

# **Auditing Government Response to Climate Change**

**Draft document April 2009**

## Foreword

This document is a draft version of the guidance: "Auditing Government Response to Climate Change". The project was initiated by the INTOSAI Working Group on Environmental Auditing (INTOSAI WGEA) and described in the work plan 2008-2010:

*Prepare guidance materials on auditing the government's management of climate change. Possible sub-topics include:*

- *background information, such as sources of GHG emissions, related international environmental agreements, and domestic programs;*
- *mitigation of GHG emissions, including emissions trading systems;*
- *adaptation to the impact of climate change;*
- *special needs of developing countries; and*
- *measurement, verification, and reporting.*

The following countries volunteered to be members of the sub-committee: Australia, Austria, Brazil, Canada, China, Indonesia, Poland, the Russian Federation, Slovenia, South Africa, the Netherlands, the United Kingdom, the United States, Zambia and Zimbabwe. So far, thank you for all your constructive comments and suggestions.

A final updated version will be available on the INTOSAI WGEA website in November 2010. In the final version, comments from the INTOSAI WGEA Steering Committee will be incorporated, final layout adjustments will be made and more case studies and success criteria in auditing climate change policy will be included. For this reason, we will also be collaborating with the Global and the European coordinated audits on climate change policy.

In the meantime, we hope this temporary version will be useful when planning climate change audits. If you have any comments or suggestions, please do not hesitate to send them to Kristine Lien Skog, [kristine-lien.skog@riksrevisjonen.no](mailto:kristine-lien.skog@riksrevisjonen.no), or Ragnar Brevik, [ragnar.brevik@riksrevisjonen.no](mailto:ragnar.brevik@riksrevisjonen.no).

Sincerely,

Kristine Lien Skog  
*Senior Audit Adviser*  
Office of the Auditor General of Norway  
Postal address: P.O. Box 8130 Dep, N-0032 Oslo.  
Office phone: +47 22 24 12 21

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# Executive Summary

Auditing the government's response to climate change is an important and complex exercise. This guide is, like climate change itself, quite extensive. In this executive summary, we will introduce the main information needed to understand the environmental problem and its impacts. We will then describe central key questions to be answered by the auditor when planning climate change audits.

## ***What is climate change?***

Climate change is described as one of the biggest environmental challenges of this century. The scientists are now, according to the Intergovernmental Panel on Climate Change (IPCC), highly confident on how strong the human Greenhouse Gas emissions (GHG-emissions) impacts on climate change.

The IPCC's fourth report states that the warming of the climate system is unequivocal. This is evident from observations that show:

- An increase in average air and ocean temperatures
- An increase in the average global sea level
- Widespread melting of ice and snow
- Changes in weather, such as wind patterns, the amount and type of precipitation, and frequency of severe weather events

## ***Impacts of climate change***

IPCC have also assessed how climate change might impact on society, environment and economy. Climate change will have wide-ranging effects on the natural ecosystems and socio-economic sectors. Systems that are already dependent on scarce resources are particularly vulnerable to the impacts on climate change.

Potential climate changes impacts:

- Water resources:
  - reduce in quality and quantity of freshwater supplies
  - flooding due to sea level rise and extreme weather events
- Agriculture and food supply:
  - Crop yields
  - Irrigation demands
- Ecosystems and biodiversity:
  - Loss of habitats and species
- Human health:
  - Weather-related mortality
  - Infectious diseases
  - Air quality respiratory illnesses
- Settlement and society:
  - People who live in coastal and river flood plains
  - People whose economies are dependent on climate sensitive resources
  - People who live in areas prone to extreme weather events

## **Adaptation and mitigation**

*Mitigation* involves taking actions to reduce greenhouse gas emissions and to enhance sinks aimed at reducing the extent of global warming.

*Adaptation* involves taking action to minimize the effects of global warming, to reduce the vulnerability of natural and human systems against actual or expected climate change effects.

Extensive emission cuts are needed to reduce the negative impacts on climate change. In the same time, extensive action is needed to adapt to today's and expected future changes. Human caused GHG-emissions are directly related to our economic growth and welfare, and are therefore challenging to reduce. The negative impacts of climate change will mostly be experienced in developing countries, where it is challenging to adapt.

## **The most central audit criteria**

The United Nations Framework Convention on Climate Change (UNFCCC or the Convention) is the main global response to the challenge of climate change. The Convention and its Kyoto Protocol spell out a number of commitments for Parties and is thus where the auditor might start looking for Climate Change specific audit criteria.

The guide extracts and describes the following commitments:

- *All Parties [shall formulate], implement, publish and regularly update national and, where appropriate, regional programmes containing measures to mitigate climate change by addressing anthropogenic emissions*
- *All Parties [shall] develop, periodically update, publish and make available ... national inventories of anthropogenic emissions by sources and removals by sinks of all greenhouse gasses ... using comparable methodologies*
- *All parties [shall] facilitate adequate adaptation to climate change [and] cooperate in preparing for adaptation to the impacts of climate change*
- *All Parties, including Non-Annex I Parties, shall establish plans for activities aimed at adaptation to the adverse effects of climate change*
- *All Parties [shall promote] and cooperate in the development, application and diffusion, including transfer, of technologies, practices and processes that control, reduce or prevent anthropogenic emissions of greenhouse gases*
- *All Parties to the UNFCCC shall promote research, systematic observation and development of data archives with a view to reducing uncertainty about the causes and effects of climate change*
- *[The] developed Parties included in Annex II shall provide new and additional financial resources to meet the agreed full costs incurred by developing country Parties in complying with their obligation under [the Convention]*

In addition, the guide describes some audit criteria useful when compliance with climate change performance:

- Criteria on good governance:
  - Effective accountability arrangements
  - Transparency in decision-making
  - Involving the public and engaging stakeholders
  - Management by objectives and results
- Criteria on good management: internal control systems

### ***Key questions when planning climate change audits***

This guide will lead the auditor through all phases needed to understand, identify and design climate change audits, using general auditing terminology on climate specific issues. The guide is based on a four step process, and several key questions are posed to the auditor, described and illustrated in each step.

The following key questions might be useful when planning mitigation audits:

- Step 1: Identify the emissions in your country
  - a. What are the overall trends and projections for greenhouse gas emissions in your country?
  - b. What are the main sources of GHG emissions in your country?
- Step 2: Understand the government's response to the environmental problem
  - a. Does your country have international mitigation commitments?
  - b. What are the national targets for mitigating GHG emissions in your country?
  - c. Which are the relevant responsible public bodies, their roles and responsibilities concerning reduction of GHG emissions?
  - d. What are the key policy instruments for reducing GHG emissions?
- Step 3: Choose audit topics and priorities: decide on audit objectives
  - a. Risk analysis on effectiveness- Are the right things being done to achieve objectives and targets?
  - b. Risk analysis on efficiency- Are things being done in the right way?
  - c. Risk analysis on economy- Does the government focus on keeping the costs low?
  - d. What risks should be prioritised in an audit? Define the audit objective.
- Step 4: Design the audit
  - a. Will the government meet its emissions targets or commitments?
  - b. Are policy instruments effective?
  - c. Is the governance of the climate change response efficient?

The following key questions might be useful when planning adaptation audits:

- Step 1: Understand the climate change impacts on society, economy and environment in your country
  - a. What is the vulnerability to climate change in your country?
- Step 2: Understand the government's climate change response
  - a. What are the objectives and targets of adaptation policies?
  - b. What are the policy instruments for adaptation?
  - c. Who are the public players and what are their responsibilities?
- Step 3: Choose audit topics and priorities: decide on audit objectives
  - a. Risk analysis on effectiveness- What are the risks related to the results of policies and instruments?
  - b. Risk analysis on efficiency- Are things being done in the right way?
  - c. Risk analysis on economy- Are the government focusing on keeping the costs low?
  - d. What risks should be prioritised in an audit? Define the audit objective.
- Step 4: Design the audit
  - a. Have the responsible ministries identified the climate change-related threats?
  - b. Does the government have in place an overarching policy, plan or strategy?
  - c. Is the adaptation governance efficient?
  - d. Are policy instruments effective?

The guide describes relevant sources for further reading and text boxes illustrating different audits done in this field. In appendices, the auditor can find examples of mitigation and adaptation design matrix.

# Chapter 1: Introduction

## 1.1 A global challenge

The Intergovernmental Panel on Climate Change (IPCC) has stated that warming of the climate system is unequivocal and very likely caused by an observed increase in the concentration of human-induced greenhouse gases (GHGs) in the atmosphere.<sup>1</sup> Furthermore, the increase in global average air and ocean temperatures will have an overall negative impact on human beings, species and ecosystems. Climate change contributes to challenges such as decreases in the quality and quantity of fresh water and to a more uneven distribution of food resources.

The UN Development Programme (UNDP) considers climate change to be the greatest global challenge of this century, as increased exposure to droughts, floods and storms is already limiting opportunities and reinforcing inequality.<sup>2</sup>

Climate change is a natural process, but it is the recent rapid changes induced by human activity that have made the issue important. So far, climate change has mainly been caused by emissions from the developed countries. At the same time, it is the developing countries that have felt the consequences of climate change the hardest. On the other hand, most scenarios show increases in GHG emissions from developing countries.

It is now firmly established that both mitigation and adaptation efforts will be necessary to tackle climate change. Mitigation in the climate change context refers to implementing policies to reduce GHG emissions and to enhance sinks; adaptation refers to an adjustment of natural or human systems in response to actual or expected stimuli and their effects.<sup>3</sup> The extent of the consequences of climate change and the future course of human development will depend on the action taken now and in the years ahead.

The United Nations Framework Convention on Climate Change (UNFCCC) was adopted in 1992 aiming to achieve stabilisation of GHG concentrations 'at a level that would prevent dangerous anthropogenic interference with the climate system'. This is the main international response to climate change, the Convention having been signed by almost 200 countries. The Kyoto Protocol to the UNFCCC was adopted in 1997. It commits the developed countries to stabilising their GHG emissions by establishing legally-binding quantified emissions targets. The UNFCCC also commits its parties (member countries) to promoting and preparing for adaptation.

### The IPCC's Assessment Reports

The four assessment reports published by the IPCC form the scientific basis for this guide. The most recent report, the fourth, was published in 2007.

For more on the IPCC, see its website, <http://www.ipcc.ch/>, where most of its reports can be downloaded.

<sup>1</sup> IPCC (2007), Synthesis Report, Fourth Assessment Report (AR4), pp. 30-31.

<sup>2</sup> UNDP (2007): *Human Development Report 2007/2008. Fighting Climate Change: Human Solidarity in a Divided World*. UNDP.

<sup>3</sup> Both definitions are from IPCC AR4 glossaries: mitigation from Working Group III, adaptation from WG II.

## 1.2 Climate change is an auditable issue

It is against this background Supreme Audit Institutions (SAIs) must view audits of governments' climate change response. Climate change is *material*. A large and growing amount of money will be spent all over the world in order to reduce emissions, enhance sinks and adapt to climate change. SAIs can make an important contribution by improving government performance and management.

Furthermore, climate change is auditable. SAIs can and do audit governments' climate change response. Climate change involves a wide range of risks that make it particularly relevant to auditors. Climate change is a field of urgent importance, where new activities are being established. The expectations of climate change programmes and policies are also high, as they are often directly linked to people's well-being.

The main objective of this guide is to inspire SAIs to conduct more audits of governments' climate change response. By helping SAIs to understand the risks involved and illustrate ways of designing audits, this guide can contribute to effective and goal-oriented audits. This, in turn, can contribute to improving government performance and management.

Auditing a government's response to climate change is similar to auditing other environmental issues. Nevertheless, understanding climate change, its impacts and international and national responses to climate change is crucial when conducting goal-oriented audits. In this guide, we will apply existing audit skills and methodology to the climate change area, including financial, compliance and performance approaches.

**Mitigation of global warming** involves taking actions to reduce greenhouse gas emissions and to enhance sinks with the aim of reducing the extent of global warming. This is in distinction to **adaptation to global warming**, which involves taking action to minimise the effects of global warming, to reduce the vulnerability of natural and human systems to actual or expected climate change effects.

Relevant and concrete information for auditors on mitigation and adaptation issues is therefore described in detail, with references for further information if available. This guide can therefore be used as a reference guide when planning climate change audits.

## **1.1 Content and structure of the guide**

Firstly, you will find a chapter on the *background to climate changes* (Chapter 2). It provides an overview of what climate change is, what causes it and how it can threaten ecosystems and human beings. This knowledge is necessary in order to identify relevant audit approaches.

*Audit criteria* for climate change policy will then be presented (Chapter 3), including international audit criteria (the UNFCCC, the Kyoto Protocol and the planned post-Kyoto agreement), setting standards for national responsibility for and action on climate change. General knowledge about good governance and good management, including internal control systems, also contributes to the audit criteria framework.

Chapter 4 is an introduction to *how to plan an audit* on governmental response to climate change. This chapter provides the reader with background information to better understand the terms used and how to read Chapters 5 and 6, including an extensive explanation of a *four-step process* for choosing and designing relevant audits of climate change.

The methodological framework from Chapter 4 is then *applied to mitigation issues* (Chapter 5) and *adaptation issues* (Chapter 6), which will assist the auditor when planning an audit of the government's response to climate change. This includes identifying information needed to prioritise between possible topics and design the audit. The guide focuses on the need to design relevant and goal-oriented audits based on the national context. Adaptation issues are very different from mitigation issues. The international commitments, the sectors involved and the policy instruments are different. A separate description and analysis is therefore required. Nevertheless, the way of structuring this chapter by the steps is the same as described in Chapter 4 and used in Chapter 5.

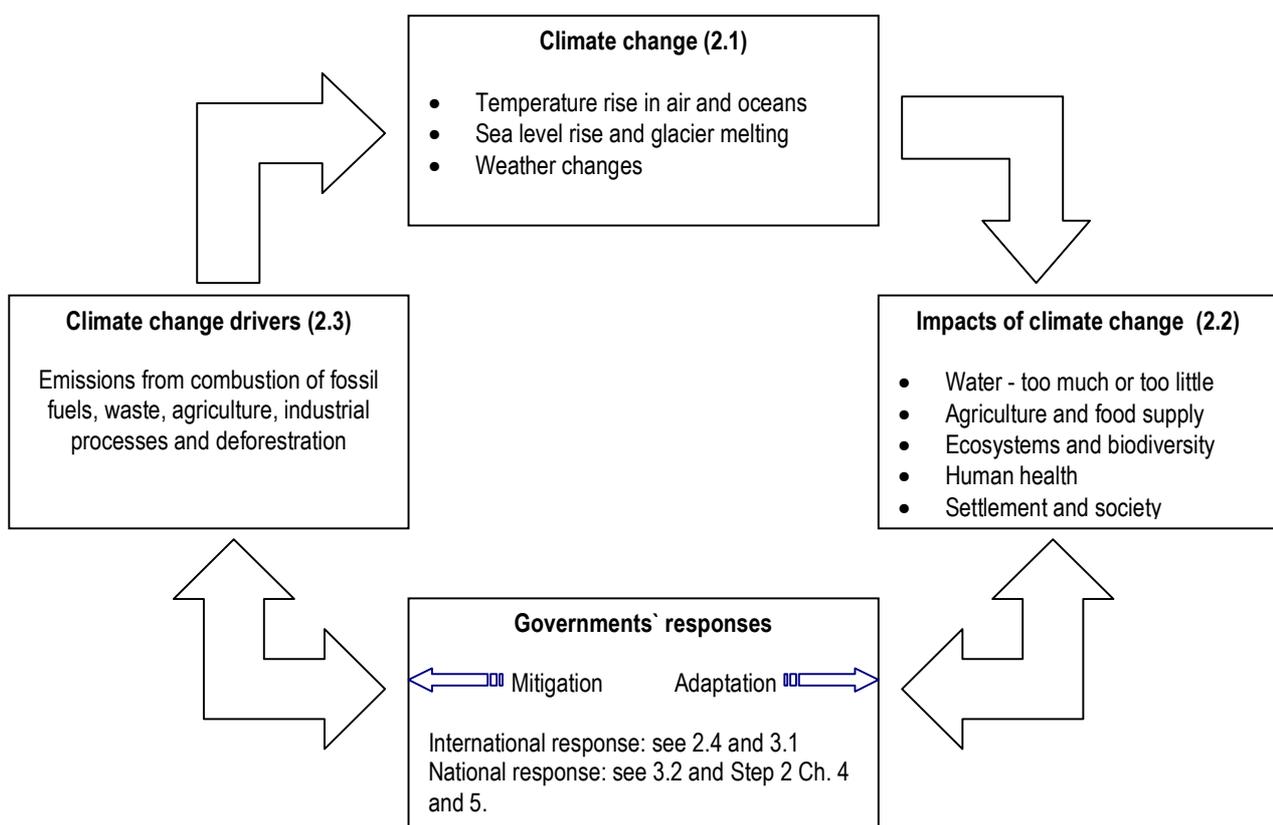
Finally, Chapter 7 will provide a *sample of audits* on climate change describing examples of different audit approaches, including their main findings and the methods used. We also include several appendices, where further information on specific themes and glossaries can be found.

## Chapter 2: Background to Climate Change

The IPCC's fourth assessment report states that it is very likely that most of the rise in temperature during the last 50 years is caused by GHG emissions from human activity. Furthermore, it is assumed that rising temperature and climate change will have a large impact on biodiversity, human health, food production, freshwater supplies and many other areas. These impacts will have significant social and biological effects.

This chapter will be organised in four main sections. The first describes the evidence of climate change as presented by the IPCC. The second section describes the impacts of climate change, while Section 2.3 points out the causes of anthropogenic climate change. Finally, Section 2.4 presents the main international response to climate change, the United Nations Framework Convention on Climate Change. Figure 2.1 explains the relationship between the sections.

Figure 2.1: Climate change drivers, indicators and impacts



This figure is based on Figure 1.1 in IPCC (2007). AR4, Synthesis Report.2.1

## 2.1 What is climate change?

Climate is defined as the average weather over a period of time. We speak of climate in terms of local, regional and sometimes even global weather. *Climate change* is when the climate deviates from the average climate over a long period of time.<sup>4</sup>

The IPCC's fourth report states that the warming of the climate system is unequivocal. This is evident from observations that show:

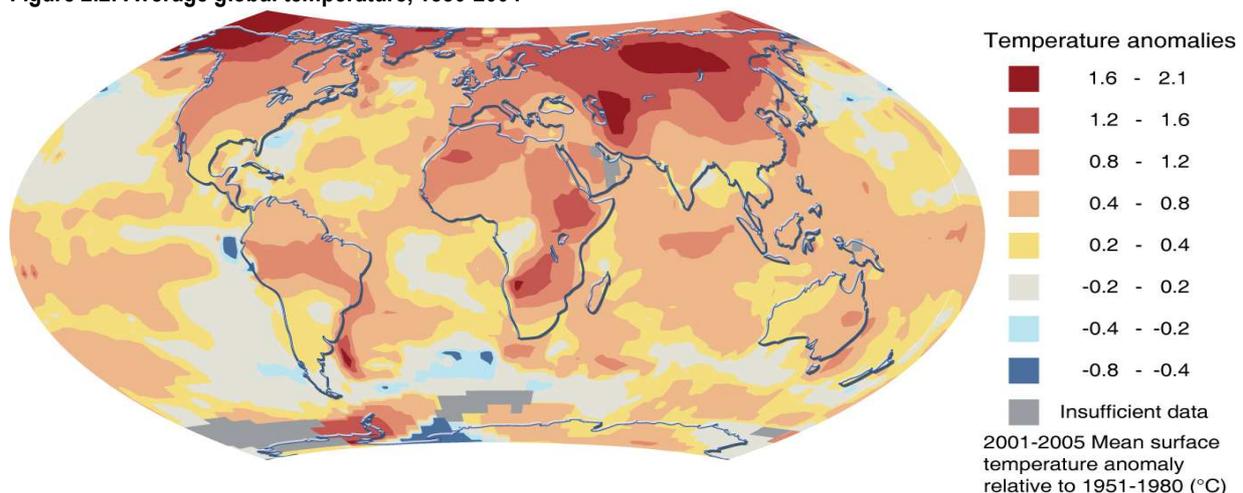
- An increase in average air and ocean temperatures
- An increase in the average global sea level
- Widespread melting of ice and snow
- Changes in weather, such as wind patterns, the amount and type of precipitation, and frequency of severe weather events

### 2.1.1 Temperature rise in air and oceans

During the period from 1906 to 2005, the global mean temperature increased by 0.74°C. Especially in recent years, the mean temperature has increased substantially since the reading of global temperatures started around 1850, and 20 of the 21 warmest registered years have occurred during the last 25 years (see Figure 2.2). The rise in global mean temperature during the last 50 years has been twice as great as during the last 100 years.<sup>5</sup>

The IPCC states that the temperature increase is widespread across the globe, but higher in the northern latitudes, as Figure 2.2 illustrates. It is expected that inland regions will generally warm faster than oceans and coastal zones. The main rise in ocean temperature is in surface water, but new scientific findings show that the average temperature of the global ocean has increased down to depths of at least 3,000 metres.

Figure 2.2: Average global temperature, 1880-2004



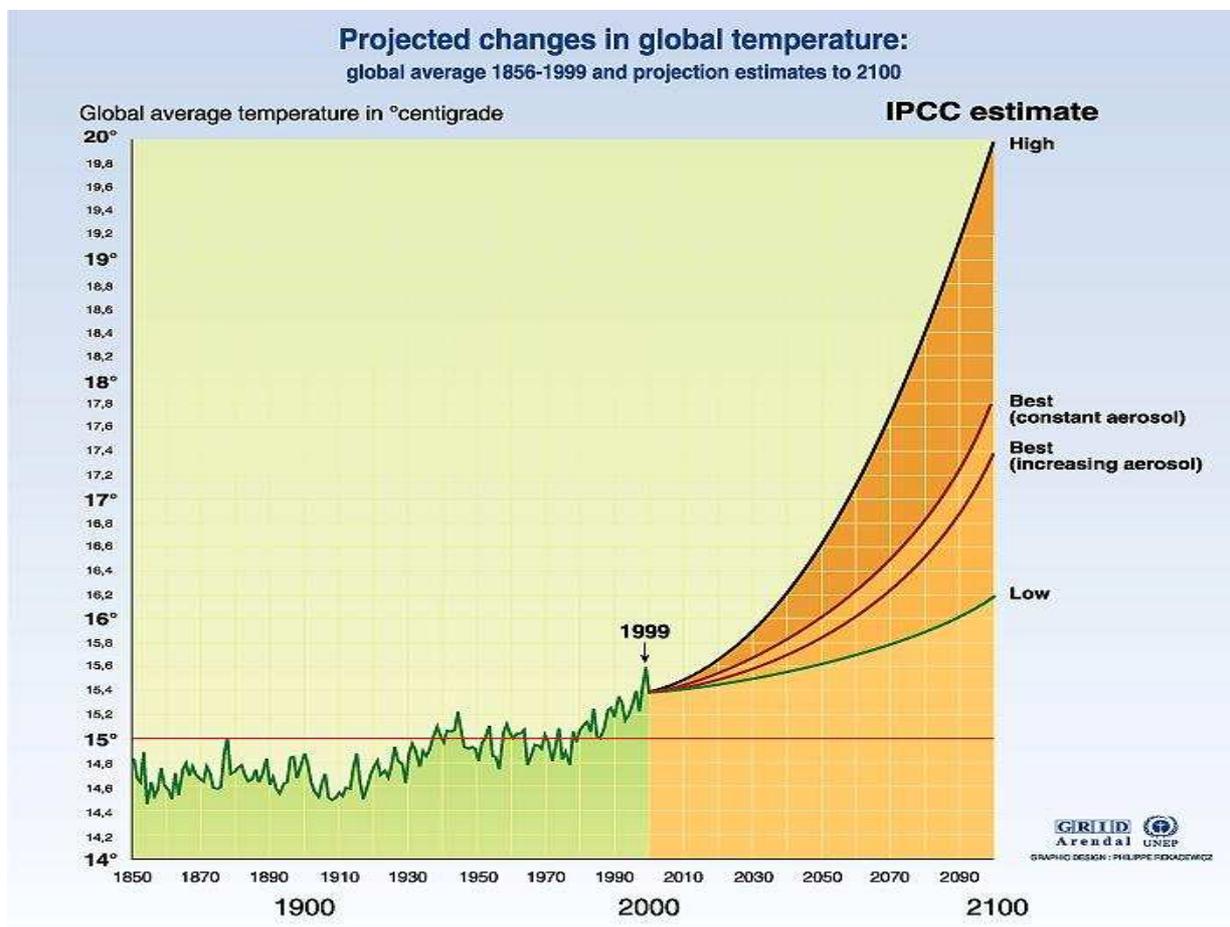
<sup>4</sup> See IPCC (2007). Annex I: Glossary. *Mitigation. Contribution of the Third Working Group (WGIII) to the AR4*. IPCC.

<sup>5</sup> IPCC (2007). 'Summary for Policymakers'. *The Physical Science Basis WGI AR4*. IPCC.

Climate models predict a global warming of about 1.4 to 5.8°C between 1990 and 2100 without any climate change policies being implemented to achieve emission reductions. These projections are based on a wide range of assumptions about the main forces driving future emissions, such as population growth and technological change. Even a 1.4°C rise would be greater than in any century time-scale trend for the past 10,000 years. See IPCCs projections in the figure below.

When it comes to regional and seasonal warming, predictions become much more uncertain. Most areas are expected to warm, but some will warm much more than others. The cold northern regions are expected to experience the greatest warming during winter. The reason is that snow and ice reflect sunlight. Less snow means more heat is absorbed from the sun, which increases any warming. This results in a strong positive feedback effect. By the year 2100, winter temperatures in northern Canada, Greenland and northern Asia are predicted to rise by 40 percent more than the global average.

Figure 2.3: Projected changes in global temperature.



Source : Temperatures 1856 - 1999: Climatic Research Unit, University at East Anglia, Norwich UK. Projections: IPCC report 95.

## 2.1.2 Sea level rise and glacier melting

As the upper layers of the oceans warm, water expands and the sea level rises. The increased temperatures also cause glaciers to melt and thereby result in a rise in the sea level. The IPCC reports that the mean sea level has risen by nearly 20 centimetres during the 20<sup>th</sup> century. Models suggest that warming of 0.6°C would result in the sea level rise to date.

The average sea level is predicted to rise by between nine and 88 centimetres by 2100. This would mainly be caused by the thermal expansion of the upper layers of the ocean as they warm, with some contribution from melting glaciers. The uncertainty range is large, and changing ocean currents, local land movement and other factors will cause local variation compared with the global average. In its Fourth Assessment Report, the IPCC states that the contraction of the Greenland ice sheet is predicted to continue to contribute to sea level rise after 2100. If this contraction is sustained for centuries, it may lead to the virtually complete disappearance of the Greenland ice sheet and a resulting contribution of about seven metres to sea level rise.

Snow cover has declined by some 10 percent since the late 1960s at mid and high latitudes in the Northern Hemisphere. It is also very likely that the annual duration of lake and river ice cover has shortened by about two weeks during the course of the 20<sup>th</sup> century. Almost all recorded mountain glaciers in non-polar regions have retreated during this period as well. In recent decades, the extent of Arctic sea ice in the spring and summer has decreased and the Arctic sea ice has thinned.

## 2.1.3 Changes in weather

Many regions of the world are experiencing increasing amounts of precipitation. However, there are large regional differences. For example, an increase of 0.5 – 1 percent per decade has been measured in most mid and high-latitude areas in the Northern Hemisphere, accompanied by a two per cent increase in cloud cover. Precipitation over tropical land areas seems to have increased by 0.2 to 0.3 per cent per decade, while a decline in precipitation of about 0.3 per cent per decade has been observed in sub-tropical land areas (10 to 30°N) in the Northern Hemisphere during the 20<sup>th</sup> century. On the other hand, the frequency and intensity of droughts in parts of Africa and Asia seem to have worsened.

Global precipitation is predicted to increase, but, at the local level, trends are much less certain. By the second half of the 21<sup>st</sup> century, it is likely that winter precipitation will rise at northern mid to high latitudes and in Antarctica. For the tropics, models suggest that some land areas will see more precipitation, and others less. Australia, Central America and Southern Africa show consistent decreases in winter rainfall. Climate models also consistently show extreme precipitation events becoming more frequent over many areas.

The frequency and intensity of extreme weather events such as storms and hurricanes is likely to continue to increase. There is now higher confidence in the projected increases in droughts, heat waves and floods, as well as their adverse impacts.<sup>6</sup>

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<sup>6</sup> IPCC (2007). 'Summary for Policymakers'. *The Physical Science Basis WGI AR4*. IPCC.

