Europe's environment

An Assessment of Assessments

European Environment Agency


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Arctic Ocean
Norwegian Sea
Barents Sea
East Siberian Sea
Bering Sea
Sea of Okhotsk
GREENLAND
ICELAND
Reykjavik
NORWAY
SWEDEN
FINLAND
RUSSIAN FEDERATION
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Contents

Introduction

The European Environment Agency (EEA) has produced four pan-European 'state of Europe's environment' reports in support of the United Nations Economic Commission for Europe (UNECE) 'Environment for Europe' process ([1]). Over time, and in conjunction with a host of other reports (including the additional four five-yearly state and outlook reports produced by the EEA for its geographical area ([2])), this has provided a comprehensive overview of environmental challenges across the region.

To complement this, and in support of the 2011 'Environment for Europe' Ministerial Conference in Astana, EEA has prepared *Europe's environment — An Assessment of Assessments* (EE-AoA). This assessment of assessments focuses on the two themes of the Astana Conference: water and related ecosystems, and green economy.

An assessment of assessments process reviews and critically analyses the existing assessment landscape across the pan-European region. It thus provides a basis to identify strengths of and gaps in existing assessments and their findings, their regional specificities, and the ways in which they can be improved to make them more policy-relevant.

The methodological basis for an assessment of assessments was developed during the United Nations Marine Assessment of Assessments commissioned by the United Nations General Assembly in 2009. The present report demonstrates the robustness and viability of extending an assessment of assessments process to a broader set of thematic and geographic perspectives.

For the assessment of assessments presented here, almost 1 000 environmental assessment reports were identified and recorded in a dedicated virtual library, with the support of experts across 53 UNECE countries and international organisations. More than half of these publications have been reviewed in detail — focusing on water and related ecosystems, and green economy ([3]).

([1]) In 1995, 1998, 2003 and 2007.
([2]) In 1995, 1999, 2005 and 2010.
([3]) Building on the methodology developed and applied in the context of the recent UN Marine Assessment of Assessments.

Overall, this exercise highlights that the assessment landscape is crowded, fragmented and diverse across the region. More reports, more statistics and more indicators are being produced today than five years ago. However, the evidence that more of what is produced is used for policy, awareness or action-driven purposes, is often missing.

This assessment of assessments exercise has resulted in a report, which is structured as follows:

- *Chapter 1* describes the overall setting for the EE-AoA, including the landscape of environmental assessments and their context. Furthermore, it explains the methodology that underpins the assessment of assessments exercise.

- *Chapter 2* focuses on water and related ecosystems. This chapter highlights that the number of publications recorded over the past years is impressive. However, description of the status remains predominant, while topics such as water scarcity, extreme events, water ecosystems or water management are addressed only in a limited fashion.

- *Chapter 3* focuses on green economy. As green economy is a relatively new topic and conceptual aspects are still to be clarified, there are only very few dedicated green economy assessments. Nevertheless, a host of sectoral and/or thematic assessments do address issues directly or indirectly related to green economy.

- *Chapter 4* presents a cross-cutting overview across and beyond the two themes addressed in the previous chapters. It highlights a number of key observations and questions about environmental assessments across the region covering commonalities, institutional responsibilities, processes and content, and scope for improved environmental governance, as well as applicability and transferability of the results.

- Finally, in *Chapter 5*, based on the findings across the assessment of assessments — and with the contribution and endorsement of the UNECE Steering Group on Environmental Assessments — a set of recommendations is presented to help strengthen the overall suite of environmental assessments in support of the 'Environment for Europe' process.

Europe's environment
An Assessment of Assessments

1 Setting the scene

Key findings

At the Sixth 'Environment for Europe' Ministerial Conference held in Belgrade in 2007, environment ministers made a new request for a further pan-European report, asking the EEA to consider producing a fifth assessment. At the same time a reform of the 'Environment for Europe' process was called for in order to improve its focus and make it more policy relevant. The reform plan was approved by the UNECE Committee on Environmental Policy in early 2009 and adopted by UNECE at its sixty-third session.

During the two years following the Belgrade Conference, reflections about producing a fifth assessment pointed to the need for a reform of the process. This was already contained in the report produced by EEA for the 2007 Belgrade Ministerial Conference on lessons learned to be used for future environmental assessment and reporting work in the region ([4]). It concluded that to improve the pan-European assessment it was necessary to:

- Establish systematic data exchange (every year as a minimum) with countries in Eastern Europe, the Caucasus and Central Asia (European Neighbourhood Policy countries, the Russian Federation and Central Asian countries).
- Strengthen the cooperation and partnerships between international organisations in terms of working together to obtain good environmental information, sharing the information available and better coordinating their information demands towards countries.
- Continue activities of the UNECE Working Group on Environmental Monitoring and Assessment on a more regular basis.
- Run open consultations with the countries during the different stages of the report's preparation.

([4]) 'Pan European Assessment Reports on the State of the Environment and associate activities lessons learned in working with countries in Eastern Europe, the Caucasus and Central Asia on the preparation of the Belgrade Report' (ECE/CEP/AC.10/2008/3).

Given the major challenges faced at a pan-European level, two recent developments were taken into consideration for reforming the pan-European environmental assessment process:

i) The European Union (EU) initiative on a Shared Environmental Information System (SEIS) (http://www.eea.europa.eu/about-us/what/shared-environmental-information-system); and

ii) The United Nations experience in the preparation of the Marine Assessment of Assessments, launched in 2005 by United Nations General Assembly resolution 60/30 (http://www.unga-regular-process.org).

Considering these developments an agreement was reached by the UNECE's Committee on Environmental Policy in 2009 to carry out an assessment of existing European environmental assessments, instead of developing a new fifth pan-European environmental assessment. This exercise, named *Europe's environment — An Assessment of Assessments*, was carried out by EEA under the guidance of a steering group to assist the preparation of the report for the Astana Conference.

The agreement on developing the EE-AoA process was recognised as an important first step in reforming the future of European environmental assessments. The main purpose was 'to provide a critical review and analysis of existing environmental assessments that are of relevance to the region and the two selected topics for the Astana Conference, to identify gaps that need to be covered and priorities that should be addressed for conducting assessments to keep the pan-European environment under continuous review' (ECE/EX/2010/L.6, annex I, para. 1).

While a first major outcome of this was to produce a report for the Astana Ministerial Conference, the process was seen to be a longer-term activity, with the potential to continue after the Conference to cover other topics and provide the basis for developing a sustainable assessment process across all environmental topics, including *inter alia* the regular updating and sharing of relevant information.

Thus, the EE-AoA is not a new assessment of environmental issues but an analysis and assessment of the methods and underpinning information tied to the policy debate to support improved outcomes as reflected in the recent assessments available across the pan-European region. The two themes of the Astana conference, water and related ecosystems and green economy, served as the basis for production of the EE-AoA.

Building on the 'Assessment of Assessments' (AoA) methodology, this assessment introduces a number of novelties which can be summarised as follows:

1. *Enhanced ownership through a participatory process.* Individual countries through dedicated networks had a lead role in the EE-AoA process by providing the information input into the process and by being involved in the critical evaluation of the information. Besides countries, United Nations subsidiary bodies (UNECE, the United Nations Environment Programme (UNEP) and the United Nations Development Programme (UNDP)), EEA and other international organisations such as the Organisation for Economic Co-operation and Development (OECD), actively contributed to the process making it a concerted effort at the pan-European level and at the regional level, the latter especially through the concrete contribution of the Regional Environmental Centres (RECs) in the preparation of the four sub-regional AoA reports under EEA coordination.

2. *A modular and flexible approach at various scales.* The EE-AoA process may be applied at the national level and upwards, through an aggregation procedure that leads to 'regional assessments'. To further this objective, four regional AoA modules having the same thematic coverage were developed in parallel covering the countries in Eastern Europe, the Caucasus and Central Asia and the Russian Federation. Similarly, the AoA process has the potential to be disaggregated from the national level downwards to the sub-national/local level, an ability that may prove to be important for large countries such as the Russian Federation. Further, this modularity makes the approach flexible and replicable.

3. *A specific and challenging thematic focus.* The EE-AoA dealt with two complex and totally different themes. The main challenge was to understand and capture their complexity at both national and regional levels through the use of common tools, necessarily kept as simple as possible to be effectively used by a wide range of contributors.

4. *Consistency ensured through guidelines and capacity-building*. As countries and international organisations were invited to nominate their representatives to contribute to the assessment process, the production of guidelines to ensure a common understanding of the process and of the objectives to be tackled became imperative. Furthermore, training and assistance was provided by EEA in order to ensure consistency and coherence of the process and also to develop capacities for further assessments.

5. *Interactive information technology platform for production and dissemination of the results.* The high number of stakeholders involved in the assessment process made it essential to rely on a common platform for both the uploading and sharing of information. The EE-AoA portal (http://aoa.ew.eea.europa.eu/) acts as a repository of the knowledge, and a processing/analytical instrument allowing the generation of summary overviews and statistics for the public at large.

6. *Developing and enriching the AoA methodology and toolbox.* All the tools used to implement the EE-AoA process are available in the EE-AoA portal for further use including their development path and description. These tools can also be considered as outcomes and products of the process.

1 Setting the scene

1.1 Context, aims and objectives

1.1.1 Introduction

Environmental information is an essential component of the environmental policy process. This was recognised at the very first 'Environment for Europe' conference, held at Dobris Castle, near Prague, in June 1991. Since then, the types of information needed and for whom at different stages of the policy process have been further clarified. For example, progress has been made on specifying the information which is needed by different stakeholders for tracking progress and effectiveness of policies and distinguishing this from that needed for framing new issues. There are six main stages in the policy process (also referred to as the Policy Cycle), for which data and information are at the centre (Figure 1.1).

The European Environment Agency (EEA) has produced a series of four pan-European 'state of Europe's environment' reports in support of the UNECE 'Environment for Europe' process over the past 20 years ([5]). Over time, and in conjunction with a host of other reports (including the additional four five-yearly state and outlook reports produced by the EEA for its geographical area), this has resulted in a comprehensive overview of environmental challenges across the region.

To complement this, and in support of the 2011 Ministerial Conference, the European Environment Agency, supported by UNECE, has prepared a *Europe's environment — An Assessment of Assessments* (EE-AoA). This assessment of assessments focuses on the two themes of the Astana conference: water and related ecosystems, and green economy. Water issues are serious and worsening in many parts of Europe. Cross-border regional solutions are essential. The green economy raises hope of a more equitable and sustainable development that respects all natural capital including water.

([5]) 'Environment for Europe' process, see: http://www.unece.org/env/efe/welcome.html.

Figure 1.1 Main stages in the policy cycle, supported by data, information and knowledge. In this report, the policy process is taken to include all 6 stages of this policy cycle (Source: EEA).

But what progress is being made? Is the right information available to be able to tell? And are the correct approaches to assess what is known being used to support the policy process? Given the volume of environmental reports, indicators and data available a huge amount seems to be known about these issues. But is all this informing the policy process effectively, and is the best being done with the resources available for assessment?

The aim of this AoA is to investigate these issues by assessing the assessments: cataloguing what exists, reviewing what is in them and analysing how they are put together. The overall objective is to improve the way in which the state of Europe's environment is kept under on-going review.

1.1.2 The growth in the number of European environmental assessments

Since 1995, the landscape of environmental information and assessments has become considerably more populated. This includes the increasing frequency of national-level 'state of environment' reports, indicator- and statistic-based environmental assessments and compendia, as well as thematic and sectoral assessments at country level, such as for transport, energy and agriculture.

Many more assessments are also now found at trans-country regional levels covering for example transboundary river basins, other ecological units such as mountains ranges (Carpathians for example), or lakes and inland seas including the Aral, Caspian, Baltic and Black Seas. Furthermore, at the European level, in addition to the pan-European and EEA level assessments mentioned above, the multilateral environmental agreements also produce assessments, the most recent example being the second assessment of the UNECE transboundary rivers and international lakes convention.

In this process, some of the former gaps in data have been filled and the information, on which the assessments have been based, has become more timely. However, the data and information is still far from harmonised or equally accessible across the region. Most significantly, perhaps, the influence of the many environmental reports and assessments on the policy process and on improving the environment is unclear.

1.1.3 Efficiency and effectiveness of European environmental assessments

The increasing number of environmental assessments is on one level welcome, as the Aarhus Convention explicitly promotes the development of national 'state of environment' reports and accessibility to environmental information (see Box 1.1).

On another level, however, the growth in the number of environmental assessments in Europe over the past 15–20 years, and of environmental information in general, has led to an unclear overall picture, competing claims on resources with some overlaps and redundancies, while at the same time leaving some priority gaps still to be filled.

Before starting the AoA work, it was recognised that doing another pan-European assessment would not only create a competition for resources with EEA's mandated five-yearly assessment due in 2010, but also distract attention and resources away from the necessary long-term task of building an improved system to ensure the continuity and effectiveness of the assessment process.

Box 1.1

The Aarhus Convention

The 1998 UNECE Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters is a new kind of environmental agreement that:

- links environmental rights and human rights;
- acknowledges that we owe an obligation to future generations;
- establishes that sustainable development can be achieved only through the involvement of all stakeholders;
- links government accountability and environmental protection;
- focuses on interactions between the public and public authorities in a democratic context.

The subject of the Convention goes to the heart of the relationship between people and governments. It is not only an environmental agreement, it is also a Convention about government accountability, transparency and responsiveness.

The Aarhus Convention grants the public rights and imposes on parties and public authorities obligations regarding access to information, public participation and access to justice. The Aarhus Convention is also forging a new process for public participation in the negotiation and implementation of international agreements.

Source: From UNECE website: http://www.unece.org/env/pp.

The results of past reports, such as the 2007 Belgrade assessment, were still considered highly relevant and valid for supporting planning and prioritisation for the Astana conference due to the unfortunate long-term, persistent and often chronic nature of most of the environmental issues being assessed. Furthermore, the results of more up-to-date reports, such as the EEA's 'State and outlook 2010' report (SOER 2010) and the second trans-boundary waters report, were already considered to cover much of the ground that a new 5th assessment should address, although restricted in geographical or thematic coverage.

It was becoming progressively clear that when commissioning, planning and launching new European-level environmental assessments, it was important to take broad stock of other related activities and past similar experiences and be clearer about the specific goals of any new assessment and its links to other assessments. This raises a number of issues including:

- the number of environmental assessments currently being commissioned and produced across Europe;

- the way they are being commissioned and produced; and

- their effectiveness in the way they are being put to use.

Overall, these concerns can be analysed under two headings:

1) *Efficiency of production* (of an assessment): Assessments put demands on many parties, especially countries to deliver data and review results but also on organisations. When multiple assessments are requested without coordination and appropriate means, this can create competing demands, lead to problems with the coherence and quality of results and strain overall resources.

2) *Effectiveness of use/result* (of the assessment): Assessments aim at strengthening the way that policy and action are underpinned by knowledge, but it is questionable whether this effectiveness increases in step with the number of assessments produced.

1.1.4 The process towards an EE-AoA

At the Sixth 'Environment for Europe' conference held in Belgrade in 2007, ministers initiated a reform of the 'Environment for Europe' process in order to improve its focus and make it more policy relevant. A reform plan was approved by the UNECE Committee on Environmental Policy (UNECE/CEP) in January 2009 and adopted by the 63rd session of the UNECE in March/April 2009.

The reform plan envisages that the decision on themes to be prioritised at ministerial conferences should take into account 'preliminary findings of available assessments and statistical reports on environment' and that the 'official substantive documentation' produced for the Ministerial Conferences should be limited to 'the pan-European assessment and theme-specific reports' as key inputs to and outputs of the conferences.

Following agreement on the reform plan, the UNECE Committee on Environmental Policy asked the EEA to host a high-level consultation with countries and organisations involved and with regional and international partners to consider options for the next assessment. Building on the recommendations in the EEA's 4th assessment report on lessons learnt, the aim was to help bring more clarity to future pan-European environment assessment activities and in particular to help better specify what to produce for the Astana Ministerial conference in 2011.

The high-level consultation took place on 3 July 2009 at the EEA and addressed the following main five aspects:

- the need and use of future pan-European environment assessments and especially as an input to and output of the 2011 Astana Ministerial conference;

- the latest experiences and current trends in producing and using assessment results to support knowledge-based environmental policy development, implementation and decision-making across the region;

- ways to improve the effectiveness of different environmental assessment activities at different levels across Europe through better linking, sharing and cooperation;

- ways of engagement with stakeholders and concrete ways for streamlining the production, use and communication of related assessment activities with the long-term aim of developing a streamlined and sustainable assessment process serving multiple purposes including organising the necessary relationships between all the different actors, organisations and other components involved;

- key knowledge gaps for priority action to improve the information base on which assessments are founded and gradually extending the Shared Environmental Information System (SEIS) on the basis of its principles and component parts.

These questions were all placed in both the specific context of the 'Environment for Europe' process, including preparations for the Astana conference, and also beyond so as to start building a long-term, sustainable and regular assessment-reporting process on the European environment. Agreement was sought on the future place and role of an improved pan-European environment monitoring and assessment process to which all countries and organisations of the region could be partners and contributors.

Given the major challenges faced at a pan-European level, two developments were underlined to be taken into consideration for reforming the pan-European environmental assessment process:

i) the EU initiative on the Shared Environmental Information System (SEIS) (http://www.eea.europa.eu/about-us/what/shared-environmental-information-system); and

ii) the UN experience in the preparation of the Marine Assessment of Assessments, process launched in 2005 by the UN General Assembly resolution 60/30 (http://www.unga-regular-process.org).

After detailed discussions, agreement was reached by the UNCEE's Committee on Environmental Policy in its meeting in October 2009 to carry out an assessment of existing European environmental assessments, instead of developing a new 5th pan-European environmental assessment. This exercise, which was named *Europe's environment — An Assessment of Assessments* (EE-AoA), was requested by the UNECE Committee on Environmental Policy to be carried out by the EEA under the guidance of a steering group to assist the preparation of the report for the Astana Conference. This agreement was endorsed by the UNECE Executive Committee in February 2010, enabling the process to begin ([6]).

The agreement specified that the overall goal is 'to assess the regional needs, priorities and sustainable long-term mechanisms to keep the pan-European environment under continuous review' and to make concrete proposals to this effect including 'recommendations on how to develop a shared environmental information system in the region'.

Box 1.2

The UN Marine Assessment of Assessments — towards a regular process

The UN Marine Assessment of Assessments was a major achievement involving country contributions, international organisations, experts and non-governmental organisation participation. The idea was to appraise what had been achieved to date with the many regional and global marine assessments regionally and globally and to make recommendations to streamline and improve such activities in the future to improve quality and effectiveness.

Building the knowledge network was the most valuable part of the Marine Assessment of Assessment. The assessment demonstrated the importance of scientific credibility, political relevance and legitimacy for effective assessments. These were underpinned by good data flows and indicators. The success of these factors relies on the set-up and management of the process.

Though limited in scope to the state of the marine environment, the Marine AoA served as the basic inspiration and starting point for the EE-AoA.

([6]) Establishment of the Steering Group on Environmental Assessments and its Terms of Reference. ECE/EX/2010/L.6. 18 December 2009. UNECE Executive Committee Thirty-fourth meeting, Geneva, 26 February 2010.

The first such Assessment of Assessments, in the field of the global marine environment (Box 1.2), was a pioneer in determining the foundations for the development of a regular process for global reporting and assessment. While a first major outcome of the EE-AoA was to produce a report for the Astana Ministerial Conference focused on the two conference themes (water and related ecosystems and the green economy), the process was seen to be a longer-term activity with the potential to continue after the conference to provide the basis for developing a sustainable assessment process across all environmental topics, including *inter alia* the regular updating and sharing of relevant information.

Nevertheless, compared with the single thematic focus of the Marine AoA, the two Astana ministerial conference priorities cannot be easily dealt with as separate topics for an Assessment of Assessments since they are both interconnected and of different natures: water and related ecosystems form part of the main 'assets' of the green economy, while the Green Economy is a set of principles, aims and actions across the socio-economic domain that not only depends on these assets to deliver increased human welfare, but also at the same time is expected to positively impact on them to build resilience for the future. Thus it was recognised from the start of the EE-AoA exercise that, while it may be possible to clearly refer to an Assessment of Assessments for water, such a reference is not similarly clear for the Green Economy due to its wide scope and uncertainties conceptually.

1.2 What is an AoA?

An AoA is essentially about reforming how environmental reporting and assessment is carried out to support the policy process. This is entirely complementary to the issue that SEIS has been designed to tackle with respect to environmental data and information. The EE-AoA, focused on assessments, is therefore effectively kicking off a new field of SEIS activities.

This section describes the criteria and analytical frameworks on which the EE-AoA was built and against which the assessments were evaluated. This more conceptual and idealised description is complemented in Section 1.3 by an explanation of how the EE-AoA was implemented in practice, including comparisons to the Marine AoA. Both sections aim to provide the conceptual and methodological underpinning to understand the present exercise, as well as offer explanations and reflections on the approaches and methods used so that they may be taken up elsewhere as appropriate.

1.2.1 What is an assessment?

Strictly speaking, an assessment is a formal process of appraisal against various standards or criteria. Environmental assessments usually refer to works that either bring to light the consequences of scientific findings on environmental processes or track changes and progress, often against environmental standards or targets. In the present context seeking improved ways of governing environmental knowledge to support the policy process, the aim of environmental assessments is to support the framing and implementation of environmental policy and more generally to support the transfer of knowledge and translation and communication across the so-called science-policy interface.

1.2.2 Criteria and frameworks for assessing the assessments

As mentioned in Section 1.1, the two main challenges underlying the EE-AoA are those of *efficiency of assessment production* and *effectiveness of the assessment result*. Two specific frameworks have been used to analyse these qualities.

First, the Saliency-Credibility-Legitimacy framework ([7]) provides a reference for analysing the *effectiveness* of assessments. Thus, for example, by analysing how and for what reasons assessments are commissioned in the first place, saliency can be assessed. By analysing the basis and source of information underlying an assessment, a measure of the assessment's credibility is formed. Furthermore, analysing the stakeholder engagement in an assessment exercise helps provide a measure of legitimacy which affects the uptake of the results, leading in turn to real improvements in the environment. These aspects are not mutually exclusive and an analysis using this framework can reveal important insights into the implicit or intentional trade-offs being made between them.

SEIS provides a second framework of components which together address *efficiency* and *effectiveness*:

i) common content: a common set of indicators helps link and streamline assessments (efficiency) and make them policy relevant (effectiveness);

ii) organisational matters: having agreed institutional arrangements increases access to and transparency of information (efficiency and effectiveness); and

iii) on infrastructure and tools: availability of reporting tools helps reduce the burden on countries to make information available (efficiency) and helps improves quality (effectiveness).

([7]) Cash, D., Clark, W., Alcock, F., Dickson, N., Eckley, N., and Jäger, J., 2002. 'Salience, Credibility, Legitimacy and Boundaries: Linking Research, Assessment and Decision Making'. John F. Kennedy School of Government Faculty Research Working Paper RWP02-046. John F. Kennedy School of Government, Harvard University.

In addition, the MDIAK and DPSIR conceptual frameworks developed by EEA (see Boxes 1.3 and 1.4) are useful tools to clarify in greater detail the type of information that underpins the assessments analysed by these two frameworks. Thus, the MDIAK reporting chain supports an analysis of the basis of the information used in the assessment and whether this can be traced — an aspect that underpins credibility. The DPSIR analytical framework, meanwhile, helps clarify the scope of the assessment and the degree to which assessments are integrated across the cause-effect chain, or narrowly-based focusing on, for example, simple descriptions of the state of the environment.

Box 1.3

The MDIAK reporting chain

To help specify and distinguish between the different types of information needed in particular for countries to report on to support the policy process, the EEA uses the MDIAK framework specifying, in reverse order:

K What do we need to **K**now?
A What **A**ssessments are needed?
I What **I**ndicators are needed?
D What **D**ata is needed at European level?
M What **M**onitoring is needed to deliver the required data?

Box 1.4

The DPSIR analytical framework

To structure thinking about the interplay between the environment and socioeconomic activities, the EEA uses the driving force, pressure, state, impact, and response (DPSIR) framework. This is used to help design assessments, identify indicators, and communicate results and can support improved environmental monitoring and information collection.

1.2.3 Applying the frameworks

There are two complementary dimensions of assessment that can be addressed by an AoA. The first concerns the methodological approaches and information underpinning the assessments. This gives rise to the following kinds of questions:

What types of assessments exist and what is the extent and type of underpinning information? And how were the assessments carried out, that is how do we come to know what we know?

The second dimension concerns the environmental issues themselves, which raises the following types of questions:

What do the assessments tell us about the issues at stake? And how are the issues understood across Europe, including the persistent and emerging challenges related to them and the steps being taken to tackle them?

The Marine AoA focused on the first dimension. Taking stