will reduce greenhouse gas emissions, create good urban environments and develop strategies to face future climate change.



Weaknesses in adaptation strategies, plans and programmes

Some audits have pointed to the lack of coordination and clarity concerning roles and responsibilities in strategies or in sectoral plans and programmes.

Despite the Dutch strategy being an example of a good starting point for adaptation actions, it was only partially operationalised (Case 8). On the other hand, the operationalisation and assignment of responsibilities of a more limited strategy for the water sector in Malta were considered satisfactory (Case 6).

The audits revealed that there are also challenges related to the operationalisation of adaptation policies, plans and programmes. This can be exemplified by a lack of coherence between indicators for measuring and assessing the performance of the measures and activities envisaged for adaptation (Case 9). This increases the risk of incorrect planning of measures and activities, which may prevent the achievement of the objectives laid down in the strategic documents related to adaptation.

Time frames for implementation are to a varying degree included in the strategic documents reviewed. In Bulgaria, all long-term programme and planning documents, for instance for measures to increase adaptive capacity in the forestry sector, have a term for implementation. In Malta’s case the water-specific strategy has time frames for its adaptation measures, whereas the overall adaptation strategy makes very little reference to time frames.

CASE 8: Dutch national adaptation strategy only partially operationalised

The government prepared a national adaptation strategy for the Netherlands in 2007. It was debated in parliament in 2008 but the government has not yet worked it out into a national adaptation agenda with concrete measures, a time path and delegated responsibilities as it had told the House of Representatives it would do. The strategy, which was based on risk and vulnerability assessments of all sectors exposed to climate change, has disappeared from the spotlight without proper explanation. Since 2010, part of the strategy has been operationalised in the Delta Programme (Case 23) and a number of ministries have developed policies for certain sectors and areas that are vulnerable to climate change. However, not all the risks and vulnerabilities identified in the strategy have been covered.



CASE 9: Inconsistency between long-term and short-term planning document

In Bulgaria, lack of compliance can be found between the objectives, priorities and indicators in some long- and medium-term planning documents adopted by the government in contrast with the objectives, priorities and indicators of the policies and programmes approved by the government for implementation within the programme budget framework of the sectoral ministries. This discrepancy is clearly outlined in the indicators set for measuring the degree of achievement of the objectives.

An example of this is the objectives of the River Basin Management Plan for the East Aegean Basin. The indicators for assessing the degree of achievement of the objectives identified in this management plan are not envisaged in Water Management Policy at the Ministry level.



2.3 Coordination

Efficient governance systems for adaptation are important due to the complex and cross-sector nature of adaptation, its policies, and the numerous actors involved on various governmental levels. Governmental leadership, coordination and clear roles and responsibilities are thus essential for the successful and effective implementation of adaptation policies.

Coordination of adaptation policies is not sufficient

In many cases, roles and responsibilities are founded on the principle of sector responsibilities. Also, on the EU level, adaptation to climate change has been mainstreamed in some policy areas. One example is the on-going Common Agricultural Policy (CAP) reform where the aim is to put in place strong actions to achieve climate resilient agriculture (Case 10).

It is observed in the audits that the responsibility for adaptation issues is clearly defined to a varying degree (Case 11). In general, the agencies do perform their tasks according to their mandates when the roles and responsibilities are assigned.

As mentioned, in light of the numerous actors responsible for adaptation, the coordination of adaptation policies is crucial in order to successfully implement adaptation actions. Lack of coordination increases the risk of inefficient policy implementation and a lack of synergies between actions, as well as risks of contradictory effects of actions and measures.

There are numerous ways of coordinating adaptation policies effectively within or across sectors. In many cases, coordinating bodies are appointed on national levels. The organisational setup on political and operational levels varies among the countries. On a political level, in most cases, ministries have been assigned the responsibility for adaptation to climate change. On an operational level, it is in general linked to the sectoral responsibility at various governmental levels.

Despite the fact that, in most countries, coordination of adaptation is ensured formally, and communication systems for government bodies are in place, the extent and quality of coordination varies among the countries. Most SAs responded that the coordination of adaptation policies has weaknesses, and that there is clear room for improvement (Case 12, Case 13 and Case 14).

The EU plays an important role in order to coordinate adaptation to climate change among European countries, and formal entities and coordinating bodies are in place at the European level. In addition, on an implementation level, the EU has started to gather, harmonise and centralise information on adaptation from Member States (Case 15).

CASE 10: Adaptation is mainstreamed through sectoral policies on the EU level

The on-going CAP reform and related funding instruments are major tools for raising the profile of climate change adaptation and putting in place strong actions to achieve climate resilient agriculture. DG CLIMA is cooperating with DG AGRI on the CAP reform process, which started with the adoption of a Communication on the future CAP in November 2010.



CASE 11: Weaknesses in assignments of responsibilities and coordination in Bulgaria

For the period 2006–2010, in Bulgaria were in force (drafted, approved and performed) more than 15 mid- and long-term planning and programming documents on national and sector levels, envisaging measures and activities aimed at adapting water-sector, agriculture and forestry to climate change. 20 percent of these planning documents did not clearly define the institutions responsible for the implementation or the coordination of measures and activities and do not set terms for implementing specific measures. Such are:

- the National Strategy for Water Sector Development and Management in Bulgaria for the Period until 2015
- the National Strategy for Sustainable Development of Forestry in Bulgaria for the Period 2006–2015
- River Basin Management Plan for the Danube River Basin.



CASE 12: Lack of national coordination of adaptation actions in Cyprus

In the absence of a national adaptation strategy, each governmental department involved in adaptation issues currently deals independently with issues that are within its own responsibilities. No official coordination system has been established and no central supervising authority exists. The government recognises this as a major weakness and intends to resolve the problem through the CYPADAPT project mentioned in Case 2, the results of which will include a monitoring plan for the national adaptation strategy. Furthermore, national framework legislation on climate change, which will define a central monitoring and coordinating authority, is currently under preparation.



CASE 13: Coordination between consumers and producers of climatic information in the Russian Federation needs to be improved

Executive authorities of the Russian Federation, agricultural organisations and other agencies had been provided in time with accurate information about current and forecasting climate change, hazardous weather conditions, including operational agrometeorological and agroclimatic information.

At the same time the audit showed a discrepancy between the increasing demand for hydrological and meteorological information, environmental conditions and climate change impacts, and the recourses available for technical knowledge, skills and human resources.

The following main challenges were identified:

- lack of sufficiently accurate long-term climatological forecasts, which science is not currently able to guarantee
- lack of risk assessments (including economic risk assessment)
- insufficient cooperation between providers of climatological information and the users, increasing the risk for delayed/ineffective adaptation measures.

The audit showed the following main needs for implementation of the climate state policy defined by the Climate doctrine of the Russian Federation:

- modernise legislation
- include adaptation and mitigation measures in medium- and long-term socioeconomic plans
- establish a coordinating authority to regulate climate change issues.



CASE 14: Poor coordination of the responsible authorities in Ukraine

In 1999, the Cabinet of Ministers of Ukraine established the Interagency Commission to ensure the development of national mitigation and adaptation strategies, and action plans, as well as to implement the commitments of Ukraine under the UN Framework Convention on Climate Change and the Kyoto Protocol. The ministries, other central and local authorities, and the National Academy of Sciences submitted annual proposals for research needed to develop these plans. These proposals were coordinated by the Interagency Commission.

However, in 2010–2011 the Interagency Commission was not appointed and re-assembled. As a result, research actions on climate change were not coordinated, which in turn has led to a postponement of the national strategies and action plans.



CASE 15: EU has an active role in coordinating adaptation policy among its members

The European Commission organises coordination between its different General Directorates and with Member States. It also engages in dialogues with partner countries.

The Commission sets up specific expert groups to focus on different themes to coordinate and refine EU positions and actions. Member States' representatives in these groups are typically from the environment or finance ministries.

In addition to the EU climate expert groups, a network of representatives of the EU Ministries of Foreign Affairs, the Green Diplomacy Network, meets regularly to discuss the international political aspects associated with climate change and to plan and organise diplomatic outreaches as well as specific campaigns.

Furthermore, DG CLIMA is in the process of gathering information on adaptation from Member States, in particular through the Climate Adaptation Platform. One of its objectives is to receive coordinated information in a centralised and harmonised manner from all Member States.

Moreover, implementation of the White Paper on adaptation to climate change is via actions identified in a Joint Action Programme (JAP). One of the actions is the European Climate Adaptation Platform (Climate-ADAPT).



2.4 Implementation, results and impacts

Policy instruments

There are various policy instruments for ensuring effective implementation of adaptation policies. The most common tools are legal and economic policy instruments. Given the particular nature of adaptation, the policy instruments' main purpose is to contribute to activation of adaptation actions (INTOSAI WGEA, 2010).

Legal frameworks insufficient for adaptation

Several countries covered in this audit have not come far in terms of developing new or existing legal policy instruments and/or frameworks to take account of existing or future climate changes and adaptation needs. This is due to, among other factors, a lack of adaptation policies (strategies, plans and programmes).

On the European level, the European Commission still has no legal framework for adaptation to climate change. However, a legal proposal on the Monitoring and Mechanism Regulation is currently under co-decision negotiation at the Council and the European Parliament and includes reporting requirements on adaptation action and activities.

However, the national audits revealed that even though national strategies on adaptation to climate change are not in place, there are examples where adaptation issues have been incorporated in legal frameworks, for example in spatial planning. Integrating adaptation to climate change into spatial planning policies, processes and practices is essential since climate changes increase the probability of extreme weather events and disasters. These events, for example flooding and storms, have major impacts on a society and contribute to severe economic losses (1.1). In particular, it is important to take into account climate change in infrastructure- and housing planning in order to minimise future damage and costs due to extreme weather events.

The national audits show that adaptation issues are to some extent addressed in planning processes and some countries have integrated adaptation into planning processes for some vulnerable sectors (Case 16). However, in one case identified, future climate change was not taken into account in danger zone maps (Case 17).

CASE 16: Dealing with natural hazards

In Austria, there are already measures and regulations in place dealing with the consequences of climate change. Danger zone maps show areas threatened by natural hazards and areas to be kept free for water-related purposes or a special type of management. Regional laws dealing with spatial planning offered the possibility to rezone areas due to increasing risks of natural hazards (e.g. changing from developed areas to green land) without the obligation for compensation payments, which can make rezoning easier and cheaper for the public purse.



CASE 17: Use of danger zone maps in adaptation to climate change

In Norway, about 160,000 persons live in areas that were mapped as 200-year flood zones or susceptibility areas for rockfalls or snow avalanches or hazard areas for quick clay at the end of 2008. None of the existing national mapping projects were up-to-date in relation to climate change forecasts. A majority of the municipalities and county governors in question were not aware that susceptibility maps for rockfalls and snow avalanches existed for their area and had no sufficient understanding of how the maps should be used in preventive work. Many municipalities lack the required expertise to prevent flood and landslide hazards.



Economic instruments are used for adaptation

Governments have a wide range of economic policy instruments, for example covering additional costs for adaptation, funding for preparedness systems or funding for research or technology development (INTOSAI WGEA, 2010).

Several audits show that funds have been set aside to implement measures to handle existing issues related to climate change adaptation. An example of this is the water sector in Malta, where measures were found to be adequately funded in the short-term.

In another case, the government has in general pointed out possible sources of financing for adaptation measures, but there are cases where the sources of financing are not determined. This is especially relevant to the performance of investment measures and activities, since such increases the risks of poor performance in the implementation of these investment measures.

In one audit, successful implementation of subsidy schemes aimed towards encouraging water re-use was noted. At the same time the audit revealed that the water pricing policy applied was not appropriate (Case 18).

The EU provides financial support to adaptation projects across the region (Case 19). As the EU’s climate change actions are horizontal in nature and implemented in the context of other policies, accurate information on adaptation financing is not available. Neither the legal proposal, nor the on-going Joint Action Plan (JAP), introduced the need for an analytical accounting system and an adapted budgetary tool.

CASE 18: Economic policy instruments for adaptation in Cyprus

Among the actions aimed at managing water demand in Cyprus, as a means of adapting to climate change and the subsequent water scarcity, the Water Development Department operates subsidy schemes to encourage water re-use.

The SAI of Cyprus stressed that a pricing policy is one of the most effective tools to control water demand and encourage its efficient use, noting that the current pricing policy does not fully reflect the real cost of the water provided. The SAI expressed the opinion that, besides the subsidy schemes, one of the most effective economic instruments would be the implementation of a suitable water pricing policy, reflecting the real cost of water, as required by the relevant European Union Water Framework Directive. In this respect, the relevant authority is preparing a new regulation, setting the price of drinking water in a way compliant with the aforementioned Directive.



CASE 19: EU's use of financial instruments

Under Cohesion Policy, certain dedicated adaptation projects are already being funded today, including projects such as sea walls, wetland restoration, reforestation, flood defences, etc., often serving multiple purposes (water management, biodiversity, transport, etc.), and responding to local or regional needs and priorities. Those which fund investments that provide protection against disasters, e.g. flood defences, are currently funded under the "risk prevention" priority in Cohesion Policy.

The LIFE programme has also contributed to climate change adaptation, for instance by restoring ecosystems and increasing their resilience, by improving habitat connectivity or by supporting the development of municipal strategies for local climate change adaptation, or even national adaptation strategies, such as the one for Cyprus mentioned under Case 2 above.



Current challenges initiate adaptation actions

Climatic conditions have severe impacts on various economic sectors across Europe. Examples are water scarcity in southern Europe and flooding in northern Europe. Projections show that anticipated climate change will, in many cases, increase the negative impact on already vulnerable sectors (1.1).

Hence, climate change adaptation policies may be short-, medium- or long-term. Short- and medium-term policy is tailored towards climate-related impacts that are occurring or may occur in the near future. Long-term policy is about long-term planning and actions to deal with anticipated climate change impacts (INTOSAI WGEA, 2010).

The audits have revealed that the countries are in an early stage of adapting to climate change. In most countries on-going activities concentrate on mapping of future impacts and, to a certain degree, policy development. The limited actions identified in the audits address to a large extent existing critical issues, and are not initiated due to medium- or long-term impacts of anticipated climate change.

Where water supply is a problem, measures taken are to handle existing drinking water and ground water challenges. In other cases, the measures implemented, for example warning systems for flooding, were originally designed to handle a geographical and topographical issue. These measures will, however, also be a part of the overall adaptation portfolio.

As mentioned, some countries have implemented short-term measures in sectors where climate conditions have a severe impact. Of the few results assessed, there are examples where measures achieved the intended results and were successfully implemented, but there are also examples of areas where anticipated goals were not achieved (Case 20). The audits also showed that in some cases non-sustainable adaptation measures are taken. In one case, where a lack of RVAs and strategies were identified, the measures taken were not subject to any Strategic Environmental Assessment (Environmental Risk Assessment) and it was questioned whether measures were sustainable (Case 21). On the other hand, instances were noted where various mechanisms were in place to monitor and ascertain that environmental and sustainable perspectives are appropriately considered during implementation (Case 22).

CASE 20: Achievement of goals in agriculture sector in Bulgaria


In Bulgaria, the activities for protecting crops from extreme meteorological events such as hailstorms is recognised as an activity contributing to the adaptation of agriculture to climate change. During the period 2008–2010, hail-protected crops increased about twice as compared to 2006 and 2007. This significant increase of effectiveness was a result of improvements to the quality of the hail protection activity system, monitoring the atmospheric processes and visualising meteorological radar data provided by modernised radar stations.

The area of irrigable land in the country was more than halved during a period of 10 years. This was due to ineffective governance and a lack of financial resources to repair and maintain the infrastructure inside the arable land, which led to fewer functioning hydro melioration systems and facilities. At the same time, only 4–8 % of arable land with irrigation systems is being used, mainly due to an increase in the prices of water for irrigation.




CASE 21: Implementing adaptation measures under pressure

In order to address immediate needs to supply drinking water in Cyprus, desalination plants have been constructed. Due to the pressing need to solve the problem as soon as possible, i.e. to ensure the adequacy of drinking water, the timeframe did not allow for a feasibility study, cost-benefit analysis and ex-ante environmental impact assessments to be carried out, and therefore the environmental sustainability of the project is doubtful.

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CASE 22: Implementation controls

Most of the groundwater-related climate change adaptation measures that have been or are in the process of being implemented in Malta are mainly those featured in the Water Catchment Management Plan. There are various mechanisms in place to monitor the progress of the implementation of these measures, such as reviews by the Inter-Ministerial Committee and mandatory reporting to the EU. Additionally, various mechanisms are in place involving financial controls at the level of the implementing entity. Such mechanisms include national budgetary and EU co-financing procedures.

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2.5 Costs and benefits of climate change

There are, broadly speaking, two sets of costs (and benefits) related to climate change adaptation. First, there are the costs related to the impacts of climate change, that is, the costs that will result if no actions are taken or continue under business-as-usual. Second, there are costs related to measures taken to adapt to the impacts of climate change.

Generally, the costs of timely adaptation measures make economic, social and environmental sense, as they may reduce potential damages very significantly and pay off many times compared to inaction (EEA, 2010a; Stern, 2006). UNFCCC (2011) stated that assessing the costs and benefits of adaptation options is an important part of the adaptation process. Information on costs and benefits will assist adaptation planners and practitioners in identifying the most appropriate interventions for reducing vulnerability, enhancing adaptive capacity and building resilience. Furthermore, co-benefits are decisive for getting adaptation action prioritised in the political process and subsequently implemented (EEA, 2012b).

Lack of cost estimates in policy documents

Cost estimates related to climate change impacts are in general not addressed in the RVAs. Exceptionally, cost estimates are made for particular sectors or where plans have been fully approved. Also, the strategies, plans and programmes reviewed do little in terms of estimating future costs of adaptation.

An earlier study on National Adaptation Strategies also found that none of the strategies reviewed had assessed the costs and benefits of adaptation in a comprehensive fashion, committed resources or specified who will pay (Swart et al., 2009).

However, there are some initiatives and tools that show progress in the area of estimating costs. In the Dutch Delta Programme, insights have been made into the costs of adaptation (Case 23), and in Austria, work has been done to estimate the financial consequences of climate change, but not on adaptation measures (Case 24).

As mentioned, on the national level, cost estimates of adaptation to climate change are in general lacking. However, the European Commission provides information on cost-benefit analysis for climate change adaptation. Furthermore, the European Commission is currently working on developing tools for assessing adaptation costs to assist member countries in taking economically, socially and environmentally timely measures (Case 25).

Lack of cost estimates might contribute to postponement of actions and increase the cost of adaptation in the future. As mentioned, the costs of timely measures pay off many times compared to inaction. One of the national audits revealed examples where measures became more costly by postponing actions or by insufficient planning (Case 26).

CASE 23: The Delta Programme

The objective of the Delta Programme is to protect future generations in the Netherlands from inundation (i.e. flooding of the coast and of rivers), to ensure that there is sufficient fresh water and to climate-proof urban development. A government official – the Delta Commissioner – has been appointed specifically for the Delta Programme. The legal basis of the Delta Programme is the Delta Act, which entered into effect on 1 January 2012. It provides for a separate fund, the Delta Fund, to finance the Delta Programme. The Delta Fund will be funded by at least €1 billion a year as from 2020, based on a cost estimate made by a government advisory committee.



CASE 24: Lack of cost estimates in Austria

Both in Salzburg and Tyrol, climate change was identified as a crucial topic for the future of alpine tourism. Although there were strategic ideas and political commitments, no concrete measures or cost estimations could be found. The SAI recommended elaborating and implementing plans with tangible measures and cost estimates for public expenses.



CASE 25: Tools for estimating costs at the European level

A methodological study launched by the European Commission conducted an extensive review of available information on costs of adaptation (from projects, programmes and budget lines) on adaptation measures within the EU (and when appropriate neighbouring countries) and a review of existing methodologies for identifying these costs (ClimateCost¹²). On the basis of the research/fact-finding, it assessed and compared such methodologies, identified the methodological and data challenges associated with calculating expenditures on adaptation. It proposed a set of criteria for classifying different projects, programmes or budget lines and calculating the expenditures on them and proposed a system to estimate the “adaptation share” for projects not exclusively intended for adaptation as well as producing a list of frequently occurring cases and borderline cases.

The PESETA projects (Projection of Economic impacts of climate change in Sectors of the European Union based on bottom-up Analysis), led by the Joint Research Centre, have undertaken a qualitative multi-sectoral assessment of the economic consequences of climate change in Europe¹³.



¹² <http://www.climatecost.cc/>

¹³ <http://peseta.jrc.ec.europa.eu>

CASE 26: Insufficient planning or delay in adaptation actions increased the costs

The SAI of Cyprus noted that the postponement of the construction of a desalination plant in Limassol, in combination with a severe drought, made it necessary in 2008 to import drinking water from Greece using tankers at a very significant cost. These costs would have been avoided had adaptation measures been taken on time.

Furthermore, it noted that an academic study showed that if a more appropriate pricing policy for drinking water, reflecting its scarcity, had been introduced ten years ago, then the economies that would have resulted would have allowed for lower prices to be implemented today and would improve the water balance situation.

The SAI of Cyprus also noted that as a result of the fact that no feasibility study or cost benefit analysis was carried out prior to the construction of the desalination plants, the government is contractually bound to cover the capital and part of their operational costs, even when these are on stand-by (e.g. in years with adequate rainfall).

Given the current financial circumstances, the SAI of Cyprus recommended the prioritisation of adaptation measures according to a cost-benefit analysis.

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3 Conclusions and recommendations

Due to its anticipated severe impacts on the environment, economy and society, one of the major environmental concerns in Europe today is climate change. Adaptation actions are necessary to minimise the negative consequences. Knowledge about sectors' risks and vulnerabilities are essential for developing adaptation policies. Furthermore, a strategy including adequate policy instruments is crucial for managing adaptation to climate change in an efficient way. Due to the cross-sectorial nature of climate change, coordination of adaptation policies and actions are necessary. Timely adaptation actions are economically, socially and environmentally sustainable.

Conclusions

The cooperative audit's main findings indicate that governments are not sufficiently prepared for the expected impacts of climate change and do not have adequate actions in place to deal with these unavoidable negative effects.

The national audits show that Risk and Vulnerability Assessments (RVAs) have been prepared for a selection of sectors in most countries, and the RVAs are found to be of sufficient quality to support policy development. However, in some cases RVAs are based on climate scenarios close to the 2-degree target, which likely will be exceeded. The effectiveness of the policies might thus be insufficient to meet future challenges.

Although there are a few examples of risk-based strategies, the majority of the countries have not developed comprehensive adaptation strategies. In most countries, a framework for coordination of adaptation is formally in place, but in practice it is deemed insufficient.

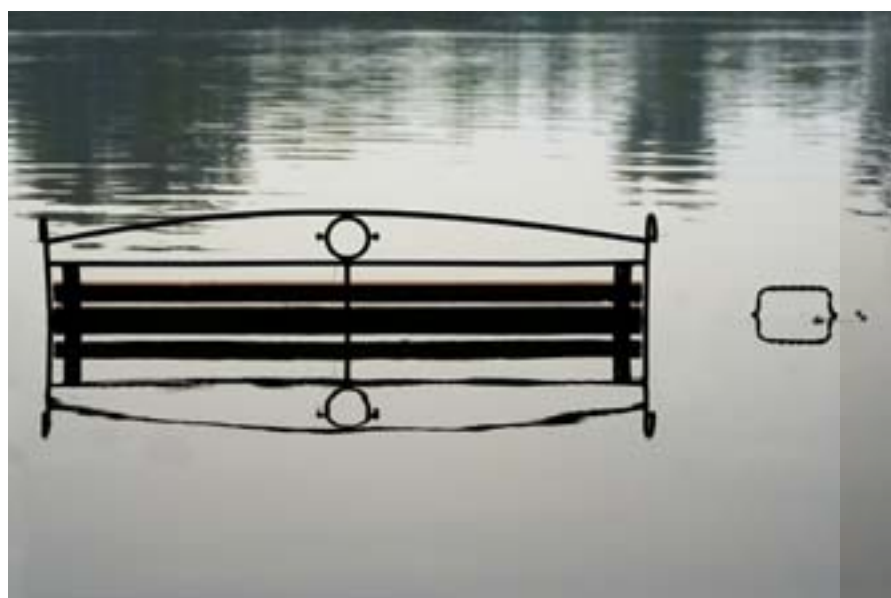
The national audits revealed that the implementation of adaptation measures is still in an early phase. The few actions identified are to a large extent a response to vulnerabilities based on existing climate conditions and not triggered due to anticipated medium-term and long-term climate change impacts.

The national audits showed that knowledge of the costs and benefits of future climate change impacts and adaptation measures is often lacking. This increases the risk of climate change and adaptation issues not being sufficiently addressed in decision-making processes and cost-effective measures not being implemented. If governments prepare now, adaptation to future climate change can be undertaken in a more cost-effective way.

Recommendations

It is recommended that:

- countries use adequate RVAs for policy-making and consider the impacts of likely climate change scenarios with higher expected temperature increases than the 2-degrees scenario
- adaptation strategies and action plans should be developed and implemented at the government level
- the strategies should clearly specify the time-frame for implementation and the roles and responsibilities of all the parties involved
- governments should ensure coordinated adaptation policy and its implementation
- governments should provide knowledge, to the extent possible and meaningful, of the costs and benefits of climate change impacts and adaptation measures to ensure cost-effective implementation





4 Lessons learned

The partner SAls appreciated the collaboration and found it valuable for the SAI's work. The cooperative audit contributed to the initiation of the national adaptation audits. The joint effort in developing the audit questions for the cooperative audit broadened the scope of the national audits and facilitated knowledge sharing.

Even though the national audits' topics and approaches differ, collaboration is possible and highly beneficial. The flexible framework of the cooperative audit, where SAls answered only questions that were relevant to their audit and context, made it possible for the SAls to participate.

Since the framework for the national audits was a European cooperation, several SAls reported enhanced interest in the SAls' work and awareness of the subject among all recipients of the national reports.

The joint report provides valuable knowledge relevant to national and cross-national governments. The report gives a picture of national adaptation issues and corresponding governmental challenges across Europe. The cooperative audit addresses common challenges, examples of national challenges as well as best practice related to governing adaptation to climate change.

Adaptation to climate change is a demanding subject to audit due to the complexity of the topic, including its cross-sectoral and long-term nature. Furthermore, most countries are in the early phases of implementing policies and actions related to the subject, making it even more challenging. These factors, including a lack of common adaptation policy, made it necessary to have a flexible framework for the joint report. This is one of the main reasons for the joint report's qualitative approach.

One of the project success criteria was the partners' extensive ownership of the project, which was gained through the dedicated work of the SAls, sharing of the workload and project meetings. The partners did not find the cooperative audit time-consuming. However, since SAls' participation in cooperative audits needs to be harmonised with national audit plans, the time to make a decision to participate in a cooperative audit is long. The first idea to conduct this audit was presented to the EUROSAI WGEA members in autumn 2009. The kick-off meeting was held in February 2011, 15 months later. Nonetheless, the time for carrying out this cooperative audit, from the kick-off meeting to when the report was launched, took about one and a half years. The partner SAls acknowledge the importance of carrying out this audit within the framework of EUROSAI WGEA and the role of its Secretariat as the coordinator, project leader and main party responsible for compiling the joint report.

5 Acknowledgements

Nine European Supreme Audit Institutions (SAIs) have been partners in this cooperative audit on adaptation to climate change: the Austrian Court of Audit, the National Audit Office of the Republic of Bulgaria, the Audit Office of the Republic of Cyprus, the European Court of Auditors (ECA), the National Audit Office of Malta, the Netherlands Court of Audit, the Office of the Auditor General of Norway, the Accounts Chamber of the Russian Federation and the Accounting Chamber of Ukraine. In addition, the State Audit Office of Hungary was an observer of the project.

This report was prepared by the EUROSAI WGEA Secretariat assisted by the project group. The project group consisted of representatives of the partners' SAIs (chapter 8).

The project leader for the project was Ms Herdis Laupsa, head of the EUROSAI WGEA Secretariat/the Office of the Auditor General of Norway (OAGN). The main authors of the report were Ms Herdis Laupsa and Mr Ragnar Brevik (OAGN). In particular, we would like to thank the following colleagues for their valuable contributions, comments and fruitful discussions of the joint report, Ms Willemien Roenhorst (the Netherlands Court of Audit), Dr Kristin Rypdal (OAGN), Mr Akis Kikas (the Audit Office of the Republic of Cyprus), Mr William Peplow (the National Audit Office of Malta), Dr Heinrich Lang (the Austrian Court of Audit) and Ms Rossena Gadjeva (the National Audit Office of the Republic of Bulgaria). Ms Willemien Roenhorst and Dr Heinrich Lang were responsible for the case studies and abstracts. Furthermore we would like to thank Mr François Osete and Mr Armando do Jogo for their contribution to the report's communication plan.

The Secretariat and the project group are very grateful to the external reviewers and their valuable and thorough assessment of this report; Mr Andre Jol (European Environment Agency), Ms Rosário Bento Pais (European Commission) and Dr Rob Swart (Wageningen University and Research Centre). Any remaining errors and inconsistencies are the responsibility of the project group.

6 Abstracts of the audits and fact-finding study

AUSTRIA

Name of Audit:

Adaptation to climate change in Salzburg and Tyrol

Publishing Information:

August 2012; Reihe Bund 2012/8, Reihe Salzburg 2012/7; Reihe Tirol 2012/5; available in German at www.rechnungshof.gv.at



The national audit objectives

To assess whether the organisational and strategic foundations and the measures set out in key sectors at the level of the Laender of Salzburg and Tyrol are sufficient to meet the challenges of adaptation to climate change, in particular in the Alpine region.

The scope of the audit

- Existing programmes, plans and measures in the key sectors water management, forestry, tourism, natural hazards and spatial planning.
- Covered period: 2006–2010.
- Audited entities: Federal Ministry of Agriculture, Forestry, Environment and Water Management; governments and administrations in Salzburg and Tyrol.

Conclusions and key recommendations:

The Alps are one of the most vulnerable regions in Europe. The SAI highlighted that although adaptation is an inevitable and indispensable issue, it is no substitution for mitigation.

At the federal level, work on a policy paper dealing with adaptation issues was in process. At the level of the Laender, there have not been concrete concepts yet. The SAI emphasised the enforcement of a national adaptation strategy and its refinement at the regional level.

A study showed only small effects in the sectors involving water and no immediate need for action up to 2050. In Salzburg and Tyrol, adequate danger zone plans and drainage studies for rivers were in force. The SAI indicated a possible need of amendments due to a temperature rise.

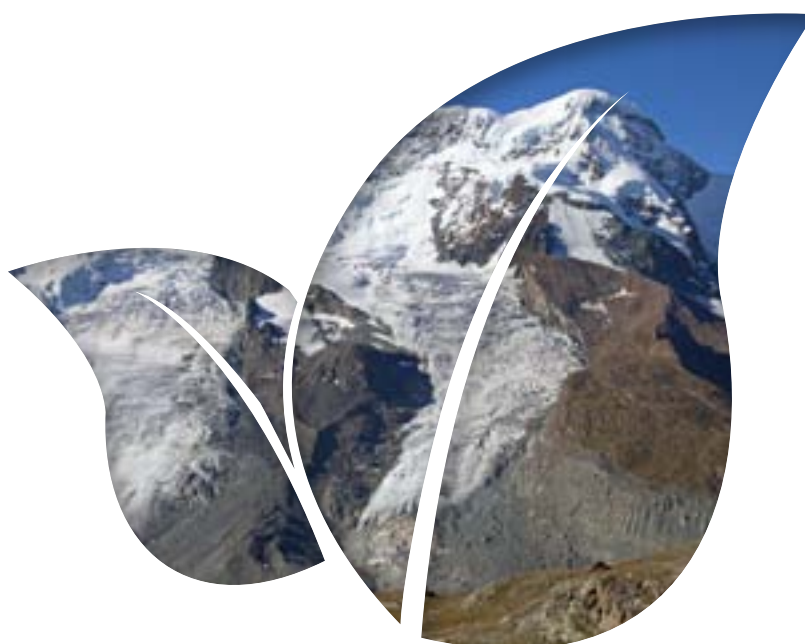
Tourism contributed 7.6 % to the total gross national product of Austria. Nevertheless, tangible programmes with cost estimates in the two Laender were not available. The SAI emphasised implementing adaptation issues in tourism strategies and taking climate change into account when approving new tourism infrastructure.

The thawing of the permafrost soil (altitude more than 2500 m) will lead to an increase of rockfall, slope instability, landslides and damage to alpine infrastructure such as roads and tourism facilities. Knowledge concerning the distribution of permafrost in the Alps in Austria was still low. The SAI emphasised considering these risks when dealing with projects in perilous permafrost areas.

One result of climate change and the associated increase of natural hazards in the Alps will be an expansion of risk areas. In both Salzburg and Tyrol, the regional laws dealing with spatial planning offered the possibility for compensation-free changes to land zoning if the actual zoning could not be maintained due to increasing risks of natural hazards. The SAI valued the approach of the spatial planning sector.

Responses of the government to the audit recommendations

Both Laender agreed to reinforce work on adaptation issues (especially in the tourism sector) and on further development of river management and danger zone plans. In Salzburg, a map of permafrost areas has been developed after the audit. Both Laender also agreed to implement the latest research knowledge into legal amendments.





BULGARIA

Name of Audit:

Audit on adaptation measures undertaken by the Government of the Republic of Bulgaria in relation to climate change during the period 1 January, 2006 – 31 December, 2010 in the Ministry of Environment and Water, the Ministry of Agriculture and Food and the Ministry of Interior

Publishing Information:

The audit report was approved by the president of the Bulgarian National Audit Office on 15.03.2012.



The national audit objectives:

The audit objectives were to provide the executive authority independent and objective information about the results from the performance of the measures and activities of the Government for adapting to climate change in a part of the vulnerable sectors – water management, agriculture and forestry.

The scope of the audit:

1. The audit was focused on the performance of climate change adaptation measures and activities undertaken by the Government especially in the fields of water management, forestry and agriculture – sectors identified by the European Parliament as vulnerable. In addition, the audit scope included measures and activities undertaken by the Government in the field of the prevention of disasters and accidents and their impact with relevance to the National Early Warning and Alerting System, including early monitoring.
2. Covered period: 2006–2010
3. Audited entities: National level governance

Conclusions and key recommendations:

The Bulgarian Government faces the challenge of developing and approving a national strategy/programme for the adaptation of the vulnerable sectors to climate change that complies with the general European framework, encompasses all vulnerable socio-economic sectors and covers all identified risk factors assessed as being significant for the sectors' sustainable development.

Regardless, no national adaptation strategy is available, the Bulgarian government has fulfilled a lot of measures and activities are aimed to increase its adaptive capacity within agriculture and forestry. Examples include forest reservation and restoration, hail suppression, irrigation of the arable land and the establishment and development of an early warning system including a monitoring and risk assessment system. Most of these activities were assessed by Bulgarian National Audit Office as being effective, except the development and functioning of the agriculture irrigation system.

Response of the government to the audit recommendations:

The Bulgarian government started to reconsider the Water Strategy and the Water Act. The governance of public stakeholders of the irrigation system has been changed. There are a lot of different priorities other than adaptation and that is why the Third Action Plan on Climate Change is again focused on mitigation.





CYPRUS

Name of Audit:

Adapting to climate change – Facing today the challenges of the future.

Publishing Information:

The full audit report in Greek and an English summary were published in http://www.audit.gov.cy/audit/audit.nsf/other_gr/other_gr?OpenDocument, on 15.06.2012.



The national audit objectives:

The main audit objective was to examine the measures taken in Cyprus to facilitate adaptation to climate change, and to assess their implementation, coordination and effectiveness.

The scope of the audit:

1. The audit focused on the general framework of establishing and implementing a successful adaptation strategy and has focused on the measures taken in the sectors of water, forests and agriculture.
2. Covered period: The audit examined measures implemented up to and including the year 2011.
3. Audited entities: Ministry of Agriculture, Natural Resources and Environment, Department of Environment, Water Development Department, Department of Forests, Department of Agriculture, Meteorological Service and the Agricultural Research Institute.

Conclusions and key recommendations:

Although Cyprus is very vulnerable to climate change, no formal risk and vulnerability assessment has been carried out and a national strategy for adaptation to the future climatic conditions has not been designed yet. These issues will be addressed by the project "CYPADAPT," which is co-financed by the European Union and is expected to be completed in early 2014. The SAI proposed that measures should be prioritised according to a cost-benefit analysis, and those with the lower costs and the highest contributions to adaptation should be implemented first.

The measures that are being taken by various Ministries/Departments are aimed at solving already existing problems and not towards adapting to future climate conditions. As these measures are implemented at Department level, there is no co-ordination or overall monitoring, supervision and evaluation.

The problem of reliance on weather conditions for meeting the demand for drinking water has been successfully addressed through the construction of desalination plants. However, no feasibility study and cost-benefit analysis had been carried out prior to the construction of the desalination plants. The environmental consequences of their construction have been assessed only ex post.

The total capacity of the desalination plants exceeds the total needs for drinking water and the government is contractually bound to cover the capital and part of the operational costs of the plants, even when these are on stand-by (e.g. in years of adequate rainfall). The SAI pointed out that it would be more economical and efficient to combine the production of lower quantities of desalinated water with better management of water stored in dams.

There is still a potential for the better utilisation of recycled water. The SAI suggested that the utilisation of such water via the irrigation of golf courses be examined.

Studies indicated that the death of trees (especially Cyprus cedars) was caused by the droughts of 1999–2001 and 2005–2008. Short-term measures were taken to deal with the consequences and the Department of Forests is currently developing a 10-year action plan concerning the adaptation of Cyprus forests to climate change, which is expected to be completed in 2013.

According to the Department of Agriculture, the subsidisation of improved irrigation systems and various campaigns undertaken have led to annual savings of up to 60 mill. m³ of water.

The SAI further recommended that the actions described in the working paper accompanying the White Book on climate change adaptation issued by the European Commission, both at farm level as well as sector-wide, should be promoted as soon as possible.

Response of the government to the audit recommendations:

The report was communicated to the Minister of Agriculture, Natural Resources and Environment on 10 April 2012. The response of the Minister was received on 4 May 2012 and his comments were incorporated into the final published report.

It is expected that recommendations relating to the national adaptation strategy and the other sectors audited will be taken into consideration during the implementation of the CYPADAPT project.





European Court of Auditors (ECA)

Name of Study:

Contribution of the European Court of Auditors to the EUROSAT-WGEA coordinated audit on adaptation to climate change – fact-findings.

Publishing Information:

N/A



Objectives of the study:

On 1 June 2010 the Auditor General of Norway, as chair of the EUROSAT Working Group on Environmental Audit, addressed an invitation to the President of the Court to participate in a coordinated European audit on adaptation to climate change, for which the principle of participation by the Court was accepted.

However, it appeared that the EU has not yet adopted a legal framework defining the strategy on adaptation to climate change. Nevertheless, the Commission published a White Paper in 2009 and consequently launched numerous actions in order to build the necessary tools to set up such a policy. Therefore, the contribution of the ECA to the coordinated audit has the form of a study based on a fact-finding approach.

The scope of the study:

The findings are based on interviews with the responsible services of DG CLIMA and the European Environment Agency (EEA) in Copenhagen and their responses to questionnaires. In addition, supporting documentation was reviewed and examined.

Furthermore, many key adaptation terms and concepts defined by the Intergovernmental Panel on Climate Change (IPCC), UNISDR (United Nations International Strategy for Disaster Reduction) and various other scientific/policy communities were examined.

The results of this work, which respects the matrix elaborated with the other eight Supreme Audit Institutions (SAIs), constitute the contribution to the final joint report.

Conclusions:

In 2011 the European Commission created a new Directorate General dedicated to Climate Change in order to underline the relevance of climate change for all policies and sectors of the economy and to confirm the EU's commitment to combating climate change.

The European Commission adopted the White Paper on Adaptation in April 2009, based on a phased approach for establishing an EU climate change adaptation policy. Phase 1 (2009–2012) should lay the groundwork for preparing a comprehensive EU adaptation strategy. It consists of four key action pillars:

- (a) Building a solid knowledge base on the impact and consequences of climate change for the EU;
- (b) Integrating adaptation into key EU policy areas;
- (c) Employing a combination of policy instruments (market-based instruments, guidelines, public-private partnerships) to ensure effective delivery of adaptation;
- (d) Stepping up international cooperation on adaptation.

These four pillars are in the process of being implemented by 33 actions. The state of implementation of these actions is set out in the latest update of the Joint Action Plan. Under the title of "CLIMA C3 Projects" the Commission has undertaken to produce a set of studies, with synopsis and links. Actually, both the White Paper and the structure of the matrix are based on the same logic. Before defining a strategy, a sound knowledge of risks and vulnerabilities is necessary. In the same way, effective implementation requires good coordination between stakeholders.

Currently, the Commission has no legal basis to request that Member States have their own national or regional adaptation strategy and hence has no capacity to verify the actions on adaptation and vulnerability assessments in Member States. However, the Commission is in the process of providing guidance in assessing climate impacts and vulnerabilities across different regions/cities and sectors through the European Climate Adaptation Platform (Climate-ADAPT).

Furthermore, exact tracking of appropriations "for adaptation/mitigation" is not possible up to now because there are neither such budget lines in the EU budget nor an analytical accounting system. Instead, climate action is implemented through numerous and complex EU budget instruments. Many of them are "multi-functional" in the sense that they serve multiple EU objectives, for instance biodiversity and mitigation policies (e.g. support for reducing deforestation of tropical forests).

The Commission has introduced a set of rules in order to have the legal basis adopted for the financial period 2014–2020. These proposals take adaptation to climate change into consideration.

The European Climate Adaptation Platform (Climate-ADAPT), which is the key scientific and technical tool for supporting the development of strategies for adaptation to climate change as well as risk and vulnerability assessment is at the disposal of all the stakeholders, the Commission, Member States of the EU as well as of the EEA, regions, cities and non-governmental organisations (NGOs).

The implementation of the Joint Action Plan, despite some delays, should be ready for the next financial period.

However, the information sent by the Member States to the Commission/EEA on the implementation of their national strategy has not produced enough material to be assessed by the MSs, the Commission and the Agency. Up to now, the data collected and the network exchanges of information and experiences have only permitted getting the elements for defining a strategic approach on adaptation.





MALTA

Name of Audit:

Safeguarding Malta's Groundwater

Publishing Information:

The report was published in February 2012 at nao.gov.mt/news.aspx?nid=54
(in English)



The national audit objectives:

The main audit objective was to examine whether Malta's groundwater is being adequately protected from current challenges and climate change threats.

The scope of the audit:

1. The audit focused on the adequacy of risk and vulnerability assessments as well as the policy, strategy and operational framework. Moreover the audit encompassed a review of the progress attained in the implementation of the relative measures.
2. The audit mainly focused on the period January – October 2011.
3. Audited entities: The main audited entities were the Malta Resources Authority and the Ministry for Resources and Rural Affairs (MRRA). Departments which fall within the remit of the MRRA and were also reviewed included: the Department of Agriculture, the Nitrates Section Unit as well as the Rural Development and Aquaculture Department.

Conclusions and key recommendations:

The process related to the undertaking of risk and vulnerability assessments was considered to be comprehensive and of suitable quality, as the appropriate level of expertise was engaged. These studies were subject to national as well as international reviews. The small territorial area of Malta, and its closeness to the sea have increased the complexities involved in the compilation of these studies.

The National Climate Change Adaptation Strategy, which has recently been approved by Parliament, proposes various initiatives that are considered to be 'no pain' measures; so their implementation will need to be undertaken irrespective of climate change implications. However, the legal and regulatory frameworks are still in the process of being developed. Additionally, the implementation of climate change adaptation measures may be further restricted unless human and financial resource constraints are appropriately addressed.

To date, the implementation of the relative climate change adaptation measures was limited to initiatives considered to impact groundwater in the short-term, and which complied with the climate change checks indicated in the “Water Catchment Management Plan for the Maltese Islands.” The measures listed in this plan were subject to the coordination and monitoring of the Inter-Ministerial Committee.

The SAI proposed various recommendations addressing Malta’s groundwater climate change concerns. These were mainly related to the undertaking of further research, subjecting the risk and vulnerability studies to public debate, as well as determining the financial implications of the proposed measures.

Response of the government to the audit recommendations:

In some cases, the Government has already embarked on the implementation of these proposals, namely the formal adoption of the national strategy on climate change adaptation.





THE NETHERLANDS

Name of Audit:

Adaptation to climate change: national strategy and policy

Publishing Information:

The report was published on www.courttofaudit.com (in Dutch and English) in November 2012.



The national audit objectives:

The main audit objective was to assess the Dutch government's policy on adaptation to global climate change.

The scope of the audit:

1. The audit focused on central government's risk and vulnerability assessments, the national adaptation strategy and policy, the co-ordination of adaptation to climate change and the financial aspects of adaptation.
2. Covered period: 2006 – mid-2012
3. Audited entities: Ministry of Infrastructure and the Environment, Ministry of Health, Welfare and Sport, Ministry of Economic Affairs, Agriculture and Innovation, Ministry of Foreign Affairs.

Conclusion and key recommendations:

Successive governments have taken measures in recent years to adapt the Netherlands in anticipation of climate change but there is little coherence in the policy pursued and not all areas vulnerable to climate change are covered. There is thus a risk that the Netherlands will not be adequately prepared for the consequences of climate change. If measures are not taken on a timely basis, moreover, their cost will be far higher. The Netherlands might also have difficulty remaining in step with EU policy and the policies of other EU Member States.

This main conclusion is based on the following subsidiary conclusions:

- 1) Although the successive governments have carried out several risk and vulnerability assessments in recent years, the government still does not have a full understanding of the risks and vulnerabilities facing certain policy sectors as a result of climate change. Furthermore, the responsible politicians have to date had scant regard for the relationship and interaction between the risks.
- 2) The government has not yet worked out the national adaptation strategy it presented in 2007 into specific measures with a time path and delegated responsibilities, as it had undertaken to do. It has, however, developed policy for certain areas that are vulnerable to climate change. The Delta Programme,

for example, was introduced in 2010 to protect the Netherlands from flooding at the coast and by rivers, to guarantee the supply of fresh water and to climate-proof urban development in the Netherlands. But not all the risks facing the Netherlands have been covered.

- 3) Climate adaptation policy as a whole is not co-ordinated, monitored or evaluated.
- 4) Adaptation to climate change becomes more difficult and expensive if adaptation measures are not implemented on a timely basis. The adaptation costs to the Netherlands have to date been estimated chiefly with regard to water safety, spatial development and spatial planning.
- 5) Adaptation to climate change is enjoying greater priority in European policy. The Member States will accordingly be increasingly urged to take measures and make investments. Some European countries facing similar challenges as the Netherlands (such as the United Kingdom) are already developing or implementing broad and coherent national adaptation policies.

The SAI recommended that the government assess the climate adaptation risks and vulnerabilities of all policy sectors, including the common ground between them. The government should integrate and evaluate the results in order to take a comprehensive decision on the further development of climate adaptation policy. The SAI further recommended that a national adaptation programme be developed and implemented. The programme should comprise a coherent package of measures, projects and activities and cover all policy sectors that need to adapt to climate change. The SAI also recommends that effective co-operation be fostered among the ministries. A national adaptation programme should therefore be firmly embedded in government policy. The government should also periodically monitor, evaluate and, if necessary, revise its adaptation policy.

Response of the government for the audit recommendations:

The government responded that it recognised itself in the SAI's audit of the development of climate adaptation policy in recent years. It undertook to consult the

Netherlands Environmental Assessment Agency regarding the utility of and need for a broader survey of the climate change risks and vulnerabilities facing the Netherlands. The government thinks widening its climate adaptation policy, currently concentrated in the Delta Programme, will depend on the findings of further study and future agreements within Europe.





NORWAY

Name of Audit:

The Office of the Auditor General's investigation into the efforts of the authorities to limit flood and landslide hazards

Publishing Information:

The report was published in April 2010 at www.riksrevisjonen.no
(in Norwegian and English)



The national audit objectives:

The main audit objective was to consider how the national authorities work to reduce the danger of floods and landslides in the future.

The scope of the audit:

1. The audit focused on the prevention of floods and landslides, natural hazards, flood inundation maps, landslide maps, quick-clay maps, municipal planning, adaptation, and geographical information systems (GIS).
2. Covered period: 1995–2009
3. Audited entities: Ministry of the Environment, Ministry of Petroleum and Energy

Conclusions and key recommendations:

Floods and landslides are recurring events that cannot be easily prevented. Good practices in land use planning are the most cost-effective and environmentally sound way of reducing the risk of damage from hazards, including flooding and landslides. Adaptation was not the main focus of the audit, but climate change is an important aspect since it may influence the frequency of floods and landslides in the future.

Use of GIS has given the audit an overview of areas in Norway that are at risk of floods or landslides, and the number of inhabitants and buildings in such areas.

Land use planning depends on detailed surveys of areas prone to floods or landslides. The survey resulted in maps showing potential flood or landslide areas, and is the responsibility of the Norwegian Water Resource and Energy Directorate. The directorate is subordinate to the Ministry of Petroleum and Energy. The audit concluded that these maps do not take climate change into account, making them less effective as a tool for planning.

The main responsibility for preventing floods and landslides lies with local municipalities, making their competence vital for effective policies.

The audit has shown that municipalities have limited knowledge about consequences of future climate change at the local level. Local municipalities asking the government for advice on the effects of climate change are not satisfied with the answers received, considering them to be too general and not easily applied to local conditions.

Response of the government to the audit recommendations:

Not available.





RUSSIAN FEDERATION

Name of Audit:

Performance Audit of realisation of state regulation and use of public funds during 2008–2010 allocated for preservation and restoration of fertility of soils and agrolandscapes and realisation of measures on adaptation and softening of anthropogenous influence on climate.

Publishing Information:

The Report will be published in September/October 2012 at www.ach.gov.ru/en/ (in Russian and English)



The national audit objectives:

The main audit objectives were the analysis of the realisation of measures concerning climate change, the consequences of climate change for agriculture, the consequences of agriculture for climate change and estimation of the productivity of actions aimed at adaptation of agriculture to climate change in Russia.

The scope of the audit:

1. The audit focused on an analysis of the legal basis, and assessment of efficiency of realisation of the state measures for questions of climate change and its consequences for agriculture and productivity of actions aimed at adaptation of agriculture of Russia to climate changes.
2. Period covered: 2008–2010
3. Audited entities: Ministry of Agriculture; Federal Service for Hydrometeorology and Environmental Monitoring (Roshydromet); five jurisdictional institutes; administrations of four entities of the Russian Federation (regions of Krasnoyarsk, Perm, Astrakhan and Smolensk).

Conclusions and key recommendations:

Insufficient attention of public authorities to the issues of adaptation to climate change of sectors of the economy dependent on weather conditions leads to results such that the adaptation measures of the agricultural sector to climate change are not developed sufficiently clearly in valid medium-term and long-term socio-economic development plans of the Russian Federation and its entities. Furthermore, the economics-related mechanism that applies at the present time cannot properly initiate implementation of adaptation measures in the agricultural sector to climate change and mitigation of human intervention in the climate.

The reduction of pedological fertility of agricultural land in the Russian Federation requires implementation of more intensive integrated irrigation and drainage, and agrochemical measures based on modern achievements of science and technology.

The federal target programme for the preservation and restoration of the fertility of soils in agricultural land by the volume of financing and actions is not adequate to address the issues currently facing a considerable part of agriculture, including prevention of occurrences of water and wind erosion, swamping, etc. Mineral fertiliser treatment is carried out in bulk which are not exceeding 30 % of science-based requirement.

In spite of the fact that lots of Roshydromet forecasts come true (from 70 to 95 %) and there is a low probability of the Ministry of Agriculture forecasting errors concerning agricultural goods (5–6 %), a decreasing trend is taking place in the production volume of agricultural goods as well as damage to agriculture caused by adverse weather conditions. The analysis of the cooperation of executive authorities indicated that it is necessary to assume supplementary measures, including creating a special commission that is able to estimate activities of executive authorities and able to ensure their coordination to provide implementation of adaptation measures, which would allow a reduction of the damage to agriculture caused by adverse weather conditions.

The Russian Academy of Agriculture and institutes that are within the jurisdiction of Roshydromet and the Russian Academy of Sciences have determined the consequences of forthcoming climate change, the risks of agriculture losses for the Russian Federation and measures for adaptation. At the same time, implementation of the scientific methods, references and process engineering that were developed for carrying out measures for the preservation, increase and reproduction of soil fertility of land with an agricultural designation is being realised on a small scale.

The valid regulatory and legal frameworks cannot fully ensure implementation of cooperative activities, which are intended to provide sustainable development of the Russian Federation in adverse weather conditions, including the agricultural sector.

The problems concerning climate change and adaptation of agriculture to climate change are not currently being solved at the federal and regional levels.

The SAI recommends that to ensure implementation of measures of climate policy that were defined by the Climate Doctrine of the Russian Federation, it is necessary:

- to charge the Ministry of Agriculture with creating measures to address adaptation of the agricultural sector to climate change at the draft Government Programme on agriculture development and market regulation of agricultural goods, primary goods and rations for 2013–2020;
- to consider the possibility to create a coordination authority under the jurisdiction of the Russian Federation Government, which would

be in charge of implementing measures for adaptation and mitigation of anthropogenic effects on the climate in the Russian Federation.

Response of the government to the audit recommendations:

The information will be updated in light of the input received.





UKRAINE

Name of Audit:

Performance audit of the use of state budget funds aimed at implementing the Kyoto Protocol to the UN Framework Convention on Climate Change, including funds received from the sale of units installed concerning the volume of greenhouse gases emitted.

Publishing Information:

The report No 4-2 was approved on 14 March 2012 and is available at:
<http://www.ac-rada.gov.ua/control/main/uk/publish/article/16739177>



The national audit objectives:

The main audit objectives were assessment of the current state of implementation of Ukraine's assumed commitments under the UN Framework Convention on Climate Change including commitments in respect of adaptation to climate change at national as well as sectoral level, and assessment of the legality and efficiency of the use of state budget funds aimed at this objective in 2010–2011.

The scope of the audit:

1. The audit focused on analysis of the legal, organisational and financial support for the implementation of the UN Framework Convention on Climate Change in respect of adaptation to climate change, assessment of the use of budget funds allocated to implement adequate actions in terms of legality, efficiency and effectiveness, and research into the environmental and socio-economic consequences of state policy implementation in this sphere in Ukraine.
2. The audit covered the period 2010–2011.
3. Audited entities: Ministry of Ecology and Nature Resources, State Environmental Investment Agency of Ukraine, State Treasury Service of Ukraine, Ministry of Energy and Coal Industry of Ukraine, Ministry for Regional Development, Building and Housing of Ukraine, Ministry of Education, Science, Youth and Sports of Ukraine, Ministry of Agrarian Policy and Food of Ukraine, Ministry of Health of Ukraine, State Agency for Management of State Corporate Rights and Property Management Agency of Ukraine, State Forest Resources Agency.

Conclusions and key recommendations:

The Government of Ukraine took measures to implement state adaptation to climate change policy. It determined the terms for developing an adequate national strategy, sectoral and regional plans, established and initiated procedures of preparation, review, approval and implementation of projects aimed at reducing greenhouse gas

emissions, commissioned vulnerability assessments, and assigned communication structures and coordinating bodies.

However, the lack of consistency in the authorities' actions and financial resources did not facilitate approval of national and sectoral mitigation and adaptation plans within the defined time limits. Extensions have had to be granted. As a result, there is a risk of unreadiness for climate change within the prescribed time frame.

Ukraine has gained considerable economic leverage to attract foreign investments in environmental protection by the Clean Development Mechanism and via the adaptation funds of the UNFCCC. Revenues totalled more than 1 billion dollars at the end of 2011. Half of this amount has been obtained by Ukrainian enterprises as a result of joint implementation projects.

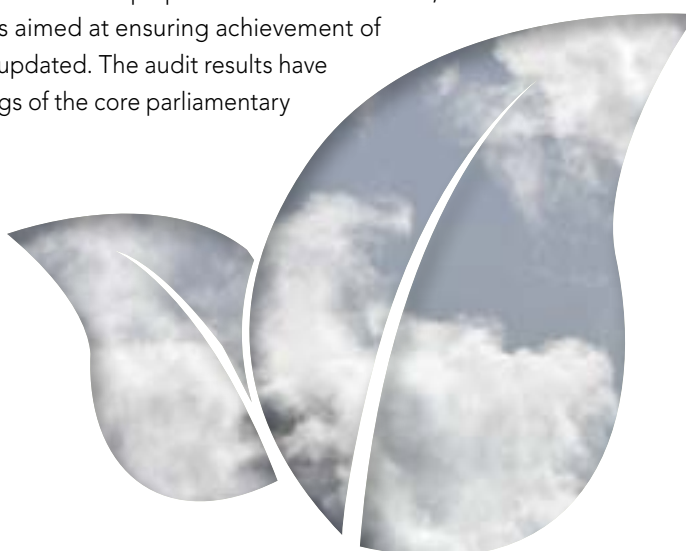
To ensure effective use of the funds, the Government of Ukraine submitted the actions and measures aimed at achievement of the purposes of UNFCCC. Adaptations actions are implemented on the local level. In addition, some measures designed to address geographical and topographical issues (e.g. monitoring and warning systems) have been started.

Nevertheless, due to the long period of implementation of these measures and their current incompleteness, anticipated ecological and socio-economic consequences have not yet been achieved in Ukraine.

The audit has shown the necessity of acceleration of the final development and adoption of the main approaches of state adaptation to climate change policy, development and step-by-step implementation of adequate action plans.

Response of the government to the audit recommendations:

The audit induced the government to step up its activities in this area; in particular the list of measures aimed at ensuring achievement of the UNFCCC goals has been updated. The audit results have been discussed at the meetings of the core parliamentary committees.



7 Audit matrix

For the cooperative audit, the audit questions were organised in an audit matrix (see below). Five main areas were addressed in the matrix, namely risk and vulnerability assessments, strategy, coordination, implementation and results and impacts. Depending on the scope of the individual national audits, the SAs responded to a selection of audit questions. Hence the data coverage varies for the different questions.

Based on the response to the questions, a selection of issues has been addressed in the report. Hence, not all the individual audit questions are specifically addressed or covered in the report.

Risk and vulnerability assessments

1. Have risk and vulnerability assessments been carried out?
2. What were the main vulnerabilities identified (sectors and areas)?
3. Are the risk and vulnerability assessments of sufficient quality? (including sub-questions on uncertainty estimates, time period, financial estimates, review of the RVAs)
4. To what extent have the outcomes of the risk and vulnerability assessments been used to influence decision-making?
5. What are the sectors covered by the vulnerability studies?
6. Please give a short description of methods applied by governments developing the risk assessments.
7. What is the anticipated increase in temperature used in the risk and vulnerability assessments (i.e. the 2 °C target)?

Strategy

1. Is there a strategy? Including sub-questions on the formal status of the strategy, whether the strategy is overall or sector-wise, and at which level the strategy was developed (the national, regional and/or local level).
2. Does the strategy correspond to the intended objectives?
3. Is the strategy of sufficient quality? Including sub-questions on whether the strategy is based on risk and vulnerability assessments, covers all risks and vulnerabilities identified, whether it operationalised, includes targets, responsibilities, timeframes and is evaluated periodically, etc.)
4. Have cost estimates been made of the measures, and are they appropriate?
5. Is the strategy a suitable framework for developing policies, policy instruments and measures?

6. If there is no strategy, is there a framework for incorporating adaptation issues into existing policy areas?

7. Is strategy implemented through operational plans?

8. Coordination

1. Have clear roles and responsibilities been assigned? Has a coordinating body been appointed?

2. Do agencies perform their tasks in accordance with the roles and responsibilities?

3. Is there sufficient coordination? Including sub- questions related to coordination government players, programmes and projects, national and local levels of governments?

4. Has a system of communication between governmental bodies been developed?

5. Are systems in place to ensure that policy instruments are coordinated?

6. Does the government ensure that the implementing agencies have sufficient knowledge and resources?

7. Please give a short description of the coordination of the adaptation policy in your country.

Implementation

1. Have systems for reporting and assessing results been developed?

2. Is there an adequate budget for adaptation?

3. Is the budget spent as intended/according to the legislature's wishes?

4. Are the measures socially, economically and/or environmentally sustainable?

5. Has adaptation been taken into account in planning processes (for example area/spatial planning)?

6. Is the implementation on time?

7. What are the regulations/enforcements of adaptation policy?

8. Are the policy instruments effective in terms of achieving intended targets?

9. Are policy instruments coordinated?

10. Has a system of information dissemination to the public been established?

11. Are warning system(s) to the public established?

12. What are the challenges related to the implementation of the adaptation policy?

13. What is the availability of danger zone plans?

14. Please give a short description on how adaptation to climate change has been included in the planning process e.g. spatial/area planning.

Results and impacts

1. Are the targets being met?

2. What are the results of adaptation policies?

8 Partners

Country/ Institution	Supreme Audit Institution	Contact Person(s)
Austria	Austrian Court of Audit	Dr. Heinrich Lang
Bulgaria	The National Audit Office of the Republic of Bulgaria	Ms Rossena Gadjeva Mr George Neshev
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Malta	National Audit Office of Malta	Mr William Peplow Ms Maria Camilleri
Netherlands	The Netherlands Court of Audit	Ms Willemien Roenhorst Mr Henk van der Geest
Norway	The Office of the Auditor General of Norway	Dr. Kristin Rypdal
Russia	Accounts Chamber of the Russian Federation	Mr Valery Brattsev Mr Valery Stefanovskiy, Mr Denis Sidorenko
Ukraine	Accounting Chamber of Ukraine	Ms Mariya Shulezhko Mr Denys Nikitin Mr Artur Kryts

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Austrian Court of Audit



Bulgarian National Audit Office



Audit Office of the Republic of Cyprus



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The Netherlands Court of Audit



Office of the Auditor General of Norway



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Accounting Chamber of Ukraine



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