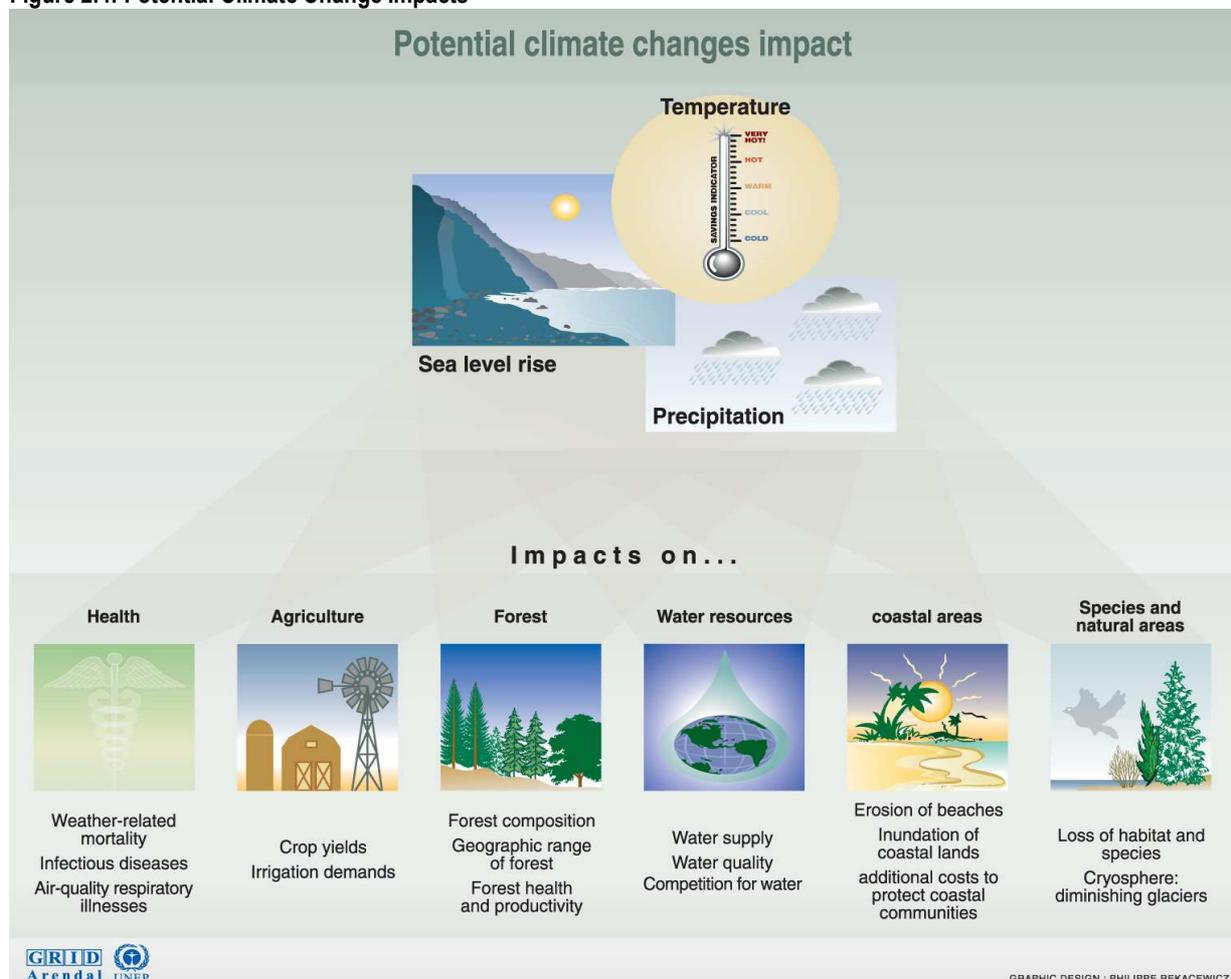
## 2.2 Impacts of climate change

*'We have heard the warnings. Unless we act, now, we face serious consequences. Polar ice will melt. Sea levels will rise. A third of our plant and animal species could vanish. There will be famine, particularly in Africa and Central Asia.'*

UN Secretary General Ban Ki-moon

Climate change will have wide-ranging environmental, socio-economic and other effects, as illustrated in Figure 2.4 below. This includes impacts on water resources, agriculture and food security, human health, terrestrial ecosystems and biodiversity and coastal zones. It must be emphasised that the impacts of climate change often exacerbate already existing stresses (e.g. making dry zones hotter and dryer). Climate change is often only one of the causes underlying environmental stress. It is particularly systems that are already dependent on scarce resources that are vulnerable to the impacts of climate change. In this sense, climate change not only influences environmental concerns, but directly adds to them.

Figure 2.4: Potential Climate Change Impacts



Source: United States environmental protection agency (EPA).

Source: Grid Arendal

## 2.2.1 Water – too much or too little

Changes in precipitation and ice melting can lead to severe water shortages and/or flooding. Saltwater intrusion from rising sea levels will reduce the quality and quantity of freshwater supplies in many places in the world. According to the UNFCCC, higher ocean levels are already contaminating underground water sources in Israel and Thailand, in various small island states in the Pacific and Indian Oceans and the Caribbean Sea, and in some of the world's most productive deltas, such as China's Yangtze Delta and Vietnam's Mekong Delta. In South Asia and the Middle East, groundwater levels are falling rapidly.

Drought-affected areas are likely to increase in extent in the future. Increased exposure to drought is of particular concern in sub-Saharan Africa, but South Asia, Australia and Latin America may also be affected. In addition to water shortages, droughts can have effects such as forest fires.

The melting of glaciers and ice caps reduces water availability and affects seasonal flows in regions supplied by melt water from mountain ranges,<sup>7</sup> but it can also cause flooding and soil erosion. Precipitation and extreme weather events are a major contributor to increased flood risk. Flood risk may also have an impact on infrastructure, food supplies, biodiversity and water quality.

The UNDP states that, by 2020, between 75 million and 250 million more people in sub-Saharan Africa could have their livelihoods and human development compromised by a combination of rising temperature, increased water stress and drought.<sup>8</sup>

Sea level rise is also expected to have impacts, especially in coastal areas. This includes coastal erosion. According to the IPCC, this effect will be exacerbated by increasing human-induced pressures in these areas.<sup>9</sup> Flooding due to sea level rise is also expected to increase. By the 2080s, the number of people affected by floods is expected to increase by many millions due to sea level rise. The largest numbers of people affected will be in densely populated and low-lying mega-deltas in Asia and Africa, but small islands are particularly vulnerable.

Too much or too little water has an impact on all sectors and regions. Billions of people already lack access to fresh water, so this is a major concern.<sup>10</sup> Combined with an increase in other factors that put pressure on water resources, such as population growth and industrial development, climate change will have a marked impact on the distribution and availability of water (UNDP report 2007/2008). Reduced flows in rivers can also have negative impacts on, for instance, hydroelectric production.

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<sup>7</sup> More than one-sixth of the world's population currently lives in these areas. (AR4, WG II p.11, summary for policymakers.)

<sup>8</sup> See UNDP (2007), 'Human development report 2007/2008- Fighting climate change: Human solidarity in a divided world'. UNDP.

<sup>9</sup> IPCC (2007), Synthesis Report AR4, p. 48)

<sup>10</sup> See UNFCCC. 'Future effects': [http://unfccc.int/essential\\_background/feeling\\_the\\_heat/items/2905.php](http://unfccc.int/essential_background/feeling_the_heat/items/2905.php) (15.04.08).

## 2.2.2 Agriculture and food supply

The assumed effect of climate change on agriculture and food supply varies a great deal between different regions of the world. In the northern part of the world, the IPCC describes an expectation of increased agricultural production due to increased temperature. However, at lower latitudes, and in tropical and dry regions in particular, we can expect a decrease in crop productivity. The temperature is expected to increase in sub-Saharan Africa, Eastern Asia and South Asia in particular. Climate change is expected to further reduce water availability as a result of increased frequency of droughts, evaporation and changed patterns of rainfall and runoff, especially in water-scarce regions. Rising temperatures and changes in precipitation will also cause shifts in crop growing seasons.

The effect of climate change on agricultural production is expected to be unevenly distributed. In developed countries, productivity is expected to grow, and the growing season will be extended, at least with a small rise in temperature, while the developing countries will face a decrease in production (UNDP). Globally, we may experience overall growth, but food resources are expected to be even more unevenly distributed than today.

Sub-Saharan Africa is one of the poorest and most rainfall-dependent regions in the world. Agricultural producers have limited resources. This makes them vulnerable to even minor shifts in rainfall patterns and temperature. This can lead to increased malnutrition and reduced opportunities for poverty reduction (UNDP) (see also Figure 2.5).

As the frequency of heavy precipitation events is expected to increase in most areas of the world, the result will be damage to crops and soil erosion. Water logging may also be an increasing problem because more rain and snow will result in more wet soil in winter in high-latitude areas, while higher temperatures may mean drier soil in summer. Local changes in soil moisture are clearly important to agriculture, but the IPCC concludes that it is still difficult to create models that simulate them correctly.<sup>11</sup>

## 2.2.3 Ecosystems and biodiversity

Temperature increases will potentially severely increase rates of extinction for many habitats and species. The extinction risk rate for plants and animals is estimated to be up to 30 per cent if the global rise in temperature exceeds 1.5 to 2.5 degrees Celsius (IPCC). Coral reefs, boreal forests, Mediterranean and mountain habitats are expected to be especially affected. Corals are vulnerable to temperature fluctuations and even a small temperature rise is expected to lead to bleaching of corals and widespread mortality. Different species will extend their habitat at the expense of other species, while others may die out because of changes in the basis for their existence. Most of the world's endangered species, probably 25 per cent of mammals and 12 per cent of birds, may become extinct over the next few decades. This is because warmer conditions alter the forests, wetlands, and rangelands that birds and mammals depend on, combined with the fact that human development prevents them from migrating elsewhere.<sup>12</sup>

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<sup>11</sup> See also UNEP. 'The environmental food crisis – The environment's role in averting future food crises', [http://www.grida.no/\\_res/site/file/publications/FoodCrisis\\_lores.pdf](http://www.grida.no/_res/site/file/publications/FoodCrisis_lores.pdf)

<sup>12</sup> See UNFCCC. 'Future effects': [http://unfccc.int/essential\\_background/feeling\\_the\\_heat/items/2905.php](http://unfccc.int/essential_background/feeling_the_heat/items/2905.php) (15.04.08).

Species tend to follow their climate zone. When the climate zones change, so does the spread of species. Changes in migratory patterns, flowering seasons and the distribution of flora and fauna have been detected across the world.<sup>13</sup>

Coral reefs are a vital part of the ecosystem that sustains fish stocks. If coral reefs collapse, this will affect both the food supply and the livelihood of many people. The UNDP reports that most of the 30 million small-scale fisherfolk in the developing world are dependent in some form on coral reefs to maintain feeding and breeding grounds. Moreover, 400 million poor people who live in tropical coastal areas get more than half of the protein and essential nutrients in their diets from fish.

A rise in sea levels means a greater risk of storm surges, inundation and wave damage to coastlines. Island states and countries with low-lying deltas are especially vulnerable to sea level rise.

#### **2.2.4 Human health**

Millions of people are likely to be affected by climate change. An increase in malnutrition and ensuing disorder is expected. This has particular implications for child growth and development. Heat waves, floods, storms and other extreme weather events are likely to cause an increase in deaths, disease and injuries.<sup>14</sup> Climate change and altered weather patterns would affect the range, intensity, and seasonality of many major tropical vector-borne and other infectious diseases, such as malaria and dengue fever, which already kills one million people annually, most of them children. There is also expected to be an increased burden of diarrhoeal diseases as a result of floods, droughts and storms.

#### **2.2.5 Settlement and society**

As shown above, climate change already has and will continue to have impacts in many areas and systems, such as human health, biodiversity, freshwater supplies and agriculture. These effects may be direct or indirect. Extreme weather events, for example, will have direct impacts on the most vulnerable industries, settlements and societies. This applies to those who live in coastal and river flood plains, those whose economies are closely dependent on climate-sensitive resources, and those in areas prone to extreme weather events, especially places that are also experiencing rapid urbanisation.<sup>15</sup> A shortage of fresh water may lead to mounting conflicts over access to water, streams of refugees and a weakening of many people's livelihoods. Sea level rise and reduced food productivity may also undermine livelihoods and add to the pressures that are leading to forced migration. This again may lead to a great change in demographic and economic patterns and land use.

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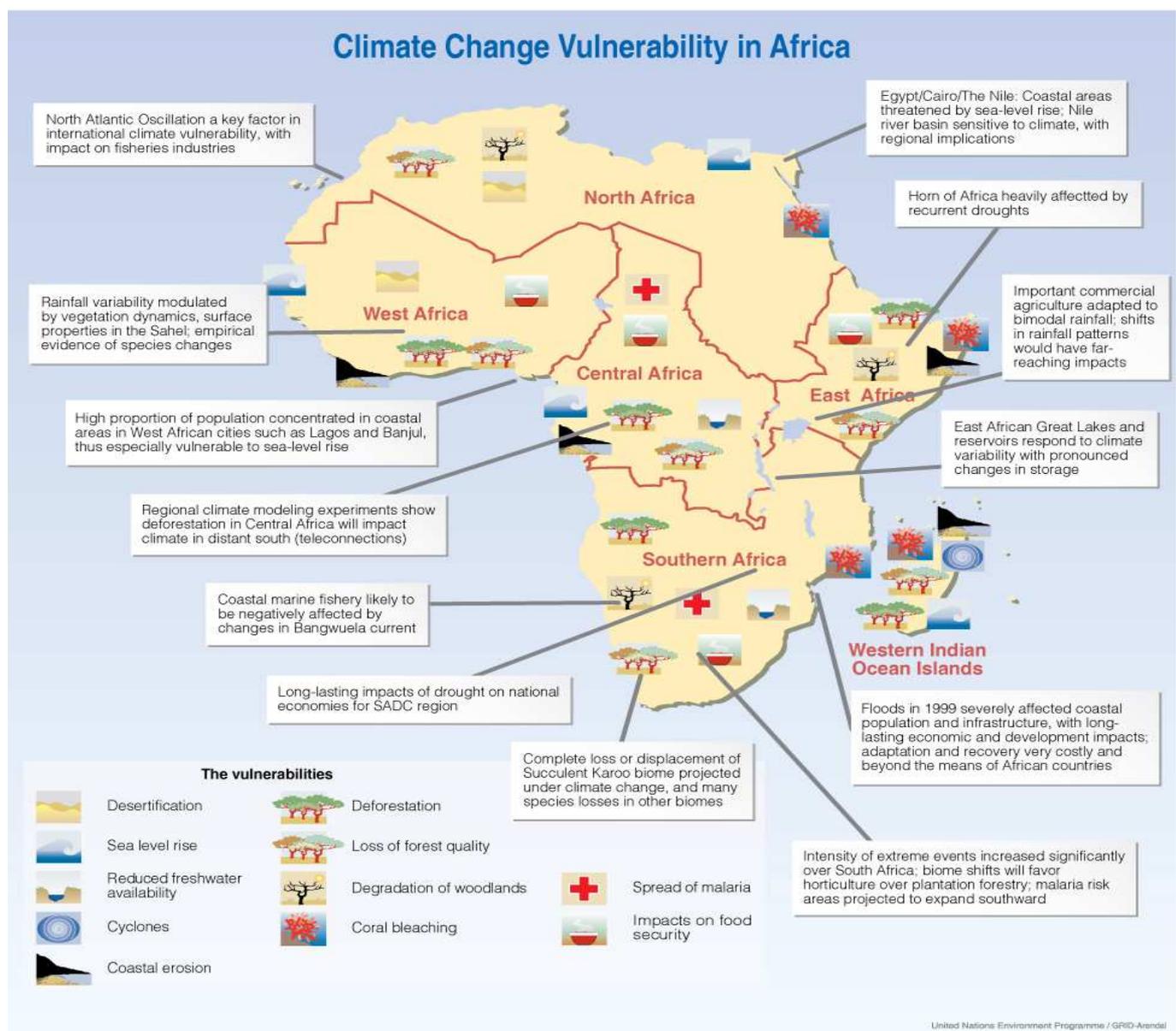
<sup>13</sup> See UNDP (2007), 'Human development report 2007/2008- Fighting climate change: Human solidarity in a divided world'. UNDP.

<sup>14</sup> IPCC (2007). 'Summary for Policymakers'. *The Physical Science Basis WGI AR4*. IPCC.

<sup>15</sup> IPCC (2007), AR4, Synthesis Report.

Climate change will have an impact on societies all over the world. The main impact of climate change is a result of its interaction with other non-climate sources of change and stress. Although all parts of the world are expected to be affected by impacts of climate change, vulnerability and the ability to adapt are unevenly distributed. The figure below, presented on GRID-Arendal's website, shows different aspects of the challenge Africa faces: multiple stresses make most of Africa highly vulnerable to environmental changes, and climate change is likely to increase this vulnerability. This graphic presentation shows which of the regions of Africa are most vulnerable to specific impacts of climate change.

Figure 2.5: Climate change vulnerability in Africa.



Source: Grid Arendal

Vulnerability to climate change is dependent on the geographical, social and sector context. Some areas are identified as high-risk locations. Coastal and riverside areas will be most affected, as well as locations dependent on water supplies and agriculture, forestry and tourism. It seems that the risk in terms of overall monetary damage is often greater in industrialised areas and that the risk in terms of total human damage is often greater in less developed areas.<sup>16</sup>

The economic and social costs of extreme weather events will definitely increase, and poor communities in high-risk areas are expected to be most vulnerable and have limited capacity to adapt. In general, the indirect effects will contribute to the most serious consequences in societies that are already facing huge stresses such as drought, water shortages and other pressures on people's livelihoods.

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<sup>16</sup> IPCC (2007). 'Industry, settlement and society' Ch. 7 in WGIII AR4. IPCC.

## 2.3 Climate change drivers: What causes climate change?

The world's climate has always varied considerably over long periods of time. This is due to natural changes in solar radiation, changes in the Earth's orbit and volcanic activity. The reason why climate change is the subject of increasing international attention is that there is reason to believe that the rapid and increasing climate changes we are facing today (described in 2.1) are caused by human activity.

### 2.3.1 The greenhouse effect

The greenhouse effect is a natural system that regulates the temperature on Earth. In principle, the Earth receives solar energy from the sun and releases the same amount of energy back into space. GHGs, which constitute less than one percent of the atmosphere, absorb and transmit solar energy and thereby warm up the surface of the Earth. Natural GHGs include water vapour, carbon dioxide, methane, nitrogen oxide and ozone. Human activity contributes to the greenhouse effect through increased emissions of GHGs to the atmosphere. Without any greenhouse effect, the average temperature on Earth would be minus 18 degrees Celsius. At present, the average temperature is plus 15 degrees Celsius.

Since the pre-industrial age, the concentration of carbon dioxide in the atmosphere has increased by approximately 31 percent, methane by 141 percent and nitrous oxide by 17 percent. This increase is due to human activity, and it has intensified the greenhouse effect. Figure 2.6 below illustrates the contribution of increased emissions from a wide range of human activity.

Figure 2.6: World greenhouse gas emissions by sector

Sector		End use/ Activity		
Energy	Transportation	13.5%	Road	9.9%
			Air	1.6%
			Rail, Ship and Other Transport	2.3%
	Electricity and Heat	24.6%	Residential Buildings	9.9%
	Other Fuel Combustion	9%	Commercial Buildings	5.4%
			Unallocated Fuel Combustion	3.5%
			Iron and Steel	3.2%
			Aluminium/Non-Ferrous Metals	1.4%
			Machinery	1%
	Industry	10.4%	Pulp, Paper and Printing	1%
Food and Tobacco			1%	
Chemicals			4.8%	
Cement			3.8%	
Fugitive Emissions	3.9%	Other Industry	5.0%	
		T & D Losses	1.9%	
		Coal Mining	1.4%	
Industrial Processes	3,4 %	Oil/ Gas Extraction, Refining & Processes	6.3%	
		Deforestation	18.3%	
		Harvest/ Management	2.5%	

**GHG Emissions**

CO<sub>2</sub> (77%)

CH<sub>4</sub> (14%)

N<sub>2</sub>O (8%)

Other gases (1%)

Land Use Change	18.2%	Afforestation	-1.5%
		Reforestation	-0.5%
		Other	-0.6%
Agriculture	13.5%	Agricultural energy use	1.4%
		Agricultural Soils	6%
		Livestock & Manure	5.1%
		Rice Cultivation	1.5%
		Other Agriculture	0.9%
Waste	3.6%	Landfills	2%
		Wastewater, Other Waste	1.6%

All data are for 2000. All calculations are based on CO<sub>2</sub> equivalents, using the 100-year global warming potential from the IPPC (1996). Land use change includes both emissions and absorptions. The figure is based on a figure presented by GRID-Arendal.

The way the climate changed during the 20<sup>th</sup> century is consistent with what we would expect as a result of an increase in GHGs and aerosols, and observed spatial patterns of global warming are consistent with model predictions. Physical evidence supports this. According to the IPCC, different measurements have shown that, while the Earth's surface has been warming, the stratosphere has cooled. The IPCC's fourth assessment report concludes that there is new and stronger evidence that most of the warming observed over the last 50 years is attributable to human activities. Box 2.1 below provides an overview of the main GHGs. It also explains how GHG emissions can be commonly expressed in carbon dioxide equivalents

#### Box 2.1: Greenhouse gases

##### GHGs and sources

**Carbon dioxide** (CO<sub>2</sub>) is mainly emitted from the combustion of fossil fuel and deforestation. It contributes approximately 80 percent to the total emission of anthropogenic GHGs. **Methane** (CH<sub>4</sub>) is mainly released by landfills, agriculture and rice cultivation. Sources of **nitrous oxide** (N<sub>2</sub>O) include chemical fertilisers, industrial processes and the burning of fossil fuels.

In addition, the Kyoto Protocol includes three groups of synthetic chemicals: **sulphur hexafluoride** and **perfluorocarbons** (PFCs) used in products or emitted as a by-product of industrial processes, and **hydrofluorocarbons** (HFCs) used as replacements for ozone-depleting substances regulated by the Montreal Protocol. Other gases and aerosols influence the climate, but they are not currently regulated by the Kyoto Protocol.

##### CO<sub>2</sub>-equivalents and global warming potential

The GHGs differ in terms of their radiative properties and lifetime. For ease of comparison, non-carbon dioxide emissions of GHGs are expressed in terms of carbon dioxide equivalents to indicate their contribution to global warming, the so-called global warming potential (GWP). GWP is used as a standardised measure when comparing emissions. For example, one tonne of methane is equivalent to 21 tonnes of carbon dioxide. Because the gases differ in terms of how long they remain in the atmosphere, these values are normally based on the effect integrated over the first 100 years after the emission year (100 year GWP).

Anthropogenic emissions of GHGs have a significant impact on the climate system. Natural GHGs are a natural part of the ecosystem. GHGs from human activity are not a natural part of the ecosystem and therefore create a surplus of GHGs in the atmosphere. Thus, even though the amount of GHGs related to human activity is a relatively small part of the total amount of GHGs, they can have a great impact on natural ecosystems.

As long as GHG levels keep rising, the climate will continue to change. The temperature will probably rise further in spite of any future emission reductions, because the GHGs remain in the atmosphere for a very long period of time and the response of the climate system is slow.

### **2.3.2 The Carbon cycle: sink and sources**

The earth's four major reservoirs of carbon are the atmosphere, the terrestrial biosphere, the oceans and sediments (including fossil fuels). The carbon cycle is the cycle by which carbon is exchanged between these reservoirs. This cycling of carbon is a prerequisite for life on earth.

About half of the extra carbon dioxide released into the air by human activity has been absorbed by the land and oceans. The processes, regions or systems that absorb greenhouse gases are called sinks. Sinks are important sources that influence the total quantity of greenhouse gases in the atmosphere. Any reduction in their capacity will result in increased global warming.

The oceans and the photosynthesis performed by vegetation on land are natural sinks. Another example of a sink is the injection and storage of CO<sub>2</sub> in geological reservoirs and changes in the amount of organic carbon stored in soils. The principal sink for CO<sub>2</sub> is forest, as young trees have a considerable potential to absorb CO<sub>2</sub> over many years.

Human activities influence the carbon cycle and the amount of carbon in the reservoirs. Important examples are increased CO<sub>2</sub> in the atmosphere caused by the extraction and combustion of fossil fuels and deforestation. The flux from fossil fuel reservoirs to the atmosphere constitutes around 80% of the anthropogenic contribution to increased CO<sub>2</sub> in the atmosphere. On the other hand, through forest management, human activities can enhance the sink of CO<sub>2</sub> (see Figure 2.6 for an overview of human activities influencing the amount of GHGs in the atmosphere).

Some changes are rapid, for example the instantaneous release of CO<sub>2</sub> into the atmosphere from the biosphere during a deforestation process, while other processes, such as the exchange of carbon from the atmosphere to the deep ocean, are very slow. About 50% of the increase in CO<sub>2</sub> in the atmosphere is removed within 30 years, while 2% may remain in the atmosphere for many thousand years.

The number of interactions between the different carbon reservoirs makes the modelling of the carbon cycle very complex. The net balance of change in vegetation is uncertain, but the latest figures indicate that the land sink is higher than emissions due to changes in land use. There is still considerable discussion about the estimation of the quantities of greenhouse gases absorbed from the atmosphere as a result of agricultural and land use change activity. To date, no common IPCC methodology has been adopted, and countries currently apply their own methods. The auditor should be aware of the potential complexities and sources of uncertainty if using modelled projections of climate change or considering how government is responding to them.

## 2.4 The main international response

*'Yet those to suffer most from climate change will be in the developing world. They have fewer resources for coping with storms, with floods, with droughts, with disease outbreaks, and with disruptions to food and water supplies. They are eager for economic development themselves, but may find that this already difficult process has become more difficult because of climate change.'*<sup>17</sup>

The review of the effects and causes of climate change highlights the need to mitigate GHG emissions. But even with major reductions in emissions, we will still be facing future changes in the climate. This necessitates international and national efforts to mitigate and adapt to climate change in all areas and countries.

The UNFCCC was adopted in 1992 at the UN Conference on Environment and Development, also known as the Rio Conference. Most of the countries in the world are parties to the Convention, which makes it one of the most important international environmental treaties.<sup>18</sup> The Kyoto Protocol is a protocol to the UNFCCC. It was adopted in 1997. The Protocol is aimed at establishing a first step towards achieving the main objective of the Convention: to stabilise GHG emissions from human activities. The Protocol establishes emission targets for the Annex I Parties (see Box 3.1 below). The rules for the fulfilment of the Protocol for the first commitment period (2008-2012) were agreed upon in the Marrakesh Accords. Progress under the UNFCCC is summarised in Table 2.1.

**Table 2.1: Timeline for key UNFCCC events<sup>19</sup>**

Year	Outcome
1992	<b>UN Conference on Environment and Development (Rio de Janeiro, Brazil):</b> United Nations Framework Convention on Climate Change
1997	Kyoto Protocol: <b>outlines legally-binding commitments to cut emissions</b>
2001	Marrakesh Accords: <b>spell out more detailed rules for the Protocol (e.g. concerning technology transfer and the flexible mechanisms) and prescriptions for implementing the Convention (concluded a cycle of negotiations, including the Buenos Aires Plan of Action and the Bonn Agreements)</b>
2005	<b>The Kyoto Protocol enters into force</b>
2006	Nairobi Work Programme on Adaptation
2008	<b>Start of the five-year commitment period under the Kyoto Protocol</b>
2009	<b>Follow-up agreement to the Kyoto Protocol</b>

<sup>17</sup> See UNFCCC. 'Future effects': [http://unfccc.int/essential\\_background/feeling\\_the\\_heat/items/2905.php](http://unfccc.int/essential_background/feeling_the_heat/items/2905.php) (15.04.08).

<sup>18</sup> UNFCCC (2007), *Uniting on Climate: A guide to the Climate Change Convention and the Protocol*. UNFCCC.

<sup>19</sup> For a more thorough review of the process, see UNFCCC, *The Ten First Years* (2004) and UNFCCC, *Uniting on Climate* (2007).

## Chapter 3: Audit criteria for climate change policy

In this chapter, three kinds of audit criteria suitable for auditing climate change policy will be presented: international agreements, criteria for good governance and criteria for good management.

### 3.1 International agreements: UNFCCC and the Kyoto Protocol

The United Nations Framework Convention on Climate Change (UNFCCC or the Convention) is the main global response to the challenge of climate change. The Convention and its Kyoto Protocol spell out a number of commitments for Parties, and it is thus where we must start looking for audit criteria.<sup>20</sup>

The UNFCCC is based on the principle of ‘common but differentiated responsibilities’. The developed or industrialised countries should ‘take the lead’ in modifying anthropogenic emissions in the long term.<sup>21</sup> More specifically, this means that the Annex I Parties have to take more responsibility than the non-Annex I Parties: firstly, they shall help developing countries to meet their commitments and, secondly, they shall take the first steps towards reducing GHG emissions; this second point was also included in the Kyoto Protocol. Box 3.1 explains what Annex I and Annex II country Parties are.

#### Box 3.1: Annex I and Annex II Parties

- *Annex I Parties* are those countries that were members of the Organisation for Economic Co-operation and Development (OECD) in 1992 and a number of countries defined as economies in transition (EITs).
- *Annex II Parties* are a sub-group of the Annex I countries. They include the members of the OECD, but not the EITs.
- *Non-Annex I Parties* are all other countries which are Party to the UNFCCC. They also include the least-developed countries and countries especially vulnerable to the adverse impacts of climate change.
- The Annex I and II Parties are listed in the Convention (in Annex I and II); the same grouping of Parties is also used in the Kyoto Protocol.

The commitments under the Convention are largely non-binding and of a general nature. They are not country-specific or time-bound. There is one exception, however: reporting to the UNFCCC secretariat. The Convention establishes rules for the timing of national communications for both Annex I and non-Annex I Parties and inventory submissions from Annex I Parties, as elaborated below.

<sup>20</sup> So far, 192 countries have signed and ratified the Convention, see [http://unfccc.int/parties\\_and\\_observers/items/2704.php](http://unfccc.int/parties_and_observers/items/2704.php). 186 countries have signed and ratified the Protocol, see [http://unfccc.int/kyoto\\_protocol/background/status\\_of\\_ratification/items/2613.php](http://unfccc.int/kyoto_protocol/background/status_of_ratification/items/2613.php). Only Parties that have ratified the Convention can be a Party to the Protocol. The Protocol has not been ratified by the United States and its commitments do not therefore apply to the USA.

<sup>21</sup> The Convention, Article 4, paragraph 2.a.

The emission targets established by the Kyoto Protocol are binding on all Annex I Parties which have ratified the Protocol. The Protocol specifies emission targets for each Party. It also has a set time frame: the first commitment period runs from 2008 to 2012.<sup>22</sup>

We present the commitments from both the Convention and the Protocol as they relate to monitoring and reporting, mitigation, adaptation, technology, funding and research.

### 3.1.1 Mitigation commitments

The Convention commits all parties to adopt programmes containing measures to reduce anthropogenic emissions of GHGs and enhance and maintain sinks. The developed countries have a further commitment to adopt mitigation policies that demonstrate that they are taking the lead in modifying longer-term trends in anthropogenic emissions.

*'All Parties [shall formulate], implement, publish and regularly update national and, where appropriate, regional programmes containing measures to mitigate climate change by addressing anthropogenic emissions.'* (the Convention, Article 4, paragraph 1.b and e)

While the objective of the UNFCCC is a long-term target, the Kyoto Protocol has a short-term and measurable target. The Protocol contains a set of legally-binding emissions targets (for industrialised countries) that amount to a total reduction among all Annex I Parties of at least five per cent from 1990 levels by 2008-2012.<sup>23</sup> The Protocol thus establishes binding, quantifiable reduction targets for Annex I Parties (see Table 3.1 on the next page).<sup>24</sup> EU emission targets referred to in the box are of course audit criteria for EU countries, and will be elaborated on in Chapter 4, Step 2 on mitigation (see page 50).

In order to achieve the reduction targets, the Kyoto Protocol commits Annex I Parties to make use of a number of national policies and measures, including increased energy efficiency, protection and enhancement of sinks of GHGs, promotion of sustainable forms of agriculture, development of new technologies, phasing out of market imperfections in all GHG-emitting sectors, limitation of GHG emissions from the transport sector and the limitation of methane emissions.<sup>25</sup> Annex I Parties shall also cooperate to improve the effectiveness of these policies and measures and endeavour to implement them in a way that minimises the effects on other Parties and, in particular, on countries that are particularly vulnerable to the adverse effects of climate change.<sup>26</sup>

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<sup>22</sup> Member parties not in compliance with their targets can be held to account by a Compliance Committee. It can impose a penalty of 30 per cent of a Party's emission target to be made up for in the subsequent period.

<sup>23</sup> The base year for some countries could be another year than 1990.

<sup>24</sup> We return to EU climate change policies in Chapter 4.

<sup>25</sup> See the Protocol, Article 2, paragraph 1.

<sup>26</sup> See the Convention, Article 4, paragraph 8 for a list of these groups of countries.

**Table 3.1: Reduction targets (2008-2012) for Annex I Parties under the Kyoto and EU agreements (in per cent)**

Party	Emissions target (Kyoto)	Emissions target (EU)	Party	Emissions target (Kyoto)	Emissions target (EU)
Australia	+8		Liechtenstein	-8	
Austria	-8	-13	Lithuania	-8	
Belgium	-8	-7.5	Luxembourg	-8	-28
Bulgaria	-8		Monaco	-8	
Canada	-6		Netherlands	-8	-6
Croatia	-5		New Zealand	0	
Czech Republic	-8		Norway	+1	
Denmark	-8	-21	Poland	-6	
Estonia	-8		Portugal	-8	+27
European Union	-8		Romania	-8	
Finland	-8	0	Russian Federation	0	
France	-8	0	Slovakia	-8	
Germany	-8	-21	Slovenia	-8	
Greece	-8	+25	Spain	-8	+15
Hungary	-6		Sweden	-8	+4
Iceland	+10		Switzerland	-8	
Ireland	-8	+13	Ukraine	0	
Italy	-8	-6.5	United Kingdom	-8	-12.5
Japan	-6		United States	-7* (not ratified)	
Latvia	-8				

The Protocol opens for cost-effective fulfilment of the commitment to control emissions. This is generally referred to as the flexible mechanisms and includes Joint Implementation (JI), Clean Development Mechanism (CDM) and emissions trading.<sup>27</sup> The flexible mechanisms mean that GHG emissions have an economic value. Normally, this value is expressed as the value of a tonne of CO<sub>2</sub> or CO<sub>2</sub> equivalents (see Box 2.1 in Chapter 2). The market determines the price of one tonne of CO<sub>2</sub>. Using these mechanisms is voluntary. However, if a country chooses to make use of them, there are certain procedures and rules that can be used as audit criteria.

The use of these mechanisms can be used to meet the emissions targets, but they should be supplementary to domestic action.<sup>28</sup> This is reviewed by the Compliance Committee's facilitative branch. However, the facilitative branch has no sanctioning powers.

*The Clean Development Mechanisms (CDM) system is a system whereby Annex I Parties<sup>29</sup> invest in projects that reduce expected GHG emissions in developing country Parties.<sup>30</sup> In return for their investment, they receive credits in the form of certified emission reductions (CERs). The financing and recipient Parties decide on how to share the credits from the project. They can use the credits to offset their own GHG emissions, save them for a subsequent period or sell them. For the recipient Party, the intention is that it should also gain from an investment in sustainable development.*

<sup>27</sup> It should be pointed out that this is trading between Parties, not companies. Furthermore, no emissions trading scheme has been established under the UNFCCC. This policy instrument will be described in Chapter 4, Step 2 on mitigation.

<sup>28</sup> UNFCCC (2001). Marrakesh Accords: [http://unfccc.int/cop7/documents/accords\\_draft.pdf](http://unfccc.int/cop7/documents/accords_draft.pdf).

<sup>29</sup> The investor can in practice be the government of a country or a company from an Annex I country with a cap on GHG emissions. For more information, see the section on the ETS.

<sup>30</sup> See the Kyoto Protocol, Article 12.

Conditions that must be fulfilled for the accreditation of a CDM project include:

- Investment in a CDM project must be additional to the financing and technology transfer commitments of Annex II Parties
- A CDM project cannot be profitable without the investment of an Annex I Party
- GHG emissions after the CDM project must be lower than they would have been without the project
- Two per cent of the CERs generated must go to an Adaptation Fund
- Requirements for additionality and contribution to sustainable development

*The Joint Implementation (JI) mechanism* works in a very similar way to CDM, in that it offers an opportunity for Annex I countries to invest in another country in a more cost-effective manner. Under JI, however, both the financing and recipient countries are Annex I Parties with emission targets under the Protocol.

The *Emission Trading System (ETS)* is a market mechanism for trading emission credits. It is based on setting a value on the right to emit one tonne of CO<sub>2</sub>-equivalents and on this right being tradable. Trading can take place between countries, companies or between countries and companies. Based on this setting of a limit on emissions, companies receive (free or through an auction) emission allowances. Companies can then trade these allowances. Companies that emit less GHGs than their allowances permit can sell surplus allowances. Conversely, companies that emit more GHG than their allowances permit must buy allowances.

The Kyoto mechanisms open for emission trading between countries, and some regions/countries have established separate emission trading schemes that are consistent with the Kyoto requirements (for example, the EU emissions trading scheme, see Table 3.2) in order to facilitate emissions trading with other countries and between installations or companies. Normally, such schemes are established in national law or legislation and more detailed rules are agreed than those that apply under the Kyoto Protocol. These rules can also include provisions for verification and control.

### **3.1.2 Monitoring and reporting commitments for mitigation**

All Parties shall submit national communications containing information about GHG emissions and removals and implementation activities. Annex I Parties shall, in addition, submit annual GHG inventories.

*'All Parties [shall] develop, periodically update, publish and make available ... national inventories of anthropogenic emissions by sources and removals by sinks of all greenhouse gasses ... using comparable methodologies.'* (the Convention, Article 4, paragraph 1.a)

Both the Convention and the Protocol have established systems for monitoring and reporting. All Parties must follow the reporting requirements of the Convention, while the Kyoto reporting only applies to the Annex I Parties which have ratified the protocol.

## **Annex I reporting requirements**

National communications and annual inventories are to be submitted by the Annex I Parties to the Convention secretariat.<sup>31</sup> They are then subject to an in-depth review and technical review, respectively.

For Annex I Parties, national communications were due six months after the Convention entered into force for that Party and every four years thereafter.

In addition, Annex I Parties shall submit annual inventories of anthropogenic GHG emissions by sources and removals by sinks.

The Kyoto Protocol establishes a more comprehensive reporting and accounting system than the Convention. To ensure compliance with the emission targets and the functioning of the flexible mechanisms, a Kyoto Protocol accounting system has been established. This system comprises three components:<sup>32</sup>

- National systems for the estimation of GHG emissions and removals
- Reporting requirements (national communications and annual reports) and review procedures
- A Compliance Committee

In addition, each Annex I Party must establish a national registry for its holdings in tradable units. A transaction log is maintained by the Convention secretariat. It will be used to verify transactions of tradable units.<sup>33</sup>

The enforcement branch of the Compliance Committee is responsible for determining whether a Party is in compliance with the methodological and reporting requirements and its emissions commitments. If a Party fails to meet its reporting requirements, it can be suspended from participation in the Kyoto mechanisms. (For further information about the review process, see Appendix 1.)

## **Non-Annex I reporting requirements**

Non-Annex I Party reporting requirements are subject to considerations of the resource situation and financial assistance from Annex II Parties. The first national communication from non-Annex I Parties was due three years after the entry into force of the Convention for that Party or three years after financial resources were made available. These Parties do not need to submit annual inventories.

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<sup>31</sup> For a thorough review of the Compliance Committee, see its webpage ([http://unfccc.int/kyoto\\_protocol/compliance/items/2875.php](http://unfccc.int/kyoto_protocol/compliance/items/2875.php), retrieved 30.03.08) or UNFCCC(2007). Uniting on Climate: .

<sup>32</sup> See UNFCCC (2007), Uniting on Climate: A guide to the Climate Change Convention and the Kyoto Protocol. UNFCCC.

<sup>33</sup> The CDM Executive Board maintains a CDM registry for non-Annex I Parties participating in CDM projects.

### 3.1.3 Adaptation commitments

*'All parties [shall] facilitate adequate adaptation to climate change [and] cooperate in preparing for adaptation to the impacts of climate change.'*

*'All Parties, including Non-Annex I Parties, shall establish plans for activities aimed at adaptation to the adverse effects of climate change.'* (the Convention, Article 4, paragraphs 1e and 5)

The obligations in international climate change agreements with respect to adaptation are fewer and less specific than those concerning mitigation. Member Parties to the Convention have no legally-binding commitments concerning adaptation. However, the Nairobi Work Programme (NWP) formulated by the UNFCCC can be regarded as a framework for establishing good practice for national adaptation strategies. The objective of the Nairobi Work Programme is to improve Parties' understanding and assessment of the impacts of climate change and countries' vulnerability to these impacts, thus enabling them to make informed decisions about practical adaptation measures. Key actions to this end include impact and vulnerability assessments, data collection and analysis, modelling and adaptation assessments. Adaptation strategies should be based on a sound scientific, technical and socio-economic basis; existing experience, domestic as well as experience from other countries, should be taken into account when relevant.

Annex II Parties to the Convention shall help developing countries to prepare for adaptation. This can be done by preparing National Action Plans for Adaptation (NAPAs). These action plans focus on immediate adaptation needs. Funding for adaptation identified through the NAPAs is channelled through the Global Environment Facility's (GEF) Least-Developed Countries Fund.

### 3.1.4 Commitments on technology, funding and research

#### Development and transfer of technology

*'All Parties [shall promote] and cooperate in the development, application and diffusion, including transfer, of technologies, practices and processes that control, reduce or prevent anthropogenic emissions of greenhouse gases.'* (the Convention, Article 4, paragraph 1.c)

The UNFCCC commits all Parties to cooperate on developing and transferring technology that can control GHG emissions. Furthermore, the developed countries shall take all practicable steps to promote, facilitate and finance the transfer of environmentally sound technologies.<sup>34</sup> It is underlined that developed and developing countries must cooperate to make sure that technologies are not only transferred but also made accessible, in the sense that know-how and capacity in the recipient countries must also be enhanced.

The development and transfer of technology is a theme in the Marrakesh Accords. A framework was established for 'meaningful and effective action' to meet the technology requirements under the Convention. This framework focuses on the assessment of technology needs, the establishment of an efficient information system, removing barriers to technology transfer and capacity building.

<sup>34</sup> The Convention, Article 4, paragraph 5.

## Scientific research

*'All Parties to the UNFCCC shall promote research, systematic observation and development of data archives with a view to reducing uncertainty about the causes and effects of climate change.'* (the Convention, Article 4, paragraph 1.g)

Scientific research is related to two interlinked yet different areas. One is climatology, which focuses on understanding climatic change;<sup>35</sup> the other is environmental science, which emphasises measuring impacts and changes in ecosystems and human systems.

In addition, Article 5 of the Convention stipulates activities members of the Convention shall carry out in order to fulfil their commitments related to scientific research. This includes supporting and developing international and intergovernmental efforts to conduct, assess and finance research, data collection and systematic observation, as well as strengthening research capacities and capabilities. These efforts shall take into account the particular needs of developing countries.<sup>36</sup>

## Funding

*'[The] developed Parties included in Annex II shall provide new and additional financial resources to meet the agreed full costs incurred by developing country Parties in complying with their obligation under [the Convention].'* (the Convention, Article 4, paragraph 3)

Annex II Parties to the Convention are obliged to provide financial assistance to the developing countries. In order to assist the developing country Parties, and, in particular, the least-developed countries and small island developing states, new and additional funds should be made available. Funds can be provided through multilateral channels or as development assistance.

### 3.1.5 Commitments under the Copenhagen Agreement

*[Comment on future process: incorporate Copenhagen agreement in a similar manner. The Bali Action Plan highlights mitigation, adaptation, technology development and transfer, and finance and investment as key areas.]*

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<sup>35</sup> By climatology we mean an interdisciplinary science that includes atmospheric science, oceanography, geophysics, geography, glaciology and others.

<sup>36</sup> This is also in line with the message of the UNFCCC, *Uniting on climate*: Common concerns about the knowledge of climate change include the need to increase developed countries' participation in climate observation networks in developing countries, and the deterioration of climate observation systems in many regions.

## **3.2 Criteria for good governance**

In this section, we introduce relevant aspects of good governance that can serve as norms and standards when auditing *national* governance in the climate change field.<sup>37</sup> The presentation of such criteria will include examples of both adaptation and mitigation.

We will concentrate on general processes and systems that contribute to good governance and thereby the achievement of the climate change targets. These principles are relevant evaluation tools when auditing mitigation and adaptation issues, as shown in Steps 3 and 4 in Chapters 4 and 5.

### **3.2.1 Effective accountability arrangements between government departments and public entities**

Climate change policy involves a wide range of sectors, and there is considerable potential for conflicting objectives and targets. It is very important, therefore, to coordinate efforts in order to ensure that the policy as a whole is effective. One possible audit criterion is whether the government has organised its work on climate change in a way that will meet this challenge. Firstly, the government must have a good overview of the parties and agencies involved, and a clear and documented responsibility map. Procedures for coordination must be documented and a forum for intersectoral work established. Secondly, the efforts of the different sectors and players must be complementary, not conflicting. This means that there must be coordination in practice, not just on paper. There are many risks to the success of such coordination, for instance if the body responsible for reaching the targets does not have the authority to apply central policy instruments. However, the optimal way of coordinating the efforts will vary with different climate change issues, the political structure etc.

### **3.2.2 Transparency in decision-making**

Transparency in decision-making is important, as it will probably lead to an open process. If a policy is discussed, decisions will be better, and transparency makes it possible to check that the government complies with laws and keeps the public interest in mind. A lack of transparency carries a risk of fraud and corruption, especially in connection with the use of flexible mechanisms.<sup>38</sup>

### **3.2.3 Involving the public and engaging stakeholders**

To succeed in climate change policy, it is necessary to involve the groups that have relevant knowledge and those that will be affected when the politics are implemented.<sup>39</sup> Effective communication with external parties is also important.<sup>40</sup>

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<sup>37</sup> See ISSAI 3000 for more information about performance auditing and governance.

<sup>38</sup> The UNFCCC has discussed transparency in information reported to it, see <http://unfccc.int/resource/docs/2006/idr/nor04.pdf>.

<sup>39</sup> See more about engaging stakeholders in UNDP (2004) 'Adaptation Policy Frameworks for Climate Change: Developing Strategies, Policies and Measures'. Cambridge University Press.

### **3.2.4 Management by objectives and results**

If your country has international or national targets for mitigation, adaptation or science and technology, the attainment of these targets will often depend on implementation by central, regional and local government. This is especially important in the context of climate change because the issue is so complex, and because there are many interlinked players and different sectors. The parliament may have set requirements for the government administration that require it to manage by objectives and results. According to such principles of governance, the government should:<sup>41</sup>

#### **Define objectives and expected results.**

The ministry in charge of climate change policy must clearly communicate what is expected of each of the subordinate government agencies and other ministries involved. This means that the overall objectives and targets must be operationalised in all sectors and at all levels. Targets should be specific, measurable, attainable, relevant and time-bound (SMART).<sup>42</sup> National objectives, sector targets and indicators should be clearly communicated to all relevant public bodies and other existing levels of government and/or administration. This may include intra-state treaties that divide up targets and assign duties and responsibilities.

#### **Develop implementation strategies**

The government should ensure that objectives and expected results are achieved, that the resources are used effectively and that the entity is in compliance with laws, regulations and standards. The authorities must develop plans and programmes to describe their obligations and targets, what risks they consider to be involved in achieving them, and the actions needed to ensure that they will meet their commitments. The authorities must also identify activities and implement them. The identified activities should be considered necessary to minimise the relevant risks and suitable for the purpose, which means that cost-benefit analyses are required. The ministry in charge must follow up the other bodies in order to achieve the overall target.

#### **Provide the information needed to assess efficiency and goal achievement**

The government should provide the information necessary for effective decision-making. Relevant and reliable information is equally important in the planning stage before implementing climate change policies and in evaluating the cost-effectiveness of the policy instruments chosen.

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<sup>40</sup> From INTOSAI GOV 9100 Guidelines for Internal Control Standards for the Public Sector: 38. See also The Århus Convention on access to Information, Public Involvement in Decision-making and Access to Justice in Environmental matters, <http://www.env.cz/www/env.nsf/83e9f45c11caa9d58525647300561fe6/75152a1bb1257c2cc1256904004257ef?OpenDocument>

<sup>41</sup>The items are based on the Norwegian Regulations on Financial Management in Central Government, Section 4

<sup>42</sup> [http://en.wikipedia.org/wiki/SMART\\_\(project\\_management\)](http://en.wikipedia.org/wiki/SMART_(project_management)).

It should monitor performance to find out whether changes are needed in order to reach the overall target. Monitoring and reporting are established as commitments under the Convention and the Protocol (see Section 3.1.2). The results from the national communications to the UNFCCC secretariat should be used by governments to improve policies, and they should be made available to the public in order to improve transparency.<sup>43</sup>

Collecting information should be an ongoing process that follows effective procedures. The information should be: appropriate (is the required information there?), timely (is it there when required?), current (is the latest information available?), accurate (is it correct?) and accessible (can it be obtained easily by the relevant parties?).<sup>44</sup>

### **Governmental risk management**

In risk management, risks can be defined as 'the chance of something happening that will impact on objectives'. Risk management aims to achieve an appropriate balance between realising opportunities for gains while minimising losses. It is an integral part of good management practice and an essential element of good corporate governance. Risk-based management is an ongoing process that should be renewed and updated frequently.

In climate policy, there is a risk of not attaining the targets and there is a risk of inefficient use of money. It is also relevant to reduce the risk of corruption and fraud.

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<sup>43</sup> The reports are available on the UNFCCC webpage, [http://unfccc.int/national\\_reports/items/1408.php](http://unfccc.int/national_reports/items/1408.php).

<sup>44</sup> From INTOSAI GOV 9100 Guidelines for Internal Control Standards for the Public Sector: 36-38.

### 3.2.5 Criteria for good management: internal control systems

An internal control system is a management tool used by entities to control and initiate activities with a view to reaching their goals. All entities involved, both governmental bodies and private partners – for instance companies buying or selling emission allowances – could have an internal control system.

An internal control system in itself is no guarantee of reaching the goal. Well defined *targets* and an efficient *organisational structure* are very important preconditions for an efficient internal control system. When they are in place, the internal control system can contribute by making sure the system works as intended.

The set of audit criteria for internal control systems is based on an INTOSAI model.<sup>45</sup> The model has five components:

#### 1. Control environment

Among other components, the organisational structures, authority, responsibility and human resources have to fit the challenges involved in managing the risks. We discussed this briefly under good governance.

#### 2. Risk assessment

- *Identifying the entities' objectives and targets*
- *Identifying risks*  
External and internal factors that could impact on the achievement of the objectives and targets.
- *Consider and prioritise among the risks*  
Priority-setting in accordance with their graveness and how they will impact on the objectives and target achievement.

#### 3. Control activities

Control activities are established to address risks and to achieve the entity's objectives. They include a wide range of activities, such as authorisation and approval procedures, segregation of duties, controls of access to resources and records, reviews of operations and so on. Corrective actions can complement control activities, and both detective and preventive control activities are necessary.

#### 4. Information and communication

Information about performance in relation to the management of established risks must be communicated in order to provide feedback by reconsidering risk management.

#### 5. Monitoring

The ongoing monitoring process is a system to assess whether the implemented activities lead to the entities' defined objectives.

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<sup>45</sup> INTOSAI GOV 9100 *Guidelines for Internal Control Standards for the Public Sector* and INTOSAI GOV 9120: *Internal Control: Providing a Foundation for Accountability in Government*.

## Chapter 4: How to plan climate change audits - an introduction

The approach we present in this chapter can help SAIs to carry out relevant audits of climate change policies and thus contribute to better governance. This chapter will focus on useful input in the planning stage in connection with scoping and designing audits.

Auditing climate change policy encompasses the full range of external governmental auditing: financial, compliance and performance audits.<sup>46</sup> This chapter will cover audit approaches that are relevant to all kind of audits.

An SAI may choose to conduct both mitigation and adaptation audits. Each SAI must consider the relevance of both topics. We have chosen to present the adaptation and mitigation audit approaches in different chapters because there are important differences in the way governments handle the threats and, consequently, differences in what audit approaches will be appropriate. One audit could cover certain elements from both, for instance by considering climate change mitigation and adaptation funding or synergies and conflicts between national mitigation and adaptation policies. For reasons of time and span-of-control, separate mitigation and adaptation audits might be preferable, however.

In the following, we will introduce a four-step process as a way of identifying relevant audit topics and designing audits concerning climate change. Thereafter, mitigation and adaptation will be divided into two chapters. Both chapters will be based on the steps described below.

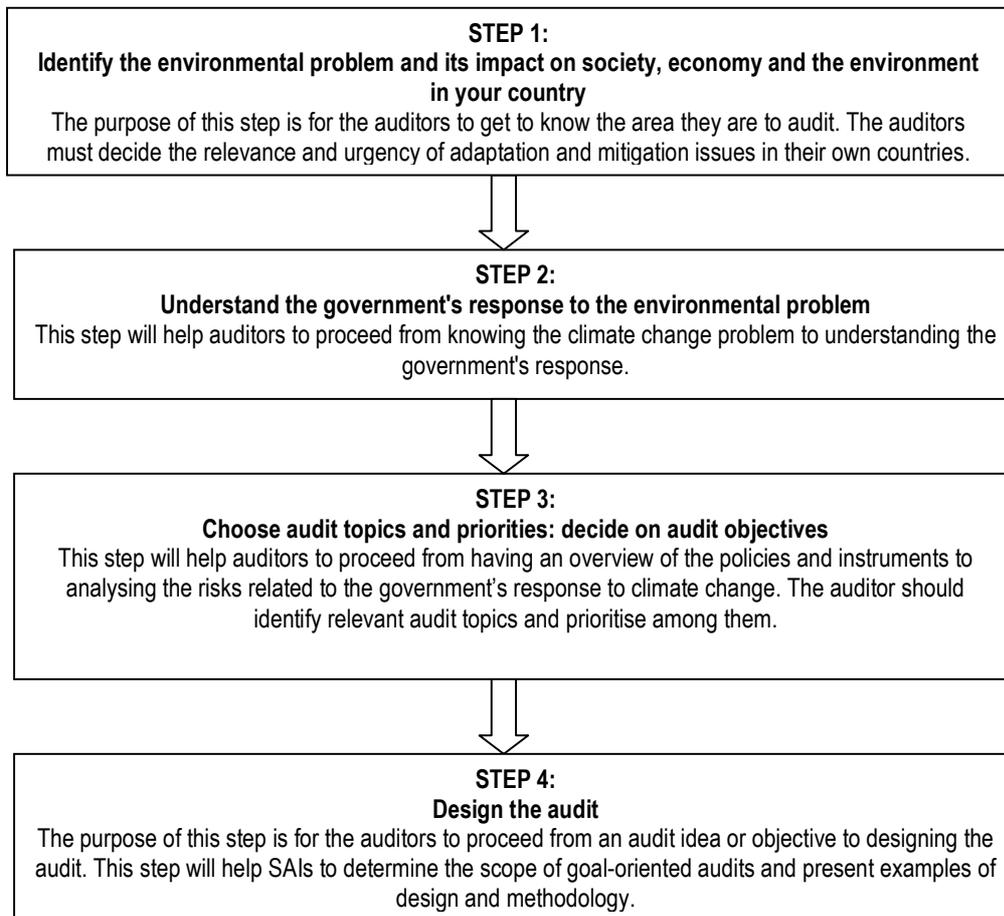
### **4.1 The four-step process**

A step-by-step process will be used to describe different actions and considerations that may be relevant during the process of planning and designing relevant climate change audits. The main purpose of Steps 1 and 2 is to collect sufficient information about environmental threats, and the governmental response to those threats, to identify relevant risks and decide upon relevant audit objectives in Step 3, and thereby design climate change audits in Step 4. The four steps are illustrated in Figure 4.1.

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<sup>46</sup> INTOSAI WGEA, *Guidance on Conducting Audits of Activities with an Environmental Perspective* (2001): INTOSAI.

Figure 4.1: The four step approach to designing climate change audits



All four steps are often included in the planning stage of an audit, but they are not always carried out explicitly due to a number of factors:

- Depending on knowledge about climate change, identifying the climate change threats and the governmental response in Steps 1 and 2 may be straightforward; if the auditors are unfamiliar with climate change policy, it may require more thorough consideration.
- Time and access to internal and external resources will influence how much and what kind of information it is possible for the auditor to gather in the planning stage.
- Whether the SAI has the mandate and authority to conduct the audit, and thereby what kind of information it is relevant to consider in the planning stage.
- The four-step process is not necessarily sequential, and the steps may overlap. For example, when scoping audits, it may be necessary to gather supplementary information on identified risk areas.

## **4.2 Introduction to Steps 1 and 2**

It may be necessary to carry out Step 1 in order to understand the climate change problems in your country, both concerning GHG emissions and your country's vulnerability to climate change. When planning mitigation audits, the most essential information is about GHG emissions. When planning adaptation audits, long and short-term effects on the environment, economy and society should be identified. Chapter 2 deals with emissions and vulnerability at the global level. In this step, we will relate the general knowledge to the specific national, regional and/or local environmental challenges and policy response:

- Mapping especially relevant or vulnerable sectors
- Understanding the causes of the environmental problem

Step 2 consists of describing the governmental response to climate change threats and problems. The response, relevant players and policy instruments will be identified in this step:

- What is the government doing about the environmental problem and its impacts?
- Which are the responsible key public bodies?
- What are the key policies and instruments the government uses?

Note that the information required in Steps 1 and 2 should be limited to identifying risks and audit criteria in the planning stage. The information and standard of audit evidence required when carrying out the audit are different and more extensive. In order to address the government's responsibility and limit the time spent gathering information, the main source of information should be the government, but also private enterprises and NGOs may have important data.

## **4.3 Introduction to Step 3**

When choosing and prioritising between climate change topics, SAIs could consider how their audits will contribute to better governance and financial statements (added value) and whether the topic is auditable, and identify risk areas by auditing the effectiveness, efficiency and economy of climate change policies.

### **How to carry out risk assessments**

Risk assessment is a planning tool to identify the most important topics before designing the audit. An effective way of doing this is to identify areas where there is a potential for improvement at the management level by focusing on areas prone to risk. Risk analyses can be defined and conducted in different ways in performance, compliance and financial auditing.<sup>47</sup> The greater the negative consequences relating to the risk, the more consideration should be given to the problem.

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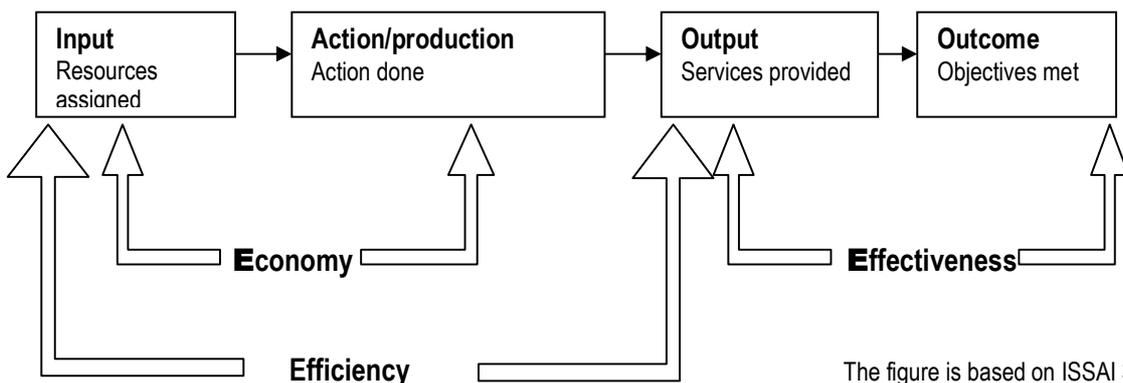
<sup>47</sup> In the performance auditing context, the ISSAI 3000 states that strategic planning 'is the basis for the selection of audit topics' and furthermore that strategic planning 'may be based on risk analysis'.

We will relate the risk assessments to the Economy, Efficiency and Effectiveness of programmes or governmental action.<sup>48</sup>

- *Effectiveness* deals with considerations of goal attainment: are the right things being done? When auditing effectiveness, side-effects are also relevant – considering unintended consequences of the policies in place. Risks related to effectiveness can be approached in two ways:
  - Whether the policy objectives and targets have been achieved.
  - Whether this can be attributed to the policy pursued.
- *Efficiency* is about getting the most or best out of the available resources, thus ensuring that results are achieved, whether things are being done in the right way. Relevant risk assessments:
  - Considering whether systems are in place to meet emission targets (good governance systems are described in Chapter 3)
  - The extent to which the organisational structure is suited to climate change policies
  - Whether human resources are capable of tackling the challenges of managing climate change policies.
- *Economy* deals with considerations at the input level, such as minimising the costs of an activity having regard to appropriate quality.<sup>49</sup> Risks related to economy can be connected to increased financial or budgetary spending on governments' climate change programmes.<sup>50</sup>

The relationship between the three Es and risks relating to the government administration and the results or impacts of the government's implementation of policies is illustrated in the following input-output model (Figure 4.2). We will base Step 3 in the following chapters on this model.

Figure 4.2: Input-output model with the three Es



The figure is based on ISSAI 3000

<sup>48</sup> ISSAI 3000, Standards and guidelines for performance auditing based on INTOSAI's Auditing Standard and practical experience.

<sup>49</sup> ISSAI 3000, Standards and guidelines for performance auditing based on INTOSAI's Auditing Standard and practical experience.

<sup>50</sup> It may be difficult to separate economy and efficiency from each other, for instance, when considering whether a system of management controls is in place or whether procurement practices are followed.

The main features of the model are:

- Internal resources are allocated as *input* for the fulfilment of the commitments (objectives and targets).
- Activities (policy instruments and internal processes) are presented as *action/production*.
- *Output* is the amount of goods and services produced by the government, such as building a barrage to prevent coastal flooding or the introduction of subsidies to support environmentally friendly behaviour.
- The *outcome* consists of more wide-ranging considerations of whether the results (intended and unintended consequences) are in line with overall objectives and targets.

We will include risk considerations that are relevant to compliance, financial and performance auditing. Financial risk assessments are relevant in the economy and efficiency context when auditing the financial statements. Financial, compliance and performance risk assessments consider economy and efficiency by monitoring governance systems that may impact on goal achievement. Compliance and performance audits also include effectiveness by assessing risks relating to the outcome of governance and policies implemented.<sup>51</sup>

#### Example 4.1: Risk assessment and audit objective identified in the planning stage

Norway has conducted an adaptation audit on flooding and landslides. The following risks were identified in the planning stage:

- Efficiency:
  - Risk that flooding and landslide risks have not been sufficiently mapped in several municipalities.
  - That knowledge is not passed on to those who need it.
  - Indications that the municipalities do not make sufficient use of the available knowledge.
  - Fragmentation of responsibility – too many parties involved.
  - Various weaknesses in the ministries' control and the directorate's management.
  - The county governors' follow-up of municipalities is inadequate, particularly of municipalities with small resources
  - Not all municipalities have updated risk and vulnerability plans. Even fewer have risk and vulnerability plans that include flood and landslide risk
- Effectiveness:
  - National goals are not sufficiently followed up in the municipalities due to conflicting goals and lack of resources.
  - Possible areas the directorate has registered as risk areas that have not been secured.
  - Building takes place in landslide and flood risk areas without the necessary security measures being in place.

Based on these risks, the audit objective was defined:

*The purpose of the investigation is to find out the extent to which the government administration complies with the decisions and requirements of the national parliament in its efforts to limit the risk of floods and landslides.*

The auditor can find an extract of the design matrix of this audit in Appendix 9.7.

The main output in Step 3 is to prioritise among the identified risks and thereby define the audit objective. Certain considerations are recommended when prioritising among the identified risk areas, such as (1) Are the risks most crucial at the overall governance level, at the sector level or at both levels? (2) Do the risks involved in the use of a policy instrument relate to its effectiveness, efficiency and/or economy? (3) And to

<sup>51</sup> To audit the government operations, see also 'Best practices Methodology,' <http://www.gao.gov/archive/1995/ns95154.pdf>

what extent will the planned audit add value?<sup>52</sup> The final considerations in this step can result in a summing up of the risk areas and defining what the auditor will achieve by conducting the audit (audit objective).

The use of the three Es in this guide is a way of structuring the risk assessments in this step. As illustrated in figure 4.2, both Economy and Efficiency have a strong impact on Effectiveness. If weaknesses in governance and/or failings in procedures are identified, this could have a detrimental effect on the outcome of policies and thereby on overall goal achievement. Such risks may be the causes of a country failing to meet its international commitments and/or achieve its national targets. In order to contribute to better management, these interconnections should be reflected when designing the audit in Step 4.

#### **4.4 Introduction to Step 4**

After having prioritised among audit topics, the auditor will have identified the most relevant topics and objectives suitable for an audit. The main purpose of Step 4 is to assist the auditor in designing the audit by providing ideas and examples.<sup>53</sup> Audit perspectives that are relevant to financial, compliance and performance auditing will be implemented in this step.

When designing the audit in this step, it may be useful to also consider the feasibility of carrying out the audit, especially concerning available audit criteria, information and audit evidence.<sup>54</sup>

We will use a matrix to illustrate different ways of designing climate change audits. The design matrix has different functions:

- A planning tool to support identification of the most relevant and feasible audit design
- A communication tool to describe the design to the board of the SAI, the government or others
- An efficiency tool to encourage systematic data collection and analysis
- An effectiveness tool to ensure the connection between the expected audit findings (what the audit will enable the SAI to communicate), the criteria for and the design of the audit (researchable questions and methodology).

The design matrix may help to define the audit objectives, researchable questions, audit criteria, audit evidence, methods of collecting audit evidence, expected audit findings (risk areas) and implementation risk (see Table 4.1). We will describe examples covering the four first columns in step four, but we recommend developing a full-scale matrix during the planning stage. Two examples of different full-scale design matrixes are enclosed.

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<sup>52</sup> See also appendix 1

<sup>53</sup> To address the logic of program evaluation designs in general, see <http://www.gao.gov/special.pubs/pe1014.pdf>

<sup>54</sup> See also Appendix 1

Table 4.1: A design matrix scheme

WHAT				HOW	FEASIBILITY	
<b>Audit objective</b>	<b>Audit question</b>	<b>Audit criteria</b>	<b>Audit evidence</b>	<b>Method</b>	<b>Risk areas</b>	<b>Implementation risk</b>
<b>What do we wish to achieve through the audit?</b>	<b>What do we wish to find out?</b>	<b>What yardstick will be used?</b>	<b>What information do we need?</b>	<b>Where are the data and how will they be collected and analysed?</b>	<b>What conclusions can we draw?</b>	<b>Professional uncertainty in the design and project plan?</b>
→		→		→		→

The complexity of climate change issues makes the design matrix even more useful when planning climate change audits. The matrix illustrated in this guide is based on those developed in the WGEA Global Cooperation Project on Climate Change and the coordinated parallel Eurosa Audit of Climate Change. Note that more tailored matrixes are needed when conducting national audits in order to address and adapt the audit to the identified risks and national constraints.

In addition to different design matrixes, we will illustrate different audit approaches by describing relevant audits already conducted in this field. We will also describe relevant audit methodologies that can be used to collect audit evidence.

## Chapter 5: How to plan mitigation audits

This part describes issues that are relevant in designing mitigation audits. Forestry, energy, sustainable energy, sustainable development and waste management are topics that are described in depth in other guides. In this guide, we will relate these issues to climate change with reference to the other guides when relevant.

The structure will follow the steps described in Chapter 4:

1. *Identify the emissions in your country*
2. *Understand the government's response to the environmental problem*
3. *Choose audit topics and priorities: decide on audit objectives*
4. *Design the audit*

### **5.1 Step 1: Identify the emissions in your country**

The main objective of this step is to identify past, present and future GHG emissions in your country, and how the emissions break down by sector. This information is needed in order to consider whether the government will meet its emission targets.

An emission inventory covering the relevant years is necessary in order to determine the risks in Step 3 and assess whether the authorities will meet their targets in the short and long term. The key questions in this step are most relevant in relation to compliance and performance audits that consider the relevance of GHG emissions and the attainment of GHG targets. For financial auditors, it is probably more useful to go straight to Step 2.

#### **5.1.1 Key question: What are the overall trends and projections for greenhouse gas emissions in your country?**

The government is responsible for producing GHG inventories of emissions and removals. The government is therefore the most natural place to search for information. If your country is an Annex I party, it is committed to reporting annually on its GHG inventory to the UNFCCC. National communications from non-Annex parties also include inventory reporting (see Section 3.1.2).

The auditor may find that up to date data for actual emissions are not available. The most recent data may be from two years ago. This makes it necessary to estimate developments with the help of indicators (e.g. traffic growth).

Specialists can assist the auditor in deciding whether the data are reliable.<sup>55</sup> If there is a lack of data or there is doubt concerning the reliability of the data, that is an audit finding. Depending on the desired output

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<sup>55</sup> The Annex 1 country reports are subject to review by the UNFCCC. This process is described in Chapter 3.

of the audit and the extent of your audits, the auditor may consider asking specialists to obtain more reliable data for use in the audit report.

In addition to identifying past overall national emissions and removals (in carbon dioxide equivalents), projections are very valuable when considering the expected short and long-term development of emissions.<sup>56</sup> The IPCC describes different external factors (including the use of technology) that influence GHG emissions and ways of assessing scenarios. If reliable national scenarios are not available, the SAI may consider contacting specialists.

### 5.1.2 Key question: What are the main sources of GHG emissions in your country?

Emissions by source can identify the different sectors' contribution to greenhouse gas emissions. As sinks of atmospheric carbon dioxide, forests are of great importance in terms of reducing the growth in global CO<sub>2</sub> concentrations. The Convention considers removals by sinks in each country as part of their GHG inventory, while special accounting rules have been established for the Kyoto protocol.

The sector contributions to GHG emissions are described in Figure 2.6.<sup>57</sup> Detailed definitions and a classification of different sources are provided in the IPCC's reporting guidelines as adopted by UNFCCC.<sup>58</sup> Examples of different types of sources and sinks are listed in Table 5.1. See also figure 2.6.

**Table 5.1: Carbon dioxide equivalents by sources**

Source	CO <sub>2</sub> -equivalents Base year	CO <sub>2</sub> -equivalents Present	CO <sub>2</sub> -equivalents Short term	CO <sub>2</sub> -equivalents Long term
Energy production				
Transport				
Buildings				
Industry				
Agriculture				
Forestry*				
Waste				
<i>Total GHG emissions</i>				

\* Forests have a major role in climate change policy: they have the potential to absorb about one-tenth of global carbon emissions projected for the first half of this century into their biomass, soils and products, and

<sup>56</sup> Not all SAIs have a mandate to conduct prospective audits.

<sup>57</sup> The sector contributions to GHG emissions are fully described in separate chapters in the IPCC fourth assessment report, see <http://www.ipcc.ch/ipccreports/ar4-wg3.htm>. Note that shipping and aviation are not included in national totals pursuant to the inventory guidelines, but are reported separately as a memo item. Auditing mitigation in these sectors may not be included in the SAI's audit mandate.

<sup>58</sup> See <http://www.ipcc.ch/ipccreports/methodology-reports.htm>, [http://unfccc.int/national\\_reports/annex\\_i\\_ghg\\_inventories/items/2715.php](http://unfccc.int/national_reports/annex_i_ghg_inventories/items/2715.php) and [http://unfccc.int/national\\_reports/non-annex\\_i\\_natcom/items/2716.php](http://unfccc.int/national_reports/non-annex_i_natcom/items/2716.php).

store them. When cleared, overused or degraded, they contribute to about one-sixth of global carbon emissions. Therefore, the net growth or decrease in national forest reserves corresponds to a negative or positive contribution to GHG emissions (sinks are also described in 2.3.2 on page 24).

**Box 5.1: Relevant sectors that influence mitigation policies described in other INTOSAI guides**

- A country's forest management is relevant when considering how it manages land use change and forest conservation. In addition, sink policy may be considered in national plans and objectives relating to climate change mitigation and adaptation. The INTOSAI guide covers .....See: [www.....](#)
- Annual total greenhouse gas emissions from the global energy supply sector are still increasing, mainly from the combustion of fossil fuels. Demand for heat, electricity and transport fuels is increasing. The authorities are advocating energy saving and the production of renewable energy, although the production of biofuels is controversial. The INTOSAI guide covers .....See: [www.....](#)
- Post-consumer waste contributes less than five percent of global GHG-emissions. The largest source is landfill methane. However, there are large uncertainties about emissions from the waste sector. National audits in this field could contribute to more consistent and adequate inventory and monitoring systems and more climate-friendly waste management practises. The INTOSAI guide *Towards Auditing Waste Management* covers all aspects of the waste stream and relevant public bodies. The INTOSAI website also covers relevant topics in this field, see [http://www.environmental-auditing.org/intosai/wgea.nsf/viewhtml/waste\\_0main.htm](http://www.environmental-auditing.org/intosai/wgea.nsf/viewhtml/waste_0main.htm)

## **5.2 Step 2: Understand the governmental response in your country**

The auditor must map the territory in order to understand the government's response to climate change and identify possible risks associated with its actions.

A broad approach covering all sectors is convenient and useful as a starting point if your audit office is unfamiliar with climate change audits and the sectors involved. Extensive planning may lead to the discovery of several risk areas and thereby several concurrent audits.

Nevertheless, focusing on sectors could be a useful approach if risks are associated with a particular sector. To reduce the extent of the audit planning stage, the auditor can identify the most relevant sector or sectors and register sector targets and management in this step.

To collect the information needed to understand the governmental response, the auditor could answer several key questions:

1. *Does your country have international mitigation commitments?*
2. *What are the national targets for mitigating GHG emissions in your country?*
3. *Which are the relevant responsible public bodies, and what are their roles and responsibilities concerning the reduction of GHG emissions?*
4. *What are the key policy instruments for reducing GHG emissions?*

### **Box 5.2: Sources of information**

- National documents
- Interviews with key players and experts
- IPPCC, Fourth Assessment Report, Chapter 13 <http://www.ipcc.ch/pdf/assessment-report/ar4/wg3/ar4-wg3-chapter13.pdf>
- National reporting to the UNFCCC: [http://unfccc.int/national\\_reports/items/1408.php](http://unfccc.int/national_reports/items/1408.php)

### 5.2.1 Key question: Does your country have international mitigation commitments?

In order to audit compliance with international commitments concerning mitigation, the first task is to identify what the commitments are for the country in question. The emission commitments are described in Section 3.1.1, and can be summarised as follows:

- The UNFCCC states that the objective is to achieve stabilisation of greenhouse gas concentrations at a level that would prevent dangerous anthropogenic interference with the climate system.
- The Kyoto Protocol commits most developed countries to reducing or stabilising their GHG emissions at certain levels during the period 2008 to 2012.
- The European Union is committed as a whole, and it also commits every member state to mitigate its emissions in relation to the EU commitment (see the example below and Table 3.2)

#### Example 5.1: EU emission targets

The European Union (EU) is a separate Party to the Kyoto Protocol, with a separate emissions reduction target of eight per cent from the 1990 emission level. In 2003, the then 15 countries of the Union redistributed their targets (see Table 3.2). The targets are approved by the European council. The new country quotas vary from reductions of more than 20 per cent to increases of 27 per cent.

#### **The '20x3' 2020 package**

EU climate change policy is based on the objective of limiting the temperature rise to two degrees above levels in the pre-industrial era. In order to operationalise this target, the European Commission has presented a climate change and renewable energy policy package. The '3x20' heading refers to a call to achieve the following targets by 2020:

- a 20% increase in energy efficiency
- a 20% reduction in GHG emissions (which could be changed to 30%, depending on the outcome of international negotiations for a post-Kyoto agreement)
- a 20% share for renewables in overall EU energy consumption

In addition, the Commission expressed its intention to increase the proportion of biofuels in vehicle fuels to 10 per cent.

### 5.2.2 Key question: What are the national targets for mitigating GHG emissions in your country?

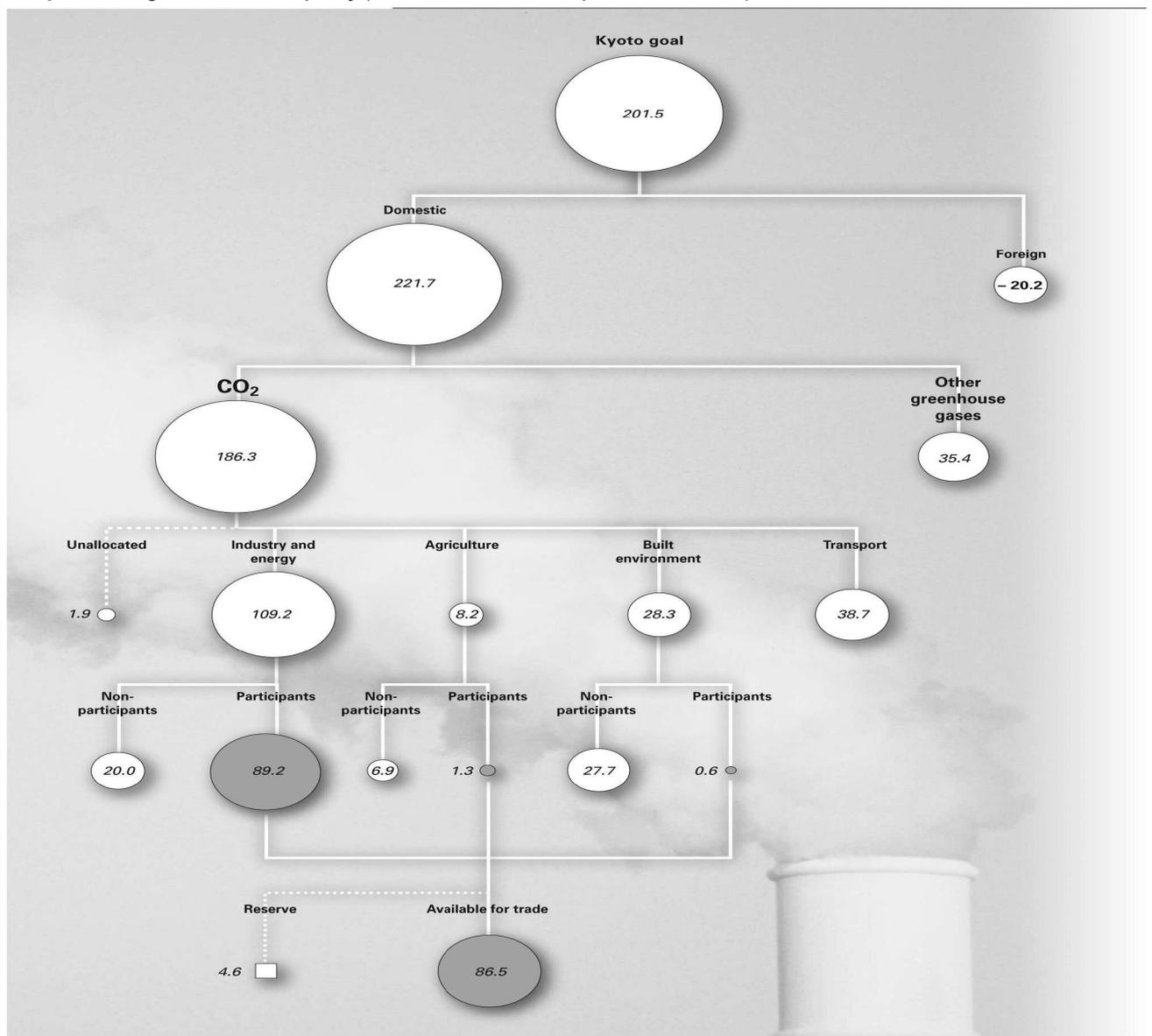
In order to consider compliance with mitigation objectives and targets, auditors must also identify relevant emission targets in their countries. National targets for reducing GHG emissions may meet the international commitments, and in some countries the national targets are even stricter. Targets covering both short and long-term emissions should be considered, although a full audit of long-term targets may be difficult.

Are the targets divided into relevant sectors? According to the principles of good governance, the target should be divided into operational, quantified targets for each sector (see Section 3.2). Note that your

country may also have other targets that influence GHG emissions, such as energy saving, the use of biofuels, forest management policies and waste management. It is also valuable to identify conflicting targets.

The SAI of the Netherlands audited the European trading scheme and its implementation in the Netherlands. Its report was published in 2006. The Government had defined separate concrete emission targets for all relevant sectors, which were applicable as criteria in compliance auditing (see Example 5.2).

**Example 5.2: Targets of the Dutch policy (in million tonnes CO<sub>2</sub> equivalents for 2010).**



Source: *The SAI of Netherlands: The ETS and its implementation in the Netherlands (2006)*

### **5.2.3 Key question: Which are the relevant responsible public bodies, and what are their roles and responsibilities?**

In Step 1, sector contributions to GHG emissions were mapped. In this key question, the auditor may want to map actions aimed at reducing these emissions, including mapping key players and their roles and responsibilities.

The way a government chooses to organise its administration may strongly affect its efficiency and effectiveness in relation to mitigating climate change. The auditor must understand the roles and responsibilities of public bodies in order to identify risks, ask relevant audit questions and address audit findings. If the auditor struggles to understand the roles and responsibilities, the government's response to climate change may be unclear. This may contribute to inefficiency and lead to a failure to achieve targets, and it could be an audit finding in itself.

In some countries, overall responsibility and the relevant policy tools rest with one ministry. In other countries, responsibility for meeting overall international commitments and national emission targets rests with the environmental or climate ministry, while other ministries are responsible for targets and policy tools within their sectors, for instance the ministry of agriculture.

The reduction of GHG emissions may also involve different political levels, such as local and national government. The roles and responsibilities relating to achieving targets may also be divided between several regions within a country, and the methods of reducing GHG emissions may differ between regions.

### **5.2.4 Key question: What are the key policy instruments for reducing GHG emissions?**

Policy instruments include both governmental instruments aimed at ensuring effective management and goal achievement, and policy tools and instruments aimed at triggering action to limit climate change.

The principles of good governance are described in Section 3.2. This description can be used as a standard of comparison in order to identify whether the administration has put in place systems to develop, assess and implement policies to achieve national targets and international commitments.

Section 3.1.1 describes policy instruments that must be put into effect by Annex II parties in particular (develop and transfer technology, and provide financial assistance to the developing countries) and special international policy instruments at their disposal (flexible mechanisms).

The flexible mechanisms are supplementary to national instruments aimed at achieving national mitigation targets. Examples of national policy instruments implemented to directly control GHG emissions are listed in Table 5.2 below.<sup>59</sup> Note that other instruments may indirectly result in GHG emissions.<sup>60</sup>

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<sup>59</sup> See a more detailed description in <http://www.ipcc.ch/pdf/assessment-report/ar4/wg3/ar4-wg3-chapter13.pdf>, page 750.

<sup>60</sup> Some of those instruments are described in other INTOSAI guides, see ...

Relevant policy instrument information could be identified in national strategies and plans, National Communications or reports on Demonstrable Progress under the Kyoto Protocol communicated to the UNFCCC.

**Table 5.2: Selected national mitigation policy instruments**

<b>Regulation and standards</b>	These instruments specify the abatement technologies (technology standard) or minimum requirements for pollution output (performance standard) that are necessary to reduce emissions. They include legislation, building codes, abatement technology and minimum requirements for pollution output.
<b>Subsidies and incentives</b>	Direct payments, tax reductions, price support or equivalent from a government to an entity for implementing a practice or performing a specified action.
<b>Taxes and charges</b>	A levy imposed on each unit of undesirable activity by a source.
<b>Tradable permits</b>	This instrument establishes a limit on aggregate emissions by specified sources, requires each source to hold permits equal to its actual emissions and allows permits to be traded among sources. Includes national and international emissions trading.
<b>Voluntary agreements</b>	An agreement between a government authority and one or more private parties with the aim of achieving environmental objectives or improving environmental performance over and above compliance with regulated obligations. Not all agreements are truly voluntary; some include rewards and/or penalties associated with participating in the agreement or achieving the commitments.
<b>Information policies</b>	Required public disclosure of environment-related information in general by industry to consumers. They include labelling programmes and rating and certification systems. Includes education, public information and training.
<b>Research and development</b>	Activities that involve direct government funding and investment aimed at generating innovative approaches to mitigation and/or the physical and social infrastructure to reduce emissions. Examples include prizes and incentives for technological advances. Includes the development and use of new mitigation technology.
<b>Non-climate policies</b>	Other policies not specifically directed at emissions reduction but which may have significant climate-related effects.

*Source: The fourth assessment report, IPCC, chapter 13, box 13.1*

To obtain a good overview, it is useful to map key policy instruments implemented by the authorities within each sector identified in Step 1. The instruments should be those that aim to meet the national emission targets.<sup>61</sup>

Some authorities have also defined outputs from each policy instrument and their contribution to expected emission reductions. If available, such information may be of use in Step 3 if the auditor wishes to consider the relevance of each policy instrument and identify the extent to which the instruments used have contributed to the achievement of the policy targets and expected results.

Example 5.3 below describes a possible way of identifying policy tools within a sector and how each policy instrument is planned to impact on GHG emission reductions. Example 5.4 describes different climate change policies in the European Union.

<sup>61</sup> Selected sectors are already identified in Step 1.

**Example 5.3: The principal policy instruments for transport equivalent in UK**

Key policy instruments	Planned impact	Latest projections: emission reductions
	in million tonnes carbon equivalent (MtCe) in 2010	in million tonnes carbon equivalent (MtCe)
<b>Renewable Transport Fuels Obligation</b>	1.6 MtCe by 2010	1.6 <sub>2</sub>
<b>Voluntary Agreement Package</b>	1.0 – 2.5 MtCe in 2010	2.3
<b>Of which, Company Car Tax</b>	1 MtCe pa by 2010	0.5
<b>Future Voluntary Agreement</b>		– 0.1
<b>Fuel Duty Escalator</b>	3.2 – 4.0 MtCe in 2010	1.9
<b>Sustainable distribution (Scotland)</b>		– 0.1
<b>Wider transport measures</b>	0.1 MtCe in 2010	0.8

Source: 'Climate change: options for scrutiny', NAO 2006 (Defra (2006) Synthesis of climate change policy evaluations), see [http://www.nao.org.uk/publications/nao\\_reports/05-06/climate\\_change.pdf](http://www.nao.org.uk/publications/nao_reports/05-06/climate_change.pdf)

**Example 5.4: EU climate change policies**

Two elements have been singled out as particularly important in EU climate change policy: the EU emissions trading scheme (ETS) and the renewable energy and climate change package. (For information about the renewable energy programme, see the INTOSAI guide on sustainable energy, www...)

*The EU emissions trading scheme*

Established in 2003, the EU ETS is the world's largest tradable permits programme (IPCC, WGIII, AR4, Ch. 13). It covers almost half of the total EU GHG emissions, Excluded sectors include transport and agriculture. Carbon dioxide is the main GHG included in the scheme (but some operators with N<sub>2</sub>O emissions are included).

Emission allowances are the main 'currency' of the scheme. These allowances are issued to operators by national governments or sold. In addition, credits from JI or CDM projects can be bought and sold in the scheme.

The distribution of allowances is decided in National Allocation Plans (NAPs). NAPs are developed by EU member states. Allowances are distributed to sectors and installations.

EU member states report both to the UNFCCC secretariat and to the European Commission (EC). Since the EU is a separate Party to the UNFCCC and the Kyoto Protocol, the EC must prepare a separate EU GHG inventory to be sent to the UNFCCC secretariat. In addition, member states must report GHG projections to the EC.

### **5.3 Step 3: Choose audit topics and priorities**

In this step, the auditor should choose and prioritise between different mitigation topics by analysing the information gathered in Steps 1 and 2.

The auditor could answer the following key questions in order to analyse the risk and decide on relevant topics and audit objectives:

1. *Effectiveness – are the right things being done to achieve objectives and targets?*
2. *Efficiency – are things being done in the right way?*
3. *Economy – does the government focus on keeping the costs low?*
4. *What risks should be prioritised in an audit? Define the audit objective.*

After assessing risks, prioritising among them and defining the audit objective in this step, the auditor should be ready to design the audit in the next step.

As illustrated and described in Chapter 4, economy and efficiency have an impact on effectiveness. Such interconnections could be detected when assessing risks by answering the different key questions in this step. If risks are identified, they may also have an impact on effectiveness. If this is the case, they should be reflected when designing audit questions in Step 4.

#### **5.3.1 Key question: Effectiveness – are the right things being done to achieve objectives and targets?**

When considering effectiveness, it is a precondition that reliable information is available (further discussed in Step 1).

##### **Risk analysis: whether the emission trends and projections are in line with targets**

A natural starting point for considering effectiveness would be whether the national or international objectives and targets are likely to be achieved. Emission trends and projections collected in Step 1 could be compared with international and/or national emission targets identified in Step 2 to consider the probability of the targets not being reached. Such an audit is based on the method for compliance audits, as we look for discrepancies between audit criteria (emission reduction targets) and the outcome (emission trends).

Three preconditions must be met in order to answer this key question and to include this approach in the future audit:<sup>62</sup>

1. The targets must be suitable as audit criteria. The short-term targets are quantified for most of the developed countries in the Kyoto Protocol (see Chapter 3). In addition to international obligations (if any), national targets should be used as audit criteria.<sup>63</sup>
2. The monitoring system must be transparent and reliable. If the country lacks information about its GHG emissions, it will be difficult to assess whether it will achieve its targets.
3. If the government uses flexible mechanisms to fulfil its commitments, it must have specified how emission cuts will break down between emission reductions in the country in question and in other countries.

The risk of emission targets not being met is high if the required emission cuts are high compared with projections, if the cost of making those cuts is high, and if realistic mitigation strategies have not been identified. The projections could be analysed to establish the probability of reaching the targets in a long-term perspective.

### **Risk analysis: whether the policy and instruments lead to the achievement of objectives and targets**

The second risk analysis relates to the results of policies and instruments. In Step 2, relevant policy tools are described as measures for mitigating climate change. In this step, the auditors could identify the risks related to the use of policy tools as a whole and identify risks relating to the most relevant policy tools in their country. The auditor could also investigate whether the observed emission results and trends are the result of other circumstances than policy.

If the emission trends and projections are above national targets or international commitments (detected in key question 3.1), this may be due to weakness in implemented policy instruments. The potential risks could be as follows:

- There are not enough current policy instruments to bring about significant change (in emission rates).
- The key policy instruments (identified in Step 2) do not lead to the intended results or are not focusing on the sectors with the largest emissions or where cuts can most efficiently be made. Note that some sectors could be relatively unreachable by policy tools because the development of new technology is required in order to include them in efforts to reduce GHG gases. Agriculture could serve as an example.
- The government has not implemented policy instruments sufficiently early to reach climate targets (for instance, early action is necessary to meet the 2-degree target according to the IPCC's fourth assessment report).

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<sup>62</sup> If those preconditions are not met, this may be an audit finding in itself as a lack of indicators describing objectives and expected results, see Key question 3.3

<sup>63</sup> If the overall national targets are weaker than the Kyoto targets or if the targets are not quantifiable, this may be an audit finding. In such case, the targets are not suitable when monitoring their own performance.

The government may not utilise the full potential of each policy instruments. Risks are likely if the government has *not* measured the output of key policy instruments or forecasted each measure's contribution to emission reductions.<sup>64</sup>

Poor governance may have serious negative impacts on the efficiency of policy instruments. It may also seriously undermine the effectiveness and outcome of these instruments. Different policy instruments have different inherent risks. In a situation in which policy makers have not decided the level of effect a policy instrument is supposed to have, there are no strong audit criteria, but the auditor could highlight the fact that the climate change policy is not measurable and therefore not goal-oriented. Risks are also likely if the government implements policy instruments before it has evaluated and compared their potential contribution to emission reductions.

More concrete risks could be identified if several instrument-specific preconditions are not met. These preconditions are described as evaluative criteria in the IPCC's fourth assessment report:

- Environmental effectiveness – the extent to which a policy meets its intended environmental objective and targets, or results in positive environmental outcomes.
- Cost-effectiveness – the extent to which the policy can achieve its objectives and targets at the minimum cost to society.
- Normative considerations – the distributional consequences of a policy, which includes dimensions such as fairness and equity.
- Institutional feasibility – the extent to which a policy instrument is likely to be viewed as legitimate, win acceptance, and be adopted and implemented.

Different evaluative criteria concerning relevant national policy instruments are described in Table 5.3.<sup>65</sup>

**Table 5.3: Environmental policy instruments and evaluation criteria**

Instrument	Criteria			
	Environmental effectiveness	Cost-effectiveness	Meets distributional considerations	Institutional feasibility
<b>Regulations and standards</b>	Emission level set directly, though subject to exceptions	Depends on design: uniform application often leads to higher overall compliance costs	Depends on level playing field: small or new players may be at a disadvantage	Depends on technical capacity; popular with regulators in countries with poorly functioning markets
<b>Taxes and charges</b>	Depends on the ability to set taxes at a level that induces behavioural change	Better with broad participation; higher administrative costs where institutions are weak	Regressive; can be ameliorated through revenue recycling	Often politically unpopular; may be difficult to enforce if institutions are underdeveloped

<sup>64</sup> This information should be detected in Step 2. Note that the government should provide such information.

<sup>65</sup> See also the IPCC's fourth assessment report, see <http://www.ipcc.ch/pdf/assessment-report/ar4/wg3/ar4-wg3-chapter13.pdf> (pp 750-768)

<b>Tradable permits</b>	Depends on emissions cap, participation, compliance	Decreases with limited participation and fewer sectors	Depends on initial permit allocation. May entail difficulties for small emitters.	Requires well - functioning markets and complementary institutions
<b>Voluntary agreements</b>	Depends on programme design, including clear targets, a baseline scenario, third party involvement in design, and review and monitoring provisions	Depends on flexibility and the extent of government incentives, rewards and penalties	Benefits only accrue to participants	Often politically popular; requires a large administrative staff
<b>Subsidies and other incentives</b>	Depends on programme design; less certain than regulations and standards	Depends on level and programme design; can result in market distortion	Benefits selected participants, possibly some that do not need it	Popular with residents; potential resistance from vested interests. Can be difficult to phase out
<b>Research and development</b>	Depends on consistent funding, when technologies are developed, and policies for diffusion. May produce great benefits in the long term.	Depends on programme design, the degree of risk and time scale	Benefits initially selected participants; potentially easy for funds to be misallocated	Requires many separate decisions. Depends on research capacity and long-term funding
<b>Information policies</b>	Depends on how consumers use the information; most effective in combination with other policies.	Potentially low cost, but depends on programme design	May be less effective for groups (e.g. low-income) that lack access to information	Depends on cooperation with special interest groups

Source: The fourth assessment report, IPCC, chapter 13, box 13.1

### ***International mitigation policy instruments: potential risk areas***

As described in Chapter 3, some policy instruments are initiated by the UN convention on climate change or the Kyoto protocol.<sup>66</sup> Those instruments cross borders and involve many stakeholders, with subsequent potential risks of ineffectiveness and inefficiency. The potential risk areas relating to the register system and fraud and corruption are described in the key question concerning risks of financial misstatements (Key question 5.3.2).

#### *Research and development*

Risk assessments in developed countries could consider whether the government encourages and develops technology suited to helping the country meet its short and long-term mitigation targets. Pursuant to their commitments, funds must have been put in place to contribute to technology transfer. Auditors in developing countries could identify risks by detecting whether their governments focus on actions to benefit from funds and transfers and to use available technology.

<sup>66</sup> How auditors choose to approach the risk analysis depends on their audit mandate and relevance to their country.

#### *Flexible mechanisms: JI and CDM*

Supervisory bodies and accountability arrangements may be difficult to enforce when different countries are involved in JI and CDM projects. The risks are greater if the political situation is unstable and if there is weakness in the management systems in the recipient country.

The auditor can check risks relating to whether the flexible mechanisms are efficient tools for meeting the overall targets. If national control mechanisms are not in place and the countries involved rely entirely on UNFCCC, there may be a risk that the results of the investments in the projects are not in line with the intentions.<sup>67</sup> The following preconditions must be met before project investments are made:

- The efficiency of the flexible mechanisms depends on the extent to which the whole system is designed to result in actual emission reductions.
- Sufficient funding should have been allocated to using the mechanisms in order to meet the targets.
- CDM projects' contribution to targets for sustainable development should be developed and defined in the recipient country.
- The projects would not be realised without the money transferred from the donor country.

If a country has built up its own portfolio of CDM projects, it can be considered a governmental task to ensure future maintenance of this portfolio in order to also ensure goal achievement in the future.

#### *Emissions trading scheme*

A robust and transparent system for buying and selling emission allowances is needed to ensure that tradable permits are effective in reducing global emissions. According to the SAI of Canada, the emissions trading system has several features that make it work effectively:<sup>68</sup>

- An absolute target, which limits total emissions;
- Tradable credits, which create an economic incentive for companies to meet their emissions targets;
- Strict rules for monitoring and reporting emissions;
- Public access on the internet to data on emissions and compliance; and
- Financial penalties that are large enough to encourage compliance.

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<sup>67</sup> Even though projects are controlled by the UN before certified allowances are issued, national governments may employ stricter standards than those set internationally, for example for setting requirements for additionality and contribution to sustainable development when selecting projects. The IPCC also points out that it has faced methodological challenges in terms of determining baselines and additionality (IPCC WGIII AR4, p. 748).

<sup>68</sup> OAG - the commissioner's report 2006 [http://www.oag-bvg.gc.ca/internet/English/parl\\_cesd\\_200609\\_01\\_e\\_14983.html#def1](http://www.oag-bvg.gc.ca/internet/English/parl_cesd_200609_01_e_14983.html#def1)

### 5.3.2 Key question: Efficiency – are things being done in the right way?

As described in chapter four, efficiency has a great effect on effectiveness.

#### **Risk analysis: whether the government makes the most of available resources**

As described in the introduction, *efficiency* is about whether things are being done in the right way. Audit criteria for international commitments and good governance are described in Sections 3.1 and 3.2 respectively:

- The UNFCCC commits each country to develop a plan and submit national communications. Annex I Parties must also submit annual inventories of GHG emissions.
- Management systems must be in place that contribute to effective and goal-oriented management.

In the following, we will mention risks in order to establish:

- Whether or not those systems are in place.
- To what extent the organisational structure is suited to implement climate change policies
- Whether human resources are capable of tackling the challenges of managing climate change policies.

The auditor could consider whether the government has assessed the risks the country faces in relation to achieving its targets and the extent to which the government has adopted plans suitable for the purpose. Risks are likely if information is lacking, inaccurate or incomplete, if the plan is not comprehensive enough and is unclear, if policies are not in place to implement the plan or if the plan does not sufficiently cover the challenges identified in Step 1. It may also indicate a lack of competence at the administrative level.

The auditor could consider risks relating to whether the reporting to the UNFCCC seems appropriate given the national context, and whether there is a reliable system in place for monitoring progress. The auditor could also consider risks related to the establishment of a greenhouse gas inventory system, including responsibilities and the quality of the information produced (detected in Step 1 and considered in key question 3.1 in Step 3 under effectiveness).<sup>69</sup>

Concrete targets in all sectors and levels of the organisation are important, showing how targets are to be accomplished and obligations met. The auditor can consider risks relating to whether the Government has developed measurable and concrete targets.

As part of good governance, there may be relevant evaluations or estimates that address the cost-effectiveness of different policy tools. The auditor could perform risk assessments relating to the existence, transparency and quality of such information. There could also be risks relating to efficiency if the government has spent money introducing policies that are known to be ineffective policy tools or where the

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<sup>69</sup> Note that the IPCC provides expert teams to review the inventories and national communications. The auditor could examine these reviews in order to consider risks related to governance (see appendix 1).

preconditions described in Table 5.3 are not met, or if it starts using policy tools without knowing how they will contribute to goal achievement.

Is there a risk related to how the mitigation management is *organised*? There are many different sources of emissions of GHG, and a wide range of public bodies will probably be identified in Step 2. There is a risk of inefficiency if management and coordination of the ministries responsible for achieving the overall emission reduction goal (typically the job of the ministry of environment), each sector (typically ministries in different sectors) and each governance level is difficult to achieve. It is also a risk indicator if the roles and responsibilities were hard to map in Step 2 because of complex organisational structures and unclear roles and responsibilities.

### **Risk analysis: whether the financial resources are misstated**

Keeping in mind the purpose of financial auditing, risk analysis is not only about identifying audit topics in a strict sense (as in performance auditing). Instead, it is about identifying where substantial procedures should be carried out to say something about whether the financial statements are misstated in any material respect. This involves two risk considerations: one related to inherent risks and another to control risks. In this key question, we first focus on analysing the risks at the strategic level, subsequently focusing on certain high-risk processes. Moreover, financial misstatements are not only relevant from a financial audit perspective, but also from the perspectives of the compliance and performance auditors.

A natural point of departure could be to focus on some of the indicators of *good governance* and *good management* described in Chapter 3, including:

- *Accountability, transparency, and involvement of relevant stakeholders.*
- Whether the operations of the government entity in question are *orderly*, i.e. that they are methodical and carried out in a well-organised way, and that they are *ethical*, i.e. carried out according to moral principles.<sup>70</sup>
- The *internal control systems* of the entity in question, as described in Chapter 3, as this is also an important indicator of whether the basic apparatus for addressing the risks of financial misstatements is in place.

Auditors could then focus their attention on areas where internal control systems are inadequate. The control environment can also be an important determinant of the control risk. If the management seems not to take climate change seriously, this is likely to be reflected in laxer control.

Facilities could be tempted to under-report their emissions in order to reduce their costs. Clear guidelines may be lacking on how to evaluate reported emissions. On the other hand, however, if the government grants emission permits free of charge, companies could be tempted to over-report their emissions in order to obtain as many permits as possible. Auditors could check the data basis for distributing emission permits. As this may include technical investigations, auditors could rely on third-party assessments. Auditors should then take extra care to check the reliability of these calculations.

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<sup>70</sup> INTOSAI GOV 9100, p. 9-10.

### Registry systems

As a price is set on carbon, emissions trading can be subjected to financial auditing.<sup>71</sup> A registry system for national and international transactions for emissions trading is important, as is a registry of emissions by facility, sector and overall.<sup>72</sup> Auditors can assess risks in establishing and operating the national emission trading registry, including security routines.<sup>73</sup> Risks are likely:

- If the responsible entity is unable to document the transactions. Has a reliable and transparent registry system for national and international transactions been established?
- If any tasks related to the running of the emissions registry system or the ETS have been privatised or outsourced. This could reduce government control if the tasks are not properly monitored.

### Fraud and corruption

Fraud and corruption are *general risk factors* that affect more or less all sectors of government and all public affairs.<sup>74</sup> The characteristics of the climate change issue *per se* – i.e. its comprehensiveness and complexity, the amount of funding involved, and the many challenges related to monitoring, control and enforcement – could entail a *particular high risk* of fraud and corruption, albeit to a varying extent depending on the country, the sector and the policy instrument in question. For climate change auditors, the following ‘rule of thumb’ can be used to prioritise between particular climate change topics from a fraud and corruption perspective: the higher the incentives in terms of economic pressure or potential profits and the greater the (perceived) opportunity to do so, the greater the risk of fraudulent and corrupt activities.<sup>75</sup>

Risks of fraud and corruption are relevant when using the ‘flexible mechanisms’<sup>76</sup> under the Kyoto Protocol (described in Chapter 3 and detected in Step 2) for a number of reasons:

- The mechanisms are both very complex and technically complicated. The mechanisms have led to the establishment of a global ‘carbon market’, which has already reached a considerable size and complexity.<sup>77</sup>
- Most of the transactions/projects in question are by nature bilateral, and many of them are carried out in countries where there is particular reason to look further into their performance with respect to good governance and internal control.

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<sup>71</sup> Even though the money is transferred between private parties, the functioning of the system is relevant to achieving national targets.

<sup>72</sup> This is part of the reporting requirements of the Kyoto Protocol and is included in the review process of the national system of Parties with quantified commitments. See Section 3.1.2 and Appendix 1.

<sup>73</sup> All Annex 1 countries are obliged to have a national registry showing stocks and transactions of allowances, and failure to present acceptable registries can lead to exclusion from participation in the flexible mechanisms.

<sup>74</sup> A survey carried out by Transparency International also suggests that corruption in the public sector takes much the same form and affects the same areas whether one is dealing with a developed country or a developing one. The survey also suggests that the methodologies are also remarkably similar. Source: ‘Transparency International Source Book 2000’, p. 14.

<sup>75</sup> For a more thorough description of the driving forces behind fraud and corruption, see ISA 240 (2006) p. 14 and ‘Transparency International Source Book 2000’, p. xviii, respectively. ISA 240 also adds ‘rationalization of the act’ as a third aspect.

<sup>76</sup> Money transactions relating to climate-related projects that are not part of the mechanisms (for instance deforestation and bilateral cooperation between developed and developing countries) could, of course, also be considered.

<sup>77</sup> According to the World Bank, the total value of the carbon market in 2007 was approximately USD 64 billion. Source: ‘State and Trends of the Carbon Market 2008’, The World Bank, p. 1.

To be managed properly, they require, inter alia, a very large 'bureaucracy', complex rules, and a sufficient number of qualified technical experts to apply the rules consistently. All these factors make monitoring, control and enforcement difficult.<sup>78</sup> Bad performance on the three good governance indicators described above can be considered as 'red flags' with respect to fraud and corruption.

### **5.3.3 Key question: Economy - does the government focus on keeping the costs low?**

Routines to assure as low controllable costs as possible should be implemented, for instance by practicing tendering procedures.

The amount of funding involved in mitigation efforts is substantial. Compliance with international commitments is a key element in this context. Meeting the commitments of the Kyoto Protocol is likely to involve considerable costs in some countries. On the other hand, non-compliance can also prove costly. Under the Kyoto Protocol, non-compliance can have significant long-term costs for a country that fails to live up to its Kyoto commitments (see also Chapter 3).

The general cost-effectiveness of acting early is stated in 'The Stern Review on the Economics of Climate Change'. According to this review, the benefits of strong, early action considerably outweigh the costs.<sup>79</sup>

### **5.3.4 Key question: What risks should be prioritised in an audit? Define the audit objective**

Risk assessment is a planning tool to identify the most important topics before designing the audit. If relevant risks are identified in the governmental response to mitigate climate change in this step, the auditor may take the view that such an audit should be conducted. In this key question, the auditor could:

- Prioritise among the risks by considering their relevance. Certain considerations are recommended when prioritising:
  - 1 Are the risks most critical at the overall governance level, the sector level or at both levels?
  - 2 Are the risks of the use of a policy instrument due to its effectiveness, efficiency and/or economy?
  - 3 To what extent will the planned audit add value?
- Define the audit objective. The final considerations in this step can result in a summing up of the risk areas and defining what the auditor will achieve by conducting the audit (audit objective).

These are essential considerations before designing the audit in Step 4.

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<sup>78</sup> See <http://www.13iacc.org/>, the 13<sup>th</sup> International Anti-Corruption Conference, where climate change and corruption was one of the main themes)

<sup>79</sup> See [http://www.hm-treasury.gov.uk/stern\\_review\\_report.htm](http://www.hm-treasury.gov.uk/stern_review_report.htm)

### **Are the risks at the overall level and/or at the sector level or both?**

This question concerns whether a holistic or sector approach to the audit is preferable. Depending on the audit mandate and identified risks, the SAI must decide whether the audit should cover overall targets and management levels or be limited to certain relevant sectors.

To ensure that the auditor maintains focus on materiality, it might be a good idea to start with the sectors that have the highest emissions (identified in Step 1). Have targets been set for the selected sector and are these targets sufficiently operationalised (identified in the above key question)? If not, there is a risk that the sector in question will not fulfil its responsibility and that they will not give priority to it.

The holistic approach could be relevant when responsibility and policy tools are split between different sectors and risks have been identified at the overall management level. For example, emissions trading schemes will often cover several sectors. Risks relating to national emission inventories and discrepancies in overall governance are also relevant focuses in relation to the fulfilment of emission targets and international agreements.

### **Are the risks related to the use of specific policy instruments?**

In performance auditing, the auditor may conclude that there are some key policy instruments that seem ineffective and should be focused on in an audit. It could also be the case that a lack of policy instruments leads to ineffectiveness. A general delay in implementing the policy instruments indicates that the government is not getting the most out of the financial resources.

In financial auditing, a system-based approach might be relevant when considering whether emission data and money transfers among the key players are reliable and transparent.

In compliance auditing, it could be relevant to focus on policy instruments if risks are identified when considering how the management follows rules, standards and international agreements in its use of specific policy instruments.

### **How will the audit add value?**

The auditor should return to the questions asked in the introduction to Step 3 by considering the impact of auditing the identified risks related to effectiveness, efficiency and economy.<sup>80</sup> The auditor should decide whether the audit will add value by considering:

- Relevance in terms of improving management systems and policy instruments.
- Appropriateness of timing
- The likelihood of acquiring new knowledge or perspectives

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<sup>80</sup> See also Appendix 1

### What audit objective is preferable?

The scheme below could help the auditor to conclude by describing the judgements made in this step and defining the audit objective, before designing the audit in the next step.

Table 5.4: A scheme for structuring conclusions and audit objectives

<b>Situation: What is the environmental problem? (greenhouse gas emissions)</b>	<b>'Complication': What has the government done to reduce the problem? Is it sufficient? (performance risks)</b>	<b>Materiality: Why is the issue important? Consequences when performance risks are likely</b>
<b>Audit objective:</b> What do you want to achieve through the audit? What is the added value of the audit?		

#### **5.4 Step 4: Design the audit**

The purpose of this final step is to provide some tips on how to design audits of government response to climate change. As described in the introduction to this chapter, we propose using a design matrix in this process. This involves specifying the audit objectives as audit questions, formulating researchable questions, and identifying criteria and evidence.

We use the audit menu developed by the WGEA Global Cooperation Project on Climate Change (the Global Audit) as the basis, utilising the researchable questions and audit criteria from this menu in particular. The structure of this step reflects that of the previous step: we begin by looking at the results (or the effectiveness) of mitigation policies, including the effectiveness of the policy instruments; and then look at the efficiency of the governance of these policies, including coordination and the establishment of internal control systems.

It is important to emphasise that choosing audit questions is not a matter of either-or. This presentation should be regarded as a menu of options, and auditors may use a combination of several audit questions. Although a performance audit will often (but not always) try to say something about the results of government policies and a financial audit will often say something about the governance systems, a combination of these or similar perspectives could be fruitful. For instance, if an audit finds a lack of results or achievement of objectives or targets, the reasons for this could be the effectiveness of the policy instruments or the internal control systems.

As described in the introduction to this step (Chapter 4), it might be useful in this step to consider the feasibility of carrying out the audit at the same time as designing the audit.<sup>81</sup>

In this step, we will present three suggested audit questions related to the Es analysed in Step 3:

1. *Will the government meet its emissions targets or commitments?*
2. *Are policy instruments effective?*
3. *Is the governance of the climate change response efficient?*

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<sup>81</sup> See also Appendix 1

## 5.4.1 Will the government meet its emission targets or commitments?

We start by looking at ways to address whether targets, both short-term and long-term, are being reached. The most straightforward way of doing this is by looking at the emissions targets from the Kyoto Protocol, comparing them with national communications to the UNFCCC and checking whether the government is on track to meet its commitment. However, there are a number of other options for checking compliance with targets. These are presented below as researchable questions and supplemented by audit criteria and evidence. We also present examples of how this has been handled in various audit situations.

### **Researchable questions**

- Is the government on track to meet its targets? Which targets have been met?
- Is use of the Kyoto mechanisms supplementary to domestic action?

### **Audit criteria**

At the global level, the only binding and quantified emission targets stem from the Kyoto Protocol, and consequently only the countries that have signed the Protocol and have commitments under it can use it as an audit criterion. This is described in more detail in Chapter 3. National targets, if they exist, should also be considered.

### **Audit evidence**

The most important source of data for this kind of evaluation will be national emission figures. Such figures can be found in the national communications countries submit to the UNFCCC secretariat. See Section 3.1.1 for more details on the reports and the reporting requirements. If a country or a group of countries has adopted a more long-term emissions target, such as the 'two degrees Celsius target',<sup>82</sup> projections are necessary to assess progress.

### **Examples**

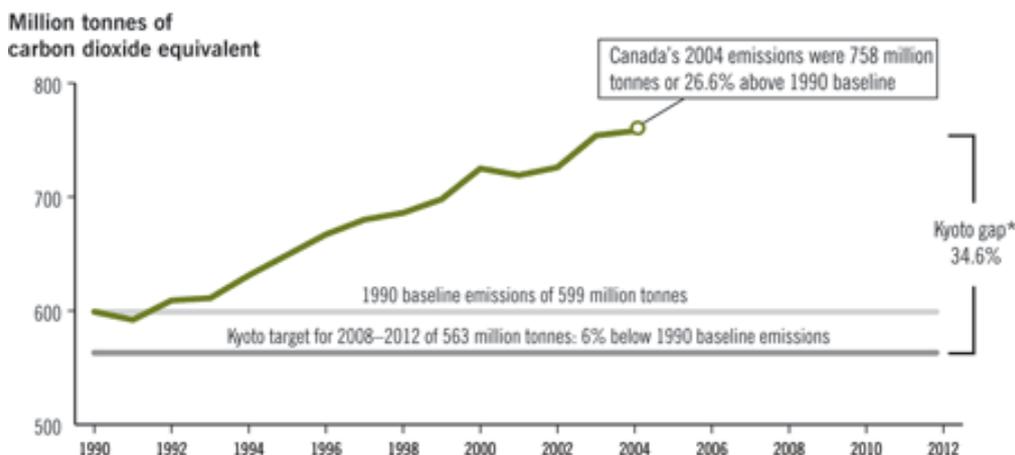
The SAI of Canada has also carried out an audit on Canada's fulfilment of the Kyoto Protocol (see Example 5.5 for a graph showing emissions development and Box 7.1.2 on page 102). This audit found that Canada's GHG emissions were 26.6 per cent higher in 2004 than in 1990. Moreover, emissions levels were still rising, not declining.

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<sup>82</sup> More on the two-degrees Celsius target can be found in Step 2 in Chapter 5.

### Example 5.5: Canada is not on track to meet its obligations to reduce emissions

Under the Kyoto Protocol, Canada agreed to reduce its emission levels in the 2008–2012 period to 6 per cent below those in 1990. The Government's own 2004 data revealed that our greenhouse gas emissions were almost 27 per cent above 1990 levels and were rising, not declining.



\* Mathematical procedures for calculating the gap do not involve adding the percentages. In addition, percentages have been calculated using the original unrounded numbers.

Source: 2006 September Report of the Commissioner of the Environment and Sustainable Development ([http://www.oag-bvg.gc.ca/internet/English/parl\\_cesd\\_200609\\_00\\_e\\_14982.html#ch0hd3b](http://www.oag-bvg.gc.ca/internet/English/parl_cesd_200609_00_e_14982.html#ch0hd3b))

## 5.4.2 Are the policy instruments effective?

As pointed out above, auditing the results of mitigation efforts often involves more than just making a statement on whether or not emissions targets are being met. If the targets are not being met, the chances are that this is because the effectiveness of the policy instruments is inadequate or that insufficient instruments have been implemented. Again, we present researchable questions and audit criteria and evidence, as well as examples.

In addition to looking at national policy instruments, we also highlight a set of instruments and policies that are based on international climate change agreements. This means we include a set of more specific researchable questions on CDM projects and emissions trading schemes (ETS), as well as on technology and funding.

### Researchable questions

- What are the main principles behind the choice of policy instruments? Table 5.5 presents a review of four evaluation criteria for mitigation policy instruments and researchable questions related to the following criteria: environmental effectiveness, cost-effectiveness, distributional considerations and institutional feasibility.
- How does the government measure the relative contribution or effectiveness of each policy instrument?

- How efficient are the policy instruments? If they are not efficient, what are the reasons for this?

**Table 5.5: Environmental policy instruments, evaluation criteria and researchable questions**

Instrument	Criteria			
	Environmental effectiveness	Cost-effectiveness	Meets distributional considerations	Institutional feasibility
<b>Regulations and standards</b>	Do performance standards limit technology development? Does the government have the necessary information to target regulations?	Cost implications to implement regulations and standards	Do regulations and standards distort competition?	
<b>Taxes and charges</b>	Has the tax level been set high enough to induce change?	Is participation broad enough for the tax to have an impact? Are institutions strong enough to limit costs? What are the marginal costs across sectors?		Are institutions strong enough to ensure compliance?
<b>Tradable permits</b>	Is the cap on emissions set low enough to have an effect? Is a rigorous system in place to ensure compliance?	Is coverage broad enough to have an effect?		Is there a risk of fraud and corruption? What is the capacity to control reported emissions?
<b>Voluntary agreements</b>	Have clear targets been set? Is there a baseline to compare with? Have private players been sufficiently involved in the design?	Are the costs of administering the agreements high compared with the effects?		Is the administration good enough to assure an effect?
<b>Subsidies and other incentives</b>	Are subsidies effective in reducing emissions?	Have the market-distorting effects been satisfactorily evaluated? Are funds being misallocated?	Do the subsidies target those who need them?	Are the subsidies kept beyond the planned time frame?
<b>Research and development</b>	Is the funding consistent sufficient and does it have a long-term perspective? Is there a strategy for making use of new technologies?	Is the basis for the allocation of funding transparent? Is the government willing to take a risk on uncertain technologies?	Is the basis for allocating funding good enough?	Is there a system for checking for results? Is an adequate administration in place?
<b>Information policies</b>	Does the government evaluate programmes? Do the programmes have an effect?	Is the effect of programmes small compared with costs?	Are campaigns targeted?	

Note: This is an adapted version of Table 13.1 in IPCC (2007). 'Policies, instruments and co-operative arrangements'. Ch. 13, WGIII, AR4, IPCC: Cambridge. The Table is also presented under Step 3 for mitigation in this guide.

### **Audit criteria**

Again, the UNFCCC and the Kyoto Protocol is the main global source of audit criteria. Along with the Marrakesh Accords (see Section 3.1) the Protocol guides the implementation of some of the instruments (e.g. JI and the CDM). The criteria for good governance presented in Section 3.2 can be used here as well.

Remember also that certain instruments or sectors can have special laws and regulations attached to them, so auditors must also consider national or regional legislation.

### **Examples**

The SAI of Canada's report on reduction of GHGs during energy production and consumption (summarised in Box 7.1.2 in the next chapter) looks at whether three government programmes have achieved the expected results. The audit reports that, even though some progress has been made, emission targets are confusing. This makes it difficult to compare the outcome with the original targets. In addition, efforts to reduce emissions from oil and gas production had minimal results.

### **Focusing on CDM and ETS**

Two important policy instruments that deserve special mention are the CDM and ETS. Here we present some researchable questions that focus on these two instruments. We also include two examples of reviews.

#### *Researchable questions for CDM:*

- What strategy and plans have been developed for the purchase of CDM quotas?
- What criteria are used for the selection of projects?
- What criteria are used to assess additionality, leakage and permanence?
- What criteria are used to assess projects' contribution to sustainable development?
- What criteria are used to assess projects' contribution to technology transfer?

A review (see Box 7.1.1) touched upon several of the aspects mentioned above and concluded that, although the CDM has been very successful in creating a global market for GHG emissions, it has not contributed to promoting sustainable development. The review also questions the additionality of a significant number of CDM projects.

#### *Researchable questions for ETS*

- Are reliable data available on actual and expected (projected) emissions at facility level?
- Are adequate registry systems in place?
- What are the principles for allocating the quotas for the plants? Do they contribute to goal achievement?
- Are reports on actual emissions from companies verified?
- Are reserves sufficient for future growth in the market?
- Are emissions trading systems efficient and cost-effective?
- In cases where quotas are sold, is the money received used in order to reduce emissions?

An audit that focused on the implementation of the European ETS at the national level was conducted by the SAI of the Netherlands. This audit found that the ETS had been properly implemented, but that it placed too much emphasis on maintaining the competitiveness of Dutch industry compared with that on the Dutch Kyoto target. Another conclusion of the audit was about the reliability of the Dutch emission data (see the summary in Box 7.1.3).

### **Focusing on technology**

There are no quantified targets for the introduction of technology development and transfer in the Convention or the Protocol. The Convention does, however, commit all member Parties to promoting and cooperating in these areas. In that sense, these issues could also be covered under the next line of inquiry, which concerns plans and strategies.

#### *Researchable questions for technology*

- Does the government have procedures in place for identifying, evaluating and implementing technology development programmes?
- Has the government followed these procedures?
- Has the government identified internal and external barriers to mitigation technology deployment and transfer?
- Do the programmes comply with national rules and procedures regarding governance, accountability, oversight requirements and management?
- How have activities and programmes been coordinated internationally?
- Does the government monitor and report on the effectiveness of these programmes?

### **Focusing on funding**

Funding in the context of climate change mitigation can include both national and international transfers. Particularly in connection with international transfers of funds, this line of inquiry often overlaps with ordinary development assistance or with CDM projects.

#### *Researchable questions for funding*

- Does the financing undertaken comply with related internal financing rules and regulations?
- What procedures are in place for coordinating and avoiding duplication across funding agencies, programmes and the private sector?

#### *Researchable questions for countries involved in transfers of funds*

- Are funds obtained from donor countries to support programmes and projects aimed at controlling GHG emissions?
- Is there a robust framework in place to manage received funds?
- Is the provision of funds facilitated through an appropriate fund transfer framework aimed at building capacity and achieving results (i.e. reducing GHG emissions) in recipient countries?
- Does the funding for climate change projects and programmes come in addition to funding for development assistance?
- Is adequate and reliable information about donor funding and its use available and easily accessible?
- To what extent does the funding contribute to reducing emissions in the recipient countries?

### *Additional audit criteria for transfers of funds*

Even though the Convention and the Protocol mention funding and financing, auditors can also use criteria more commonly used when auditing development assistance. These include donor agreements and international evaluation criteria for development assistance under the UN.

#### **5.4.3 Is the governance of the government's climate change response efficient?**

The governance of climate change policies, programmes and projects can be an important determinant of the extent to which GHG emissions are reduced. Among other things, this involves established plans and strategies, management by objectives and results, coordination among players and information for use in decision-making.

An important element that was mentioned in Step 3 is that of fraud and corruption. Auditors can formulate specific audit questions focusing on these risks, or they can be integrated into the researchable questions listed below.

#### ***Researchable questions***

- Are strategies or plans formulated in a way that contributes to efficient achievement of the objectives and targets for mitigating GHG emissions – at regional, national and sector levels and for all relevant sources (or sinks)?
- Are the targets SMART: specific, measurable, attainable, relevant and time-bound?
- Are the roles and responsibilities assigned to government agencies clear and documented?
- Do agencies adhere to roles and responsibilities? If not, what are the causes of this? Do they have the necessary capacity and resources? Does the main responsible ministry provide effective oversight of responsible agencies and players?
- Are mitigation efforts coordinated to ensure that they are complementary rather than conflicting?
- Are plans, policy choices and targets based on adequate environmental, social and economic data?
- Are data, including results, for decision-making transparent and reliable (for instance subject to a peer review / quality assurance process)?
- Are policies and programmes subjected to regular evaluations?
- Have key risks influencing goal achievement been assessed?

#### ***Audit criteria***

An important source of audit criteria here can be the principles of good governance presented in Section 3.2. Furthermore, all member Parties are committed by the Convention to formulating and implementing plans and strategies for mitigation programmes. The Protocol reiterates this commitment. The ratification of these documents therefore means that governments must initiate strategies and plans to mitigate GHG emissions.

### ***Audit evidence***

The national communications from member Parties contain information on implementation activities (see Section 3.1). These can be used to gain an overview of the way the government organises its mitigation efforts. In addition, public documents should describe the way implementation is coordinated as well as the decision basis and plan for achievement of the objectives and targets. The cooperation between responsible agencies should be documented.

### ***Examples***

The first audit question in the design matrix in Appendix 8 is 'To what extent does the responsible ministry fulfil its overriding management responsibility to ensure goal achievement?' It also contains further tips and hints for audit criteria and evidence. An audit carried out by the SAI of Canada looked at how the federal government was managing the overall approach to climate change (see Box 7.1.4 below). It concluded that an effective governance structure had yet to be created and that no government-wide monitoring and reporting of climate change expenditure existed. The SAI of Canada also recommended that uncertainties and risks associated with the emissions data system should be assessed on an ongoing basis.

## *Chapter 6: How to plan adaptation audits*

In this section, we will describe how adaptation to climate change can be audited by primarily focusing on four issues: (1) point out the importance to SAIs of understanding climate change-related threats, (2) provide information in order to map players and policies that respond to climate change adaptation needs, (3) through risk assessments, help to identify relevant adaptation issues for the country in question, and (4) ways of addressing these issues in an audit.

The structure of this chapter will follow the steps described in Chapter 4:

- Step 1: Understand the climate change impacts on society, the economy and the environment in your country
- Step 2: Understand the government's climate change response
- Step 3: Choose audit topics and priorities: decide on audit objectives
- Step 4: Design the audit

### **6.1 Step 1: Understand the climate change impacts on society, the economy and the environment in your country**

The main purpose of this step is to understand your country's vulnerability to climate change. This understanding is important when deciding where the governmental response will be most required and thereby where the SAI's actions will be most needed. The auditor must focus on the national and local impacts of climate change, and the adaptation and vulnerability situation. The auditor should consider any trends and developments in the climate change threats, both in the short and long term.<sup>83</sup> At the same time, the auditor should take account of international or regional factors that influence the country's situation.

It is the government's responsibility to make climate change assessments in order to identify appropriate adaptation measures. These assessments should serve as the main source of information for an SAI. However, in some cases, an SAI may wish to consult other sources of information, either because the government has not adequately assessed the situation<sup>84</sup> or because the SAI wants a second opinion. Auditors can in these circumstances consult non-governmental organisations (NGOs) or universities, or hire external consultants.

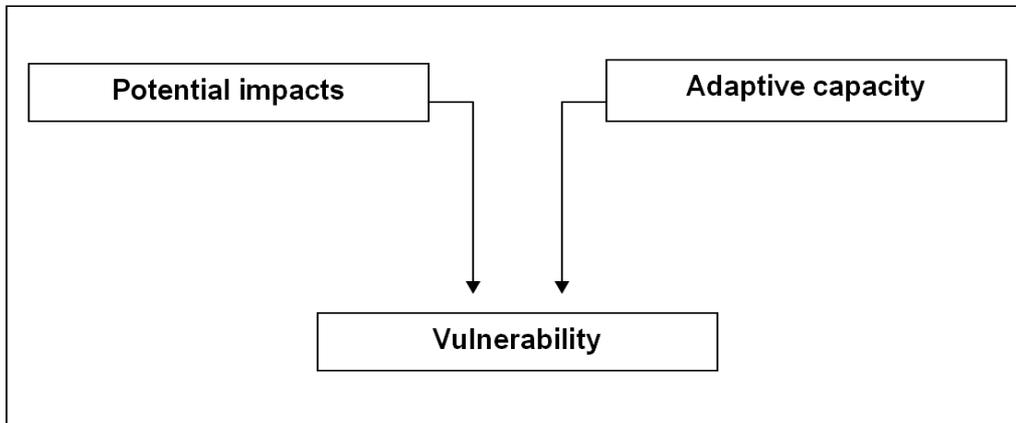
A country's vulnerability to climate change is a product of the potential impacts and a system's adaptive capacity (this relationship is presented in Figure 6.1; definitions are provided in Box 6.1). The extent to which these impacts will be realised depends on adaptation efforts (and, in the longer term, on mitigation efforts).

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<sup>83</sup> For more information, see for example 'New assessment methods and the characterisation of future conditions', in Barry et al., *Climate Change 2007 WGII AR4 IPCC (2007)*: IPCC; Moss et al., *Towards New Scenarios for Analysis of Emissions, Climate Change, Impacts and Response Strategies (2008)*: IPCC.

<sup>84</sup> Weakness in the government's climate change vulnerability assessment could also be an audit finding.

Figure 6.1: Vulnerability and its components



Source: Garnaut Climate Change Review Draft Report, Chapter 7 (June, 2008).

**Box 6.1: Definitions: adaptation, vulnerability, adaptive capacity**

- *Adaptation* is adjustment of natural or human systems in response to actual or expected climatic stimuli or their effects.
- A country's *vulnerability* to climate change depends on the potential impacts of climate change and the country's adaptive capacity.
  - Climate change *impacts* are the effects of climate change on natural and human systems. The potential impacts, in turn, depend on exposure to changes in the climate system and the country's sensitivity.
  - *Adaptive capacity* is the ability or potential of a system to respond successfully to climate variability and change, and includes adjustments of both behaviour and in resources and technologies.

Sources: The IPCC Glossary (Appendix I in WGII AR4 IPCC (2007): IPCC; The UNFCCC glossary ([http://unfccc.int/essential\\_background/glossary/items/3666.php](http://unfccc.int/essential_background/glossary/items/3666.php)); *The Garnaut Climate Change Review* (Draft Report, June 2008)

### 6.1.1 Key question: How vulnerable is your country to climate change?

Vulnerability depends on the seriousness of climate change impacts and the capacity to handle them. Therefore, both impacts and adaptive capacity should be identified in order to understand your country's vulnerability to climate change.

#### The potential impacts of climate change in your country

The potential impacts of climate change are the impacts that may occur given climate change, without considering adaptation. Understanding the potential impacts of climate change in a country thus provides the auditor with an understanding of where adaptation needs are most crucial. This, in turn, serves as a starting point for identifying areas to prioritise in an audit.

In Chapter 2, we distinguish between direct consequences of average air and ocean temperature increases, and their impacts. Consequences are described as an increase in the average global sea level, widespread melting of ice and snow and changes in weather (wind patterns, precipitation and severe weather events). We then describe potential impacts on society and settlement, human health, ecosystems, water, agriculture and food supply. Consequences of climate change and its impacts may occur with varying intensity all over the world.<sup>85</sup>

In addition to regional differences, climate change impacts are felt at the local, regional and national level. For audits of climate change adaptation to be effective, it is necessary for the auditor to grasp these specific impacts. The auditor therefore needs to focus on the national and sub-national adaptation context.

Auditors can consider a range of issues here, depending on the national context. Important areas include the impacts on the economy, society and the environment (see potential impacts in Chapter 2 and further references in Box 6.3).

#### Box 6.2: INTOSAI- guides that covers relevant impacts of climate change

- The INTOSAI guide on auditing biodiversity points out that climate change is one of the main threats to biodiversity and that the auditor could consider the contribution of a country's ecosystem goods and services to the national economy and prosperity. Examples include wetlands and mangroves (Auditing Biodiversity: Guidance for Supreme Audit Institutions (2007): INTOSAI WGEA, <http://www.environmental-auditing.org/intosai/wgea.nsf/viewStudies>)
- The INTOSAI report *Auditing water issues: Experiences of supreme audit institutions* covers audits conducted and experiences gained of water issues. Relevant water issues that may be reinforced by climate change are described: the distribution of water over the world, causing droughts and floods (<http://www.environmental-auditing.org/intosai/wgea.nsf/viewStudies>).

<sup>85</sup> See Section 2.2 in this guide, and IPCC, AR4, WGII (2007), <http://www.ipcc.ch/>

## **The adaptive capacity in your country**

The reason why an auditor should understand a country's adaptive capacity is because it is an important determinant of that country's vulnerability to climate change. Adaptive capacity is the ability or potential of a system to respond successfully to climate variability and change. It includes adjustments in behaviour, resources and technologies.

Education, income and health are generic factors that have an impact on adaptive capacity. Technology can potentially play an important role in adapting to climate change. Socio-economic development in general will influence the adaptive capacity positively. This includes economic growth as well as human capital and governance structures.

It is necessary to point out that high adaptive capacity does not necessarily translate into actual adaptation measures. In many cases, direct and planned action is required to make use of the capacity that exists for adaptation at the local or national level.

Stakeholder consultation is an important approach to assessing adaptation needs. How a group or system can cope with past or current climate threats provides a sound basis for assessments of present or future threats and adaptive capacity.<sup>86</sup>

### ***Conclusion: your country's vulnerability to climate change***

It is the vulnerability to climate change – the degree to which a system is unable to cope with climate change impacts – that determines what kind of adaptation is necessary. Vulnerability to climate change is dependent on the geographical, social and sector context.

Vulnerability to climate change is principally defined locally. To consider vulnerability only at the national level will in many cases be inadequate.

The vulnerability of both natural and human systems varies at the micro-level and can be influenced by, for example, multiple stresses and adaptive capacity. At a general level, countries characterised by, for instance, low educational levels and internal conflicts will have lower adaptive capacity. In some developing countries, this could mean vulnerability in important sectors, including water resources, agriculture and food security, human health, terrestrial ecosystems, coastal zones and marine ecosystems.<sup>87</sup>

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<sup>86</sup> Parry et al., 'Technical Summary', in *Climate Change 2007 WGII AR4 IPCC* (2007): IPCC.

<sup>87</sup> UNFCCC, *Impacts, Vulnerabilities and Adaptation in Developing Countries* (2007): UNFCCC. General impacts and vulnerabilities are also described in Chapter 2.

**Box 6.3: Do you want to know more about adaptation?**

- IPCC, Fourth Assessment Report, Working Group I (The Physical Science Basis) and II (Impacts, Adaptation and Vulnerability)
- Many developing and least-developed countries have drawn up adaptation plans for the UNFCCC. They include National Adaptation Programmes of Action (see <http://unfccc.int/adaptation/napas/items/2679.php>).
- UNFCCC, *Impacts, Vulnerabilities and Adaptation in Developing Countries*
- World Meteorological Organisation's climate pages ([http://www.wmo.int/pages/themes/climate/index\\_en.html](http://www.wmo.int/pages/themes/climate/index_en.html))
- United Nations Environment Programme (<http://www.unep.org/>) focuses on environmental issues in general, including climate change. See for instance 'The environmental food crisis – The environment's role in averting future food crises' ([http://www.grida.no/res/site/file/publications/FoodCrisis\\_lores.pdf](http://www.grida.no/res/site/file/publications/FoodCrisis_lores.pdf))
- United Nations Development Programme (<http://www.undp.org/>) offers development insights with a climate change perspective.

## **6.2 Step 2: Understand the government's climate change response**

The main purpose of this step is to understand what the government is doing to promote adaptation to climate change and identify relevant audit criteria to be used in the audit. A basic understanding of the government's efforts is necessary background information that will help the auditor to identify the most important areas to prioritise in audits.

To collect the information needed to understand the government response, the auditor could answer the following key questions:

- What are the objectives and targets of adaptation policies?
- What are the policy instruments for adaptation?
- Who are the public players and what are their responsibilities?

### **6.2.1 Key question: What are the objectives and targets of adaptation policies?**

Government efforts to adapt to climate change involve both short-term and long-term adaptation, and objectives and targets must be reflected in both. Short-term options include emergency planning and flood defence and management. In the longer term, governments can use natural resource management and land-use planning to reduce vulnerability. Governments also have some options that help adaptation efforts both in the short and long term: the monitoring of areas that are threatened by climate change, research and technology development, and capacity-building activities, both nationally and through global and inter-regional networks.

From an adaptation point of view, the UNFCCC is an important source of criteria stemming from international environmental agreements. The commitments under the UNFCCC are described in Chapter 3 but can be summarised as follows:

- All countries must formulate and implement programmes of adaptation to expected impacts. For the least-developed countries, this may involve preparing National Action Plans for Adaptation,<sup>88</sup> which identify priority activities and immediate needs and concerns.
- The developed countries must help developing countries that are particularly vulnerable to the adverse effects of climate change to meet the costs of adaptation.
- All countries shall cooperate on preparing for adaptation measures for coastal zones, water, agriculture and desertification, and minimise the adverse effects of adaptation projects.
- All countries shall promote technology and research on climate change-related issues. Developed countries must promote, facilitate and finance the transfer of, or access to, technologies and practices that can help developing countries to adapt to climate change.

Public policy has an important role in facilitating adaptation. According to the IPCC, this includes reducing the vulnerability of people and infrastructure, providing information on risks to private and public investment

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<sup>88</sup> See description in Section 3.1.3.

and decision-making, and protecting public goods such as habitats, species and culturally important resources.<sup>89</sup>

National policy statements are usually used to formulate desired outcomes. In order to be effective, policies must be supported by programmes or procedures that implement and maintain activities that contribute to the desired outcome. Programmes must have clearly established goals, have sufficient resources available to them and be subject to regular review (and improvement). The objectives and targets can be found, for example, in legislation or state budgets.

According to the UNFCCC's Nairobi Work Programme (NWP) and the UNDP's Adaptation Policy Framework (APF), establishing adaptation policies requires a thorough assessment of present and future climate change risks and vulnerability, and socio-economic factors (see also Box 6.5). Future climate risks can be assessed using climate models, scenarios and downscaling based on past and current data and observations.

APF and NWP have been designed for developing countries in particular.<sup>90</sup> They both highlight the importance of linking climate change adaptation to broader development objectives, for example the Millennium Development Goals (MDGs)<sup>91</sup> and sustainable development (see Box 6.4 below).

#### **Box 6.4: Other international agreements**

A number of EIAs can be suitable as criteria for auditing adaptation issues:

- *Sustainable development*  
By signing The World Summit on Sustainable Development (WSSD), more than 180 leaders have committed to working toward sustainable development and poverty reduction and to creating a more sustainable Earth. The agreement is described in the INTOSAI-guide *The World Summit on Sustainable Development: An Audit Guide for Supreme Audit Institutions*, see <http://www.environmental-auditing.org/intosai/wgea.nsf/viewStudies>
- *Biodiversity*  
The principal IEAs affecting biodiversity are described in the *INTOSAI-guide Auditing Biodiversity: Guidance for Supreme Audit Institutions*, see <http://www.environmental-auditing.org/intosai/wgea.nsf/viewStudies>
- *Water issues*  
Several international agreements are described in the INTOSAI-report *Auditing water issues- experiences of Supreme Audit institutions*. Among other things, the agreements concern desertification, water resources and conservation management, and marine resources conservation and management, see <http://www.environmental-auditing.org/intosai/wgea.nsf/viewStudies>
- *Millennium development goals*  
World leaders met in September 2008, committed to achieving the Millennium Development Goals by 2015 and to set out concrete plans and steps for action. The millennium goals address issues that could also be intensified by climate change: poverty and hunger, universal education, gender equality, child health, maternal health, combat HIV/AIDS, environmental sustainability and global partnership, see <http://www.un.org/millenniumgoals/>

<sup>89</sup> Adger et al. 'Assessment of adaptation practices, options, constraints and capacity', in *Climate Change 2007 WGII AR4 IPCC* (2007): IPCC.

<sup>90</sup> It should be noted, however, that no similar framework has been established for developed countries, making the NWP and APF best-practice standards also for these countries.

<sup>91</sup> See, for example, Table V-6 in UNFCCC, *Climate change: Impacts, vulnerability and adaptation in developing countries*.

**Box 6.5: Do you want to know more about UN Programmes for adaptation?**

- UNFCCC, *Nairobi Work Programme* ([http://unfccc.int/adaptation/sbsta\\_agenda\\_item\\_adaptation/items/3633.php](http://unfccc.int/adaptation/sbsta_agenda_item_adaptation/items/3633.php)). It consists of **nine components**: methods and tools; data and observations; climate modelling, scenarios and downscaling; climate-related risks and extreme events; socio-economic information; adaptation planning and practices; research; technologies for adaptation; and economic diversification.
- UNDP, *Adaptation Policy Framework* (<http://www.undp.org/climatechange/adapt/apf.html>). It consists of **seven components**: scoping and designing an adaptation project; assessing vulnerability for climate adaptation; assessing current climate risks; assessing future climate risks; assessing current and changing socio-economic conditions; formulating an adaptation strategy; continuing the adaptation process; assessing and enhancing adaptive capacity; and engaging stakeholders.

## 6.2.2 Key question: What are the policy instruments for adaptation?

Adaptation is a highly complex policy field, involving many sectors and potentially the full range of policy instruments. For the objectives and targets of adaptation policies to be effective, they must be supported by policy instruments. In most cases, a set of instruments that are designed together will be necessary.<sup>92</sup>

For example, regulations and economic instruments can complement education and awareness-raising, but may not be very effective without a system to assure enforcement and compliance. Table 6.1 (see next page) presents a list of examples of adaptation and the policy instruments used.

Policy instruments can correspond to short-term objectives, such as responding to current impacts. They can also respond to observed medium and long-term climate trends. Finally, some adaptation is already taking place in response to anticipated change based on models and scenarios.

It is important that the policy instruments create synergies with instruments that promote other, related objectives, such as desertification, water issues or sustainable development; short-term adaptation should also have synergies with long-term adaptation. Policy instruments available to a government administration can be divided into three categories: legal, economic and other (informational, organisational and physical).<sup>93</sup>

<sup>92</sup> Isabelle Niang-Diop and Henk Bosch (2004). *Formulating an Adaptation Strategy*. Working paper # 8 of the UNDP Adaptation Policy Framework.

<sup>93</sup> Based on *Guidelines for Performance Auditing*, published by the SAI of Norway 2005.

**Table 6.1: Examples of government-led adaptation in selected countries**

Country	Climate-related stress	Government-led adaptation
Egypt	Sea level rise	Adoption of a National Climate Change Action Plan integrating climate change concerns into national policies; adoption of a law requiring EIAs for project approval and regulating setback distances for coastal infrastructures; installation of hard structures in areas vulnerable to coastal erosion
Botswana	Drought	National government programmes to re-create employment options after drought; capacity building among local authorities; assistance to small subsistence farmers to increase crop production
The Netherlands	Sea level rise	Adoption of the Flooding Defence Act and Coastal Defence Policy as precautionary approaches allowing for the incorporation of emerging trends in climate; building of a storm surge barrier taking a 50 cm sea-level rise into account; use of sand supplements added to coastal areas; improved management of water levels through dredging; widening of river banks, allowing rivers to expand into side channels and wetland areas; deployment of water storage and retention areas; conducting regular (every five years) reviews of safety characteristics of all protecting infrastructure (dykes etc.); preparation of risk assessments of flooding and coastal damage influencing spatial planning and engineering projects in the coastal zone, identifying areas for potential (land inward) reinforcements of dunes
United Kingdom	Floods; sea level rise	Coastal realignment under the Essex Wildlife Trust, converting over 84 ha of arable farmland into salt marsh and grassland to provide sustainable sea defences; maintenance and operation of the Thames Barrier through the Thames Estuary 2100 project that addresses flooding linked to the impacts of climate change

Source: Adger et al., 'Assessment of adaptation practices, options, constraints and capacity', in *Climate Change 2007 WGII AR4 IPCC* (2007): IPCC.

### Legal policy instruments

Governments have a variety of legal powers they can use to address climate change adaptation issues. Examples include legislation, regulations, national budgets, permits and licences. Legislation can also correspond to international agreements. Most countries in the world have signed the UNFCCC. But international commitments are often quite vague in nature and need to be made more specific as they are adapted to national circumstances, for example by setting targets and timelines for implementation.

For many SAIs, compliance audits can only be conducted if national laws exist in relevant fields. In performance auditing, enacted legislation is typically an audit criterion against which to measure government performance. Many countries have introduced sustainable development as part of national legislation, an issue that can be extra pressing and relevant in the context of climate change and adaptation.<sup>94</sup>

<sup>94</sup> See the two INTOSAI WGEA guidelines, *The World Summit on Sustainable Development: An Audit Guide for Supreme Audit Institutions and Sustainable Development: The Role of Supreme Audit Institutions*, for tips and hints on how to audit sustainable development.

### **Economic policy instruments**

Governments can use economic tools and incentives, such as grants, subsidies, taxes and user charges, to promote adaptation. This also involves market instruments aimed at influencing behaviour by sending price or other signals.

One example is governments giving tax credits to investment funds that focus on adaptation. Another could be labelling or certification schemes to promote certain products.

Governments can contribute funds to adaptation-related activities. Domestic initiatives can include funding of the monitoring of climate systems and technology development and diffusion. Furthermore, developed countries contribute fresh funds for adaptation in developing countries. This is part of the commitments of the UNFCCC (to which we will return in Step 3), but funding for climate change adaptation can also be integrated into, for example, other development policies.

### **Other policy instruments**

Informational policy instruments can take the form of information, campaigns aimed at changing attitudes and guidance or advisory activities. Promoting public education is one example. Knowledge and awareness about climate change impacts, vulnerability and adaptation are important. Governments often play a key role in promoting public knowledge and awareness of these issues.

Organisational policy instruments can play a part in designing and changing organisational structures and processes to enable entities to function in a more efficient, effective and goal-oriented manner. The way a government chooses to organise its administration could strongly affect adaptation, as summarised below in the section on good governance.

Another kind of organisational policy instrument is the establishment of public-private partnerships, although these are temporary structures. Voluntary agreements between government and private players can be used to reduce the potential impacts of climate change and decrease vulnerability. Private players include businesses, NGOs, research institutes and community organisations.

Physical policy instruments can remedy certain types of conduct or make a course of action difficult to carry out. For climate change policy, the siting of physical structures such as airports, roads and railways may reduce the risk of damage caused by changes in climate. Building flood barriers and maintaining coastal vegetation also fall under this category.

Technology and science, promoted through international agreements (see Chapter 3), are very relevant policy instruments for adaptation to climate change.

### **6.2.3 Key question: Who are the public players and what are their responsibilities?**

Who is responsible for carrying out adaptation policies varies between countries. In some countries, this responsibility is divided between several government bodies, while in others a single government authority is responsible for environmental or climate change-related issues. In many countries, responsibility is divided between national, sub-national and local authorities.

There can also be considerable differences between countries when it comes to who formulates policies and who carries them out. It is important to understand who the relevant players are when identifying risks, formulating relevant audit questions and deciding to whom to address audit findings.

Adaptation is a complex policy area that covers many sectors, such as agriculture and forestry, infrastructure and health, and it is therefore often interlinked with other government responsibilities. Especially when considering long-term adaptation efforts, the auditor must be aware of how a wide range of players and overlapping responsibilities may have an impact on adaptation strategies.

### **6.3 Step 3: Choose audit topics and priorities; decide on audit objectives**

In Steps 1 and 2, the auditor identified the need for adaptation and the governmental response to climate change adaptation needs. Armed with this information, in this step the auditor chooses audit topics. Risk analysis, consideration of how an audit will contribute to better governance and the availability of audit criteria and evidence are important factors for the auditor when making this choice and, at the end of this step, defining the audit objective.

The auditor could answer the following key questions to analyse the risk and decide upon relevant topics and audit objectives:

- Effectiveness – what are the risks related to the results of policies and instruments?
- Efficiency – are things being done in the right way?
- Economy – is the government focusing on keeping the costs low?
- What risks should be prioritised in an audit? Define the audit objective.

As illustrated and described in Chapter 4, economy and efficiency have an impact on effectiveness. Such interconnections could be detected when assessing risks by answering the different key questions in this step. If risks are identified, they may also have an impact on effectiveness. If this is the case, they should be reflected when designing audit questions in Step 4.

#### **6.3.1 Key question: Effectiveness – what are the risks related to the results of policies and instruments?**

Auditing the effectiveness of adaptation policies can involve two questions: firstly, have the policy objectives and targets been achieved and, secondly, can this be attributed to the policy pursued?

When auditing mitigation policy, the results of implemented policies can be measured as quantified emissions. When auditing adaptation policy, the policies are more integrated in each sector and the results are often difficult to detect and measure in short term time scale.

When considering risks in goal achievement (effectiveness), the targets identified must be concrete and auditable. Short-term targets, such as emergency preparedness for flooding or extreme weather events, could be considered at the output-level: whether plans, persons, infrastructure, roles and responsibilities are in place to reduce the possible damage. Long-term target achievement, such as ensuring the food or water supply, could also be assessed by considering whether the policy instruments are effective in reaching the targets. The output might be improved food security or protected water supply; the outcome could be to avoid hunger.

In addition to looking at the results of policies and programmes, auditors can also look at the impacts of adaptation policies.<sup>95</sup> This often also involves taking the impact of external factors into consideration. One particularly relevant factor in the context of adaptation is the weather, since governments can do little to

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<sup>95</sup> The ISSAI 3000 refers to this as effectiveness auditing in its 'true' sense (p. 19)

control it. Another example is socio-economic development that influences adaptive capacity but is often external to specific adaptation projects.

At a minimum, auditors should concern themselves with the output of policies. Are the outputs in line with the objectives and targets set? A more extensive risk assessment also considers the outcome and impact of the implemented policies.

There are a number of risk indicators auditors should keep in mind:

- Risk assessments also include making judgements about priority areas, i.e. areas that were identified as particularly vulnerable in Step 1. If the response identified in Step 2 is not in line with the assessments made in Step 1, auditors can often conclude that areas that are vulnerable to the impacts of climate change or regarded as important by the public are omitted in the policy response. This makes the risk of ineffectiveness likely.
- If detected in Step 2, a prime risk indication is that the objectives and targets of policies are insufficiently clear or too complex, or that the roles and responsibilities of public bodies are unclear. This can often be the case for adaptation policies, as this is a policy area often involving several different sectors and programmes.
- Other indicators include analyses from other comparable countries showing that certain programmes, policies and instruments have had little effect and criticism from the UNFCCC or other review mechanisms related to the reporting requirements of the Convention and the Kyoto Protocol, and any unforeseen effects a policy might have had.
- If the auditor detects that the government does not use its full potential to govern (described in the next key question), risks of ineffectiveness, including fraud and corruption, are also likely (see Box 6.6).

### **6.3.2 Key question: Efficiency – are things being done in the right way?**

As described in Chapter 4, efficiency greatly affects effectiveness.

#### ***Risk analysis: whether the principles of good governance are implemented***

Governance can be considered as internal processes, the relationship between input and output in the result model described in the introduction (efficiency). The principles of good governance were described in Chapter 3. They include clear objectives and targets for policies, adequate information and an internal control system.<sup>96</sup>

A risk area in government response is whether the government has assessed the key vulnerabilities. Has the government made progress in producing a comprehensive and coherent country-specific risk assessment? Evaluations of risk assessments can be based on information gathered in Step 1.

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<sup>96</sup> Internal control systems are also relevant in financial auditing (see below).

Another risk area could be whether the government is focusing on keeping costs low or spending economically (economy). Are good procurement procedures in place? The risk of corruption can be substantial in many instances, among other things because of the asymmetric relations created by technical expertise (see Box 4.10 about fraud and corruption).

A risk is also likely to be present if the governmental policies do not respond to all targets and relevant sectors. They should correspond to the climate change-related threats identified in Step 1 and targets in Step 2. Has the government developed a strategy that includes all major areas identified (for instance in the Nairobi Work Programme<sup>97</sup>)?

Auditors can also check whether there are conflicting objectives and targets. This is particularly important in order to avoid maladaptation or adaptation that will have negative effects on other sectors. Furthermore, auditors can ask whether the objectives and targets reflect immediate or short-term impacts and vulnerability as well as long-term considerations relating to future adaptation needs.

Negative environmental consequences of governmental response are likely if environmental impact assessments (EIAs) have not been carried out.<sup>98</sup> As adaptation policies are often interlinked with other sectors and policy areas, it could be an indication of inadequate planning if such assessments have not been performed. EIAs are equally relevant in connection with both adaptation and mitigation policies. In some cases, governments can be obliged by law to carry out EIAs, and auditors can check for compliance.

Risks of inefficiency are likely if the government has a complex management structure.<sup>99</sup> Has responsibility for carrying out adaptation activities been delegated to other ministries and levels of government? Is one ministry responsible for coordinating adaptation activities? Complex management systems and unclear delegation of responsibility can, for example, be an indication of problems relating to compliance with laws and regulations

Risks of inefficiency are also likely if the government has not adequately:

- Put in place an appropriate system for monitoring, coordination, integration, a clear division of responsibility, measurement, reporting and accountability.
- Produced information about performance that is complete, valid and reliable. If it has, has it used this information to review and improve existing policies?
- Developed a system for managing risks to promote goal achievement.

Auditors can check for compliance with commitments stemming from international conventions. The most relevant to adaptation policy auditing is the UNFCCC. They are listed under Step 2. As they can be regarded as soft commitments, it can be tempting for governments to postpone the formulation of adaptation programmes. If the UNFCCC commitments have not been translated into national political action, the SAls could play an important role in driving this process forward.

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<sup>97</sup> See UNFCCC, Nairobi work programme on impacts, vulnerability and adaptation to climate change: [http://unfccc.int/adaptation/sbsta\\_agenda\\_item\\_adaptation/items/3633.php](http://unfccc.int/adaptation/sbsta_agenda_item_adaptation/items/3633.php).

<sup>98</sup> EIAs are used to ensure that the impact of policies and instruments do not have unintentional, negative effects and that potential effects are considered before legislation is enacted.

<sup>99</sup> See criteria for good governance, section 3.2.1 Effective accountability arrangements

Many developing countries face the dual challenge of being exposed to the impacts of climate change and having low adaptive capacity. In this context, it is particularly important that vulnerability assessments are carried out. National Adaptation Plans of Action (NAPAs) and the UNDP's Adaptation Policy Framework (APF) are useful tools for governments to utilise in such circumstances.<sup>100</sup> If such a plan has been formulated, it can be an important source of information, both for policy makers and auditors. If one has not been formulated, auditors could look into the reasons for the government not doing so.

***Risk analysis: whether the financial resources are misstated***

Many of the risk elements mentioned above are relevant to financial auditing. Complex management systems and diverse responsibilities are likely to increase the risk of material misstatements.

Assessing and analysing the *inherent* risks of financial misstatements in the context of climate change adaptation is particularly important given that the consequences of material misstatements may be significant even if public expenditure is not very high.

Factors that indicate inherent risks of material misstatements in an adaptation context include:

- Implementation of programmes or major changes being made to existing ones
- Introduction of new legislation, regulations and directives
- High public expectations, as adaptation is often directly related to people's livelihood
- Programmes without sufficient allocated resources and funding: lack of funding is identified as a 'major barrier' to adaptation in developing countries, a problem that is compounded by the distance between many of the local adaptation activities and the international character of, for example, the Global Environment Facility (GEF).<sup>101</sup>
- The transfer of funds and technology (which the UNFCCC commits its member Parties to), particularly as these transfers are transnational and made between developing and developed countries (see Box 6.6)
- Public-private partnerships relating, for example, to insurance programmes for natural disasters could be susceptible to corruption

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<sup>100</sup> See Chapter 3 for more background information on the NAPAs and the APF.

<sup>101</sup> See UNFCCC, *Climate change: Impacts, vulnerability and adaptation in developing countries*. See also <http://www.gefweb.org/> for more on the GEF.

**Box 6.6: Risks of fraud and corruption**

To start with the economic incentives, at present, the funds managed through the Global Environmental Facility (GEF) to support adaptation are quite limited compared with the funds already allocated to mitigation measures and, to a large extent, channelled through the global carbon market.\* However, recent studies by the UNFCCC secretariat show that the amount of funding for adaptation will have to increase sharply in coming years to reach the level of annual investment and financial flows needed for adaptation in 2030.\*\* In other words, the economic incentives for carrying out fraudulent and corrupt practices are likely to be stronger also in the adaptation context in coming years. As to the question of opportunity, it should be underlined that the mechanisms and systems related to climate change adaptation are different from the Kyoto mechanisms in many respects, as the former are more similar to and linked with 'traditional' Official Development Assistance (ODA). However, adaptation measures still face many of the same challenges as mitigation measures with respect to monitoring, control and enforcement (described in key question 3.4 in the mitigation part).

\* As of October 2006, USD 215 million was available through GEF to support adaptation. ('Frequently Asked Questions about GEF's Work on Adaptation', Global Environment Facility, October 2006.

\*\* About USD 50 billion in 2030. 'Climate Change: Impacts, Vulnerabilities and Adaptation in Developing Countries', UNFCCC 2007, p. 52.

The auditor must also understand the audited entity's internal control system.<sup>102</sup> Climate change adaptation can be a field that sees rapid growth of both funding and operations, where new technologies are applied or foreign operations are expanded. These conditions make it particularly important that management establishes its own control system. The management must also ensure that a proper control environment exists, including management's attitude, awareness and actions. External auditors should direct their attention to areas where this system is inadequate.

### **6.3.3 Key question: Economy – is the government focusing on keeping the costs low?**

Routines and procedures should be implemented to reduce the costs at a lowest level as possible, for instance in case of acquisitions.

Auditors could also look at both the actual and potential costs of adaptation programmes. A key challenge here is that the audited entity may not distinguish environmental costs from expenditure relating to its ongoing activities.<sup>103</sup> Financial audits could also consider the costs of the impacts of climate change if no government action is taken to adapt to these impacts. However, such assessments require highly complex calculations. SAIs could rely on third party estimates, taking extra care to ascertain the quality of such judgements.

<sup>102</sup> For a description of standards for internal control systems the reader is referred to the good governance section in Chapter 3.

<sup>103</sup> INTOSAI WGEA, *Guidance on Conducting Audits with an Environmental Perspective* (2001): INTOSAI.

### **6.3.4 Key question: What risks should be prioritised in an audit? Define the audit objective**

Risk assessment is a planning tool for identifying the most important topics before designing the audit. The auditor may have identified risks concerning effectiveness, efficiency and/or economy in the governmental response aimed at adapting to climate change in this step .

If relevant risks are identified in governmental response aimed at mitigating climate change in this step, the auditor may be of the opinion that an audit should be conducted. After prioritising among the different risks identified, the auditor may be able to decide upon the audit objective.

In connection with this key question, the auditor could:

- Prioritise among the risks by considering their relevance. Certain considerations are recommended when prioritising:
  1. Are the risks most crucial at the overall governance level, the sector level or at both levels?
  2. Are the risks relating to the use of a policy instrument related to effectiveness, efficiency and/or economy?
  3. To what extent will the planned audit add value?
- Define the audit objective. The final considerations in this step can result in summing up the risk areas and define what will be achieved by conducting the audit (audit objective).

These are essential considerations before designing the audit in Step 4.

#### **Are the risks at the overall and/or sector level or both?**

Depending on the audit mandate and identified risks, the SAI must decide whether the audit should cover overall targets and management levels or be limited to certain relevant sectors.

When carrying out audits of adaptation, auditors can choose between a sector approach and an approach that encompasses a more comprehensive or holistic view of the government's adaptation efforts.

If an assessment of the impacts of climate change shows that there are particular sectors that are vulnerable, auditors could focus on these sectors. Some of the more vulnerable sectors were mentioned in Step 1 above. Depending on your national or local context, some of the following sectors may be relevant:

- Forestry, agriculture (arable land and livestock) and fisheries
- Infrastructure (transport; public, residential and commercial buildings etc.)
- Coastal zones, flooding and slides
- Food supply
- Public health
- Tourism
- Sensitive ecosystems

Auditors could also consider risks relating to whether the policy response is particularly inadequate in one specific sector. Findings from one sector could also give indications of weaknesses in other sectors.

A holistic approach can be usefully employed to obtain an overview of the government's general response to climate change impacts, vulnerabilities and adaptation. If risks are likely and an overall response to adaptation needs is lacking, this could be the place to start. If responsibility is divided between many players and between several levels of government, auditors could adopt a holistic approach to shed light on the consequences of unclear responsibilities.

### **Are the risks related to the use of specific policy instruments?**

In performance auditing, the auditor could conclude on whether some key policy instruments seem ineffective and should be focused on in an audit. It could also be the case that policy instruments are lacking, leading to ineffectiveness. A general delay in implementing policy instruments indicates that the government is not getting the most out of the financial resources.

In financial auditing, a system-based approach might be relevant when considering whether emission data and money transfers among the key players are reliable and transparent.

In compliance auditing, it will be relevant to focus on policy instruments if risks are identified when considering whether the management follows rules, standards and international agreements in its use of specific policy instruments.

### **How will the audit add value?**

The auditor should return to the questions asked in the introduction to Step 3 (page 86) by considering the impact of auditing the identified risks related to effectiveness, efficiency and economy.<sup>104</sup>

The auditor can decide on whether the audit will add value by considering:

- Relevance in terms of improving management systems and policy instruments.
- Appropriateness of timing
- The likelihood of obtaining new knowledge or perspectives

### **What audit objective is preferable?**

The scheme in the next page could help the auditor to conclude by describing the judgements made in this step and defining the audit objective, before designing the audit in the next step.

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<sup>104</sup> See also Appendix 1

Table 6.2: A scheme for structuring the conclusions and audit objectives

<b>Situation: What is the environmental problem?</b> (greenhouse gas emissions)	<b>'Complication': What has the government done to reduce the problem? Is it sufficient?</b> (performance risks)	<b>Materiality: Why is the issue important?</b> <b>Consequences when performance risks are likely</b>
<b>Audit objective:</b> What do you want to achieve through the audit? What is the added value of the audit?		

## **6.4 Step 4: Design the audit**

As described in the section on mitigation, the purpose of this step is to proceed from audit objective to the design of the audit. In the introduction to this chapter, we proposed using a design matrix in this process. This involves converting the audit objectives into audit questions, formulating researchable questions and identifying criteria and evidence.

This step will be organised differently for adaptation than for mitigation. Many countries have international commitments for mitigation. For adaptation, the main issue is to understand the threats climate change presents. There are no clear-cut international commitments that bind countries in this context. However, the UNFCCC does state that countries must formulate and implement programmes to facilitate adequate adaptation. As we point out in Step 2, formulating a programme presupposes knowing what that programme is intended to respond to.

We therefore identify understanding of the threats as a basic starting point for adaptation efforts. Then the auditor can proceed to examine whether the plan, strategy or programme has been developed in a satisfactory way. Auditors can also look at the efficiency of governance systems. Finally, if a strategy or plan has been implemented, the auditor can assess the effectiveness of the policy instruments that have been employed to tackle climate change.

As described in the introduction to this step (Chapter 4), in this step it could be useful to consider the feasibility of carrying out the audit at the same time as designing the audit.<sup>105</sup>

In this step, we will present four audit questions:

1. Have the responsible ministries identified the climate change-related threats?
2. Does the government have in place an overarching policy, plan or strategy?
3. Is the governance of adaptation efficient?
4. Are policy instruments effective?

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<sup>105</sup> See also Appendix 1

### **6.4.1 Have the responsible ministries identified the climate change-related threats?**

The natural place to start for auditors is to ask whether the responsible ministry, often the ministry of environment or of climate, adequately understands the threats climate change represents. Some of the information gathered during Step 1 of this guide can be useful for evaluating the government's assessment.

#### ***Researchable questions***

- Has the government made a commitment to undertake an overall assessment of climate change vulnerability, impacts and adaptation?
- Has the government produced a comprehensive and coherent country-specific assessment of climate-related risks?
- Has the assessment been subject to quality control, review and a consultation process?

#### ***Audit criteria***

As pointed out in Chapter 3, the UNFCCC can also be a source of audit criteria for audits of adaptation efforts. The Nairobi Work Programme can also be used as an audit criterion. It is not a binding document, but a series of documents that highlight best practices in the adaptation field. Even though the NWP was mainly developed to assist developing countries, it remains one of the most comprehensive frameworks for adaptation.

Several other international environmental agreements – e.g. on desertification or biodiversity – could also be used as audit criteria, as these areas are heavily influenced by climate change.

National legislation can also be a relevant source of audit criteria. Laws on area planning, building codes etc. may contain provisions that require assessments of present and future threats.

#### ***Audit evidence***

Interviews with the government ministry that is responsible for carrying out assessments of climate change are a good starting point for data collection.

#### ***Examples***

The first line of inquiry in the design matrix in Appendix 7 of this guide focuses on whether the government has adequately assessed the risk of floods and landslides, an issue that has become more pressing due to climate change.

## **6.4.2 Does the government have in place an overarching policy, plan or strategy?**

Based on the assessment of climate change-related threats, the government should respond to the identified threats. This was also the message of Step 2 in this guide, and auditors can use this information as a starting point for evaluating the government's overall response. The focus can be on the overall response, as well as on strategies or plans covering several sectors where climate change is an important factor.

### ***Researchable questions***

- What commitments has the government made in relation to adaptation to climate change?
- Has the government developed a policy, plan or strategy for adaptation that responds to all major identified impacts and vulnerabilities, both short and long-term?
- Have judgements been made and communicated about the extent to which threats are to be avoided, mitigated or accepted?
- Has the government assessed and clearly stated its understanding of the costs and benefits of adaptation efforts?
- Has the government identified relevant policy instruments for adaptation to climate change?

### ***Audit criteria***

Auditors can use the UNFCCC as a criterion here. Section 3.1.3 presents the commitments, including the commitment to formulate and implement programmes and strategies to facilitate adequate adaptation. The UNDP Adaptation Policy Framework (APF) is a source of best practice for adaptation policy formulation.

### ***Audit evidence***

The policies, plans and strategies can be evaluated to see whether they cover all relevant threats. Government documents should also contain information about costs and benefits.

### ***Examples***

The SAI of Canada has carried out an audit of the federal government's progress in implementing a strategy for climate change adaptation (see Box 7.1.4). The responsible government agency had not yet developed such a strategy. Furthermore, coordination between government agencies was inadequate. This is also an interesting finding in relation to the next line of inquiry, which focuses on the efficiency of governance.

### **6.4.3 Is the governance of adaptation efficient?**

As adaptation is often an issue that involves many sectors, different ministries and many players with conflicting responsibilities, efficient governance systems and clear coordination are important.

#### ***Researchable questions***

- Are the roles and responsibilities assigned to government agencies clear, well-defined and documented?
- Are adaptation efforts coordinated across government to ensure they are complementary rather than conflicting?
- Has the government put in place sufficient and effective systems for monitoring, coordination, integration, assigning clear responsibility, measurement, reporting and accountability?

#### ***Audit criteria***

Specific audit criteria relating to the efficiency of governance will often be of a national character. In Section 3.1, we presented a number of criteria that can be regarded as the basis for best practice in governance. Auditors can use these criteria to evaluate governmental performance.

#### ***Audit evidence***

Auditors can check whether climate change has been taken into account in planning documents.

#### ***Examples***

Several of the questions under the second line of enquiry in the flood and landslide design matrix deal with coordination and handling of responsibility (see Appendix 7). One important element is the relationship between national government agencies and players at the municipal level.

#### **6.4.4 Are policy instruments effective?**

Focusing on the results of policy instruments can be valuable for short-term adaptation efforts, for instance emergency planning or flood defences. Generally, auditors can audit the effectiveness of policy instruments as long as clear objectives and targets have been set for the policies. For longer-term adaptation, the objectives and targets may be less clear.

##### ***Researchable questions***

- Are overall expected results being achieved?
- Is the government on track to meet its national or international commitments?
- Is the government monitoring and evaluating overall performance?
- Is the government reporting in a transparent way on overall performance? Is the information complete, valid and reliable?
- Does the government monitor and evaluate performance for specific policy instruments?
- Does the government report in a transparent way on performance for specific policy instruments? Is the information complete, valid and reliable?
- If progress is unsatisfactory – overall or for specific policy instruments – does the government understand the reasons and is it addressing the problems?

##### ***Audit criteria***

National laws, regulations and directives can be used as audit criteria. The UNFCCC does not stipulate any concrete policy instruments, but, as we will see below, it does commit its member countries to promoting research, technology and public awareness.

##### ***Audit evidence***

Reports from the responsible ministries can be used to assess the effectiveness of policy instruments. Comparisons with the results from other and comparable countries or sectors can also be valuable.

##### ***Examples***

An audit by the SAI of the United Kingdom on building and maintaining river and coastal flood defences found that more could be done to improve the cost-effectiveness of the responsible government agency's management. This audit has been summarised in Box 7.2.1 in the next chapter.

### **Focusing on monitoring and forecasting impacts**

Monitoring climate trends and forecasting future impacts is important because it provides invaluable information about what adaptation will be necessary in the years to come. On the one hand, this is part of the current policy response in that government should use funding and other incentives to promote research, and, on the other, it is part of future policy responses, as monitoring and forecasting impacts will form an important basis for assessing future climate change-related threats.

#### *Researchable questions*

- Has the government identified and prioritised the necessary modelling and monitoring activities and programmes?
- Does the government have access to the capacity required to undertake such activities and programmes?
- Has the government implemented the activities and programmes?
- What results have been achieved?
- Have the activities and programmes been evaluated? Has the feedback been used to improve them?

#### *Audit criteria*

The UNFCCC commits its member countries to promoting scientific research, modelling and forecasting. For more on this, see Chapter 3. The guidelines for national communications can also be used. National research programmes often also contain commitments for governments.

### **Focusing on technology and funding**

In Step 4 on mitigation, we focused on technology and funding. Although the researchable questions and audit criteria listed in that section were aimed at controlling emissions, many of them also apply to adaptation efforts. We therefore repeat them here, but from an adaptation viewpoint.

#### *Researchable questions for technology*

- Does the government have procedures in place for identifying, evaluating and implementing technology development programmes?
- Has the government followed these procedures?
- Has the government identified internal and external barriers to adaptation technology deployment and transfer?
- Do the programmes comply with national rules and procedures regarding governance, accountability, oversight requirements and management?
- How have activities and programmes been coordinated internationally?

*Researchable questions for funding*

- Does the financing comply with internal financing rules and regulations?
- What procedures are in place for coordinating and avoiding duplication across funding agencies, programmes and the private sector?

*Researchable questions for countries involved in transfers of funds*

- Are funds obtained from donor countries to support programmes and projects aimed at adapting to climate change?
- Is there a robust framework in place to manage received funds?
- Is the provision of funds facilitated through an appropriate fund transfer framework aimed at building capacity and achieving results in recipient countries?
- Does the funding for climate change projects and programmes come in addition to funding for development assistance?
- Is adequate and reliable information on donor funding and its use available and easily accessible?
- To what extent does the funding contribute to improve adaptation in the recipient countries?

*Additional audit criteria for transfers of funds*

Even though the Convention and the Protocol mention funding and financing, auditors can also use criteria more commonly used when auditing development assistance. These include donor agreements and international evaluation criteria for development assistance under the UN.

# Chapter 7: Audits of Climate Change

## 7.1 Audits of mitigation

### Box 7.1.1: Is the CDM fulfilling its environmental and sustainable development objectives?

#### Background

The report is an evaluation of the CDM and options for improvement. The report was prepared by the Institute for applied Ecology for WWF and published in November 2007.

#### Scope (lines of enquiry and methodology)

The sample consisted of 93 registered CDM projects, and the analysis includes the following factors:

- credibility and liability when reporting on additionality
- whether a CDM project helps to achieve sustainable development, and whether this is assessed and emphasised by the host country governments.
- whether an appropriate stakeholder consultation has been carried out in connection with the project.

#### Overall conclusions

- The CDM has been very successful in creating a global market for GHG emissions, but has so far not been very successful in achieving a high level of environmental integrity and helping host countries to achieve sustainable development. There is certainly room for improvement.
- The performance of DOEs (the 'extended arm' of the CDM Executive Board that implements the validation and verification process) appears to be rather varied.
- For a significant number of projects that were registered during the past three years, additionality seems unlikely or questionable. The overall contribution of the CDM to helping host countries to achieve sustainable development – in spite of being the prerogative of the host country – is rather small.
- Despite the problems that we currently face in the CDM regarding its environmental integrity and sustainable development objectives, the CDM has had a great impact on the thinking of business and policy makers in developing countries and awareness and understanding of clean technologies, emissions trading and future action on climate change, both in the private and public sectors.

#### Recommendations

- CDM policy allows for the crediting of government action to implement policies and measures, and it is likely to reduce transaction costs. To make it easier to assess additionality, the policies and measures should be credited indirectly in a sectoral approach. Further expiation is needed to make the sectoral CDM feasible.
- There is a clear trade off between additionality and benefits in terms of sustainable development. Excluding projects that have few benefits only makes sense if additionality is improved.
- Increasing emission trends in the ETS sector may lead to a long-term lock-in to technologies that will make it more difficult to achieve ambitious emission reductions in the next decades. To avoid such lock-ins, the use of CDM and JI should be limited and supplementary to the EU ETS.

#### Reference

<http://www.oeko.de/oekodoc/622/2007-162-en.pdf>

## **Box 7.1.2: The SAI of Canada: Reducing GHGs emitted during energy production and consumption**

### **Background**

This report is Chapter 3 of the report of the Commissioner of the Environment and Sustainable Development to the House of Commons for 2006.

### **Audit objectives**

Determine whether the federal government can demonstrate:

1. Whether selected federal government programmes achieved expected results in reducing GHG-emissions during the production and consumption of energy in Canada.
2. Whether selected programmes contribute as expected to the achievement of its broader short-term commitments and long-term goals for GHG-emission reductions.

### **Scope (lines of enquiry and methodology)**

Under objective 1, the audit covered three energy programmes and initiatives implemented in the period 2000-2006, each funded by \$ 100 million or more. Under objective 2, programmes intended to reduce GHG-emissions were examined. The SAI interviewed government officials and key stakeholders such as recipients, provincial government officials and relevant leaders in the energy field. In carrying out the audit, the SAI also reviewed programme files, reports, financial statements and other documents, as well as field visits to sites receiving funding.

### **Criteria**

- Criteria related to results:
  - Establishing of result indicators and evidence that these were being used
  - Measures that assure the quality of the information, and identify and manage key risks
  - Adjustments and corrective actions
- Criteria related to financial management:
  - Fair and reliable information about all appropriations and expenditures
  - Systems in place to provide financial management control
  - Measures that assure the quality of the information
- Fair and reliable information on how programmes contribute to the achievement of governmental goals for GHG emission reduction is dependent on:
  - Clearly defined common goals and relationships among programmes
  - Performance indicators based on goals and applicable to programmes
  - Evidence that performance was measured, compiled and reported based on indicators and contributions to common targets
  - Measures that identified and managed key risks
  - Adjustments to the programme based on relevant information

### **Audit evidence**

- Each of the programmes has made progress, and in 2006 they had achieved 22 percent of the reduction expected by 2010. Confusing emission targets made it difficult to determine the actual results, and public reports did not consistently describe the contribution to emission reductions and other targets.
- The Wind Power Production Incentive is also progressing towards its targets, and the programme was adjusted based on lessons learned. A long-term strategy has yet to be developed.
- Efforts to reduce emissions from oil and gas productions had minimal results. The federal government is counting on technical solutions, but it has not clearly stated how and to what extent Canada will reduce greenhouse gas emissions when oil and gas production are expected to increase.

### **Recommendations**

- Natural Resources Canada should ensure that a wind power strategy for Canada is developed, and that the evaluation of the Wind Power Incentive is completed. It should also carry out an economic analysis to clarify the economics of wind power and implications for the wind power programme.
- The Government of Canada should clarify how and to what extent the oil and gas sector will contribute to GHG emission reductions, and develop an implementation plan.
- Natural Resources Canada should ensure the establishment of concrete and clear emission targets for each programme funded for this purpose. The Department should provide clear and detailed information about performance and the costs of these programmes.

### **Follow-up**

Natural Resources Canada agrees with the recommendations, but does not fully indicate when and what action will be taken to follow up the audit.

### **Reference**

[http://www.oag-bvg.gc.ca/internet/English/parl\\_cesd\\_200609\\_02\\_e\\_14984.html](http://www.oag-bvg.gc.ca/internet/English/parl_cesd_200609_02_e_14984.html).

### **Box 7.1.3: The SAI of the Netherlands: The European Trading Scheme and its implementation in the Netherlands**

#### **Background**

The effectiveness of an emissions trading scheme (ETS) can be limited if there are a large number of emission allowances, and low market prices thereby lead to the whole potential to reduce GHG emissions not being utilised. The ETS system may also tempt companies to present their emissions as lower than they really are. The audit was completed in December 2006 and updated in May 2007.

#### **Audit objectives**

Determine whether the Netherlands has properly implemented the EU ETS in a way that meets the goals of Dutch Kyoto policy and ensures the effectiveness of the CO<sub>2</sub> Emissions Trading Scheme.

#### **Scope (lines of enquiry and methodology)**

The audit focused on:

1. How the ministers determined the total amount of CO<sub>2</sub> emission allowances and how this amount had been allocated among companies in the second national allocation plan (NAP 2)?
2. To what extent did the European CO<sub>2</sub> emissions trading system overlap with existing Dutch sustainability policy?
3. Is an adequate monitoring, supervision and verification system in place?

#### **Criteria**

#### **Audit evidence**

The main conclusion of this audit is that, by and large, the Netherlands has properly implemented the EU ETS, though, in setting and allocating the total number of CO<sub>2</sub> emission allowances, it placed rather too much emphasis on the interests and competitiveness of industry and electricity producers at the expense of the Dutch Kyoto goal. Moreover, the implementation of the trading system was not always transparent. As a result, the Netherlands did less to contribute to the potential effectiveness and efficiency of the EU ETS than it could have. It is fair to say that the Netherlands is probably not the only member state in this position.

- The total amount of emission allowances the government initially planned to set aside for the second trading period entailed few restrictions on CO<sub>2</sub> growth, thereby giving rise to a not insignificant risk that the Netherlands would fail to meet its Kyoto goal.
- The allocation of CO<sub>2</sub> allowances was dominated by the financial interests and the competitiveness of the participating companies. The process was also insufficiently transparent; the allowances were allocated partly on the basis of confidential information that is not available to the public (including the Netherlands Court of Audit) and is thus impossible to verify.
- Owing to the introduction of the EU ETS (in 2005), existing Dutch sustainable energy policy has become less effective in reducing CO<sub>2</sub> emissions. The policy should have been subjected to a cost-benefit analysis after the introduction of the ETS. This has yet to occur.
- There is no reason to conclude that the data provided by Dutch companies about their CO<sub>2</sub> emissions are not sufficiently reliable. There is, however, room for improvement in the monitoring, supervision and verification system.

#### **Recommendations**

- In the upcoming debate in Brussels on the modification of the trading system, the government would be well advised to advocate a greater measure of harmonisation among the member states with regard to determining allowance totals.
- The allocation of CO<sub>2</sub> emission allowances should be more harmonised across the EU. A simpler and more transparent allocation of emission allowances is needed.
- The government should conduct a cost-benefit analysis of every instrument associated with the sustainable energy policy, and on that basis reconsider the advisability of that instrument.
- In the future, the reliability of the emissions data should be made less dependent on subsequent verification. The validation of the monitoring plans, the compliance supervision and the verification of the emission reports should be more balanced.
- To enhance the quality of the monitoring, supervision and verification system as a whole, more information from the verification stage should be made available to the NEa.
- The government should continue to push for the EU-wide harmonisation of the accreditation of verifiers.

#### **Follow-up**

#### **Reference**

#### **Box 7.1.4: The SAI of Canada: Managing the Federal Approach to Climate Change**

##### **Background**

Audit work for this chapter was largely completed on 14 June 2006.

##### **Audit objectives**

1. To determine the extent to which the federal government has put in place a suitable management framework for the climate change initiative
2. To determine whether the federal government is able to assess its major climate change spending and report reliably and fairly on the costs involved in the climate change initiative
3. To determine whether greenhouse gas emission reduction strategies, including targets and policy tools for selected sectors such as transportation and large final emitters, are based on sound data and analysis
4. To determine whether the federal government is prepared to implement an effective domestic greenhouse gas emissions trading system in Canada

##### **Scope (lines of enquiry and methodology)**

The audit focused on three central agencies and five departments based on their relative contribution to the federal climate change initiative. For each audit objective, the SAI of Canada interviewed departmental officials and reviewed departmental files, reports, and other documentation. Stakeholders were also interviewed about perspectives on federal performance, including that of provincial governments, industry, environmental non-government organisations, and market experts in the area of emissions trading. The SAI also identified international practices concerning emissions trading by reviewing key documentation and consulting relevant stakeholders.

##### **Criteria**

- Objective 1: The federal government should develop and implement a regime for managing and coordinating the federal climate change initiative, and the Privy Council Office and Treasury Board Secretariat should play appropriate roles in managing this horizontal initiative.
- Objective 2: The government should develop and implement a framework for monitoring and reporting climate change expenditures.
- Objective 3: The federal government should conduct adequate analyses (economic, environmental, social and risk) with respect to Canada's overall greenhouse gas emissions reduction target, sectoral emissions reduction targets, and selected policy tools.
- Objective 4: The federal government should conduct adequate analyses, identify main steps, develop an action plan and implement required actions for Canada's proposed domestic emissions trading system.

##### **Audit evidence**

- The government has made efforts to develop a management and accountability framework, but has yet to create an effective governance structure for managing its climate change activities and produce reporting on performance results.
- There is no government-wide consolidated monitoring and reporting of climate change expenditures. The Treasury Board Secretariat is currently developing a system for capturing spending and performance information.
- Three federal climate change plans were developed (in 2000, 2002 and 2005), and the emission reduction approach in two important areas (light-duty gasoline vehicles and large industry) may slow the increase in Canada's greenhouse gas emissions. Analyses were also insufficient to support some targets and policy tools.
- The SAI identified a lack of credible independent verification of the model, data and results used to determine progress in connection with voluntary agreements with the automotive sector.
- Government has made progress in mandatory facility reporting. Key risks, including the assurance of actual reductions in greenhouse gas emissions and transparency in reporting, remain unresolved.

##### **Recommendations**

Environment Canada should ensure that the national emission data system is real, measurable and verifiable, and that methods used to calculate the emissions are transparent. The uncertainties and risks associated with the system and the implementation of actions to address them should also be assessed on an ongoing basis.

##### **Follow-up**

The recommendations from the audit will be considered when developing an environmental agenda for reducing air pollution and greenhouse gas emissions.

##### **Reference**

[http://www.oag-bvg.gc.ca/internet/English/parl\\_cesd\\_200609\\_01\\_e\\_14983.html#ch1hd3c](http://www.oag-bvg.gc.ca/internet/English/parl_cesd_200609_01_e_14983.html#ch1hd3c)

## 7.2 Audits of Adaptation

### Box 7.2.1: The SAI of the United Kingdom: building and maintaining river and coastal flood defences in England

#### Background

This value for money report was prepared for presentation to the House of Commons and was released in June 2007. It was carried out in response to a streamlining of flood defence management; a similar report was published in 2001.

#### Audit objectives

Building on the progress made since the last report, this report sets out those areas where there is room for further improvements in the value for money performance of the Environmental Agency (EA).

#### Scope (lines of enquiry and methodology)

The report examines the management, by the EA, of flood risk from rivers and the sea. It focuses on the building and maintenance of flood defences. The methods used included interviews; data analysis, including financial analysis; a review of the asset inspection process; a meta-analysis of existing information on the cost of flooding; a review of flood risk management in three EU countries (France, the Netherlands and Poland); and stakeholder consultations.

#### Criteria

Improvements in cost-effectiveness to improve the value for money performance of the EA.

#### Audit evidence

To improve cost-effectiveness, the EA needs to address:

- Inconsistencies in the management of assets across the country
- The absence of reliable data on the lifespan of assets while scientific research is ongoing
- The lack of a clear management policy for dealing with assets owned and managed by third parties
- The need for further changes to existing work practices
- The focus on the construction of new flood defences to protect large numbers of additional households and to meet the Department's Public Service Agreement target is unlikely to benefit smaller rural communities
- The proportion of construction funds spent developing proposals, which limits the number of schemes that could otherwise be built
- Weaknesses in its data systems

#### Recommendations

The report recommends that the EA:

- Focuses attention more consistently on the maintenance of those flood defences which are considered to be medium or high risk
- Implements a national management policy for dealing with third party assets
- Draws up the findings of the planned benchmarking exercise to generate real maintenance efficiency savings
- Introduces the planned improvements in training for staff involved in maintenance and emergency response
- Conducts a review in accordance with good practice at the end of each major project to determine whether benefits were realised and identify lessons learned
- Streamlines its approval process so that detailed plans are not commissioned until the proposed project has undergone a simplified gateway review
- Makes improvements to the computer asset database

#### Follow-up

#### Reference

[http://www.nao.org.uk/publications/nao\\_reports/06-07/0607528.pdf](http://www.nao.org.uk/publications/nao_reports/06-07/0607528.pdf)

### **Box 7.2.2: The SAI of Canada: Adapting to the Impacts of Climate Change**

#### **Background**

This report is Chapter 2 of the report of the Commissioner of the Environment and Sustainable Development to the House of Commons for 2006.

#### **Audit objectives**

Determine whether the federal government, in cooperation with other levels of government and key stakeholders, as appropriate:

- has set priorities based on the identified risks to Canadians posed by climate change and developed a climate change adaptation strategy and action plans to manage the risks
- is implementing the climate change adaptation strategy and action plans, and is assessing, on a regular basis, the progress it has made in implementing adaptation measures

Determine whether the federal government has organised itself to obtain, analyse and disseminate sufficient and appropriate information to help identify the potential impacts on and risks to Canadians posed by climate change.

#### **Scope (lines of enquiry and methodology)**

The audit focused on whether Environment Canada (EC) and Natural Resources Canada (NRC) have adequately assessed the impacts of climate change on Canadians and developed and implemented an appropriate adaptation strategy and action plans consistent with Canada's commitments under the UNFCCC and the Kyoto Protocol. The audit also looked at other departments to capture specific roles in programme design, or knowledge management related to setting priorities.

#### **Criteria**

- Identification of priorities and development and implementation of action plans
- Information to identify and address potential impacts and risks

#### **Audit evidence**

- The government has not yet put in place key measures to support Canadians in adapting to a changing climate. Nor has it clarified how it intends to manage its own adaptation efforts.
- The government has not developed a strategy for federal adaptation efforts to indicate the expected results and timelines, and which departments would assume what responsibilities. Federal progress in working with provinces and territories has been limited.
- Some departments have begun work on their own strategies, but only one has been completed. Departments have made limited progress in using available information about the changing climate to assess potential implications on federal policies and programmes.
- The federal government has not yet organised its activities in climate science to make sure that the federal departments and others obtain the required information.

#### **Recommendations**

- EC and the Privy Council Office should identify the responsibilities and accountabilities of the federal departments and agencies that are to be involved in a federal adaptation effort. Those departments and agencies should then clarify how the Government of Canada will manage adaptation to a changing climate.
- Working with other federal departments and agencies producing or using information needed for adaptation efforts and with other levels of government and stakeholders, EC and NRC should identify and fill gaps in the required information, including results of impacts and adaptation research and results from climate science; and identify the need for initiatives that provide decision makers with access to information and technical expertise on adaptation tailored to their needs.

#### **Follow-up**

The department and central agencies have accepted all recommendations, but the responses make no firm commitments to specific actions with time frames for implementation.

#### **Reference**

[http://www.oag-bvg.gc.ca/internet/English/parl\\_cesd\\_200609\\_02\\_e\\_14984.html](http://www.oag-bvg.gc.ca/internet/English/parl_cesd_200609_02_e_14984.html); for a full list of objectives, the scope and approach, criteria and recommendations, see pp. 24-8.

# **Chapter 8: Success criteria in auditing climate change policy**

*[ If available – good practice on auditing will be included.]*

# Chapter 9 Appendices

## 9.1 Appendix 1 FAQs - Frequently asked questions

### How will the audit add value?

Audits are needed to conduct independent assessments of the economy, efficiency and effectiveness of all government activities. The matters under scrutiny should be relevant in terms of contributing to improved government spending, better public services and better accountability and management. The auditor should therefore consider the extent to which the audit will provide incentives for learning, change and improved conditions for decision-making. Factors that should be considered are relevance, accuracy, timing and new knowledge and perspectives.<sup>106</sup>

In order to add value, an audit could benefit from including considerations about the connection between the economy (keeping the cost low), efficiency (governance) and effectiveness (results and impacts) in auditing a specific climate change topic. When auditing effectiveness, the auditor should try to consider the causes of findings and observed problems. When auditing economy and efficiency, the auditor could clarify the impact of goal achievement.

### Is the topic auditable?

The auditor must consider whether the SAI has a mandate and authority to conduct audits of identified risk areas. Auditing the issue may have little effect if the most influential players or the most relevant audit approaches are not subject to the SAI's jurisdiction. Competent auditors are also needed who can provide an overview and insights into government activities.

Especially in performance auditing, the auditor must consider whether adequate criteria are available against which to measure government performance. The auditor must also make sure that the criteria are in line with the audit topic and the issue under scrutiny. Such criteria can be taken from a number of sources, including national legislation (state budgets, environmental laws) and international commitments (UNFCCC), as well as benchmarking and good practice.<sup>107</sup>

The quality of the information used in the planning stage and of the audit evidence is crucial when conducting the audit. The auditor should therefore consider whether the information or evidence required is likely to be available and can be obtained efficiently. If the auditor intends to use the work or opinion of experts as evidence, the auditor is responsible for the conclusions in the audit report.<sup>108</sup>

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<sup>106</sup> ISSAI 3000, Standards and guidelines for performance auditing based on INTOSAI's Auditing Standard and practical experience.

<sup>107</sup> International commitments and good practice were discussed in Chapter 3.

<sup>108</sup> ISSAI 3000, Standards and guidelines for performance auditing based on INTOSAI's Auditing Standard and practical experience.

## How is the UNFCCC's review process designed?

The UNFCCC has established a process for an 'in-depth' review of the national communications submitted by the Annex I Parties. The in-depth review is conducted by an international team of experts, coordinated by the UNFCCC secretariat. The review of each national communication aims to provide a comprehensive, technical assessment of a Party's implementation of its commitments. The in-depth review results in an in-depth review report, which typically expands on and updates the national communication. The in-depth review reports aim to facilitate the work of the COP in assessing the implementation of commitments by Annex I Parties. The reports also make it easier to compare the information in the Parties' national communications, although no common indicators are used. National communications from non-Annex I Parties do not undergo a similar review, but the Secretariat regularly compiles synthesis reports on these communications.

A separate annual review process has been established for submitted GHG inventories, and the information reported under the Convention and the Kyoto Protocol is reviewed jointly (if applicable). The review process takes place in three stages; the first two stages are carried out by the Secretariat, while, in the final stage, the information is subject to an in-depth review by a team of international experts representing Annex I and non-Annex I Parties. The review team prepares an assessment of the submitted information, including recommendations to the Party on aspects of improvements. The Party is given an opportunity to comment on the review findings before the review report is made publically available. The inventories are reviewed in accordance with review principles agreed by the Convention, the basic principle being that inventories must be accurate, complete, consistent, comparable and transparent. Adherence to the Guidelines developed and adopted by the IPCC is a main criterion.

Some aspects of the inventory reviews are specific to reviews under the Kyoto Protocol. Firstly, for every Party, review teams have reviewed the basis for stipulating the assigned amount of emissions prior to the first commitment period. In this initial review, the national system for estimating GHG inventories established under the Kyoto Protocol (Article 5.1) is also reviewed. Article 5.2 of the Kyoto Protocol has established provisions for so-called adjustments, which means that, if the team has identified deviations from established guidelines and the Party is unwilling to voluntarily change the estimates where problems have been identified, the review team may replace the estimate submitted by the Party with an estimate that worsens the situation for the Party in question. Adjustments may be made when establishing the assigned amount of emissions or for any years during the commitment period. The application of any adjustment is finally decided by the compliance committee. Failure to report information and the conclusions from a review (including adjustments exceeding a defined threshold) may have consequences for eligibility for participation in the Kyoto mechanisms or compliance with the Protocol.

The initial and annual reviews under the Kyoto Protocol also address the national registry and its transactions with the international transaction log.<sup>109</sup>

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<sup>109</sup> The ITL verifies transactions proposed by registries to ensure that they are consistent with rules agreed under the Kyoto Protocol. Each registry sends transaction proposals to the ITL, which checks each proposal and sends its approval or rejection to the registry. Once approved, registries complete the transaction. In the event that a transaction is rejected, the ITL sends a code indicating which ITL check has been failed, and the registry terminates the transaction.

**9.2 Appendix 2 Regional agreements**

**9.3 Appendix 3 List of selected audits of climate change**

**9.4 Appendix 4 International organisations on climate change**

**9.5 Appendix 5 Glossary list**

## 9.7 Appendix 7 Example of a design matrix – floods and landslides

**Audit objective: what do we wish to achieve through the audit?**

*Examine the extent to which the government administration complies with the decisions of the national parliament in its efforts to limit the risk of floods and landslides.*

WHAT			HOW	FEASIBILITY	
Audit question	Audit criteria	Audit evidence	Method	Risk areas	Implementation risk
What do we wish to find out?	What yardstick will be used?	What information do we need?	Where are the data and how will they be collected and analysed?	What conclusions can we draw?	Professional uncertainty in the design and project plan?
<b>1: Has the risk of floods and landslides been adequately mapped and is there sufficient knowledge about the risks?</b>					
1.1 Are there areas that have not been mapped?	Recommendations to the national parliament.  Reports to the parliament.  Planning and building legislation.	Information about the scope of the mapping of the different risk types.  Information about climate changes has been taken into account in the mapping.	Data from the relevant directorate and geological registers.  Interviews with municipalities and county governors, focus groups with municipalities.  Questionnaire survey of county governors.	Risk that flooding and landslide risks have not been sufficiently mapped in several municipalities.	Difference in levels in the data basis.  Lack of a common terminology may make it difficult to compare map data.  Not updated data to include new buildings.

WHAT			HOW	FEASIBILITY	
Audit question	Audit criteria	Audit evidence	Method	Risk areas	Implementation risk
What do we wish to find out?	What yardstick will be used?	What information do we need?	Where are the data and how will they be collected and analysed?	What conclusions can we draw?	Professional uncertainty in the design and project plan?
1.2 Is the mapping of satisfactory quality?	Legislation relating to insurance against and compensation for natural disasters. Planning and building legislation  Recommendations to the parliament.	Information that the municipalities pass on knowledge.	Interviews with municipalities and county governors, focus groups with municipalities.  Questionnaire survey of county governors	That knowledge is not passed on to those who need it.	Difficult to obtain sufficient documentation.
1.3 Is the knowledge gained from the mapping passed on to relevant users?	Reports to the parliament about regional planning responsibility and about the relationship between central and local government.	Information that the municipalities pass on knowledge.	Interviews, focus groups, questionnaire survey ( as 1.2)	That knowledge is not passed on to those who need it.	Difficult to obtain sufficient documentation.
1.4 Is the knowledge actually used?	Planning and building legislation.	Information that shows that the knowledge is used.	Interviews, focus groups, questionnaire survey ( as 1.2).	Indications that the municipalities do not make sufficient use of the available knowledge.	Planning and building legislation.

WHAT			HOW	FEASIBILITY	
Audit question	Audit criteria	Audit evidence	Method	Risk areas	Implementation risk
What do we wish to find out?	What yardstick will be used?	What information do we need?	Where are the data and how will they be collected and analysed?	What conclusions can we draw?	Professional uncertainty in the design and project plan?
<b>2: Is there sufficient government control to prevent flood and landslide risks?</b>					
2.1 Are the ministries sufficiently coordinated as regards floods and landslides?	Legislation relating to water resources.  Planning and building legislation.	Information about the different ministries' areas of responsibility, how the ministries cooperate and whether there are conflicting goals.	Interviews with the relevant ministry and directorate.  Map the number of objections and dispensation cases.	Fragmentation of responsibility – too many parties involved.	Legislation relating to water resources.  Planning and building legislation.
2.2 How does the ministry attend to its responsibility for preventing floods and landslides?	Legislation relating to water resources.  Recommendations and reports to parliament.	Information about how the directorate and the ministry: *work in relation to floods and landslides. *process objections. * handle dispensation cases * make use of their opportunities to change the requirements for reservoir levels.	Mapping of the different ministries' areas of responsibility.  Interviews with county governors and directorates.  Interviews with the directorate.  Questionnaire to the municipalities.	Various weaknesses in the ministries' control and the directorate's management.  Possible areas the directorate has registered as risk areas that have not been secured.	Data that provide an overview of objections and dispensations may be difficult to access.

WHAT			HOW	FEASIBILITY	
Audit question	Audit criteria	Audit evidence	Method	Risk areas	Implementation risk
What do we wish to find out?	What yardstick will be used?	What information do we need?	Where are the data and how will they be collected and analysed?	What conclusions can we draw?	Professional uncertainty in the design and project plan?
2.3 Does government control ensure that national goals for floods and landslides are given sufficient attention at the municipal level?	<p>Recommendations to parliament.</p> <p>Planning and building legislation.</p> <p>Reports to the parliament concerning the relationship between central and local government.</p> <p>The regulations concerning appropriations.</p> <p>Good management criteria.</p>	<p>Is the legislation expedient?</p> <p>Have regulations been issued as expected?</p> <p>Does the ministry ensure that the legislation is implemented?</p> <p>What expertise do the municipalities have?</p> <p>Are there risk and vulnerability analyses and are floods and landslides mentioned in them?</p> <p>Information about the municipalities' mapping of landslide risks and use of flood zone maps.</p>	<p>Interviews with county governors and relevant directorates.</p> <p>Questionnaire survey of municipalities and county governors.</p> <p>Analysis in relation to flood maps.</p> <p>Questionnaire surveys of municipalities and county governors.</p>	<p>National goals are not sufficiently followed up in the municipalities due to conflicting goals and lack of resources.</p> <p>Building takes place in landslide and flood risk areas without the necessary security measures being in place.</p> <p>Not all municipalities have updated risk and vulnerability plans. Even fewer have risk and vulnerability plans that include flood and landslide risk.</p>	

## 9.8 Appendix 8 Example of a design matrix – mitigation

**Audit objective: What do we wish to achieve through the audit?**

The goal of the investigation is to assess the authorities' work on implementing the decisions of parliament concerning climate change, and to show that unclear goals can prevent target achievement.

WHAT		HOW		FEASIBILITY	
Audit question	Audit criteria	Audit evidence	Method	Risk areas	Implementation risk
What do we wish to find out?	What yardstick will be used?	What information do we need?	Where are the data and how will they be collected and analysed?	What conclusions can we draw?	Professional uncertainty in the design and project plan?
<b>1</b> <b>To what extent does the responsible ministry fulfil its overriding management responsibility to ensure goal achievement?</b>	The ministry's overriding responsibility for coordinating climate efforts. The sector ministries' general responsibility in the environmental field.  Good governance and management criteria.	The main emission targets and how they have they been operationalised.  The ministry's decision basis and plan for achievement of the target. The sector ministries' contributions to interdepartmental processes.	Document analysis and interviews. The documents that are to be examined will be identified in consultation with the ministry. The interviews will be with the responsible ministries and other sector ministries.		The systems may be changed during the period (for example through reorganisation of the work).
<b>1.1</b> Has the responsible ministry ensured that the <i>overriding</i> goals are sufficiently clearly defined and operationalised?	Good governance and management criteria.	That the goals can be documented, that they have been operationalised in the form of sub-goals and a time schedule.	A review of public documents, and interviews.	Overriding goals exist, but the extent to which sector goals are defined and sufficiently operationalised varies.	

<p><b>1.2</b> Has the responsible ministry ensured that the <i>sector goals</i> are sufficiently clearly defined and operationalised?</p>	<p>Good management criteria. In an area where goal achievement is dependent on inter-sector cooperation, sector goals must be defined, known and used in the sector ministries.</p> <p>Instructions for official studies and reports.</p>	<p>That the sector goals can be documented in public documents or in internal documents, such as minutes of meetings or similar, and used as measures for the ministries in question.</p>	<p>Request relevant documentation and use interviews to check whether the goals are used in the actual work.</p>	<p>That the goals are not sufficiently defined and operationalised in all sectors, for instance in relation to the Kyoto period. The sector ministries do not feel sufficient ownership, there are conflicting objectives and the goals are not used in day-to-day administration.</p>	
<p><b>1.3</b> Are roles and responsibilities sufficiently defined and clarified between the responsible ministry and other ministries?</p>	<p>See above. Goal achievement in the area is dependent on inter-sector cooperation. Clear roles and responsibilities are a precondition for setting clear goals and defining responsibility for implementation.</p>	<p>An overview of how the different ministries' responsibilities are described in official reports, propositions and governing documents, and how they are perceived by the ministries themselves.</p>	<p>Public documents, minutes, remits and similar. Interviews may help to reveal whether what is documented is also put into practice.</p>	<p>Various alliances, coalitions and differences in ministries' powers might be an obstacle to the defined roles and responsibilities being respected.</p>	
	<p>Good management criteria. <u>UNFCCC and the Kyoto Protocol.</u> The ministry's overriding responsibility for implementing the country's climate policy.</p>	<p>Documentation from ministries and agencies of good management information. Statistics and projections.</p>	<p>Official reports to UNFCCC, misc. white papers to the Parliament.</p>	<p>Inadequate systems to measure the effect of policy instruments. Too seldom reporting to ensure good control. It is uncertain whether the measurements actually reflect actual developments.</p>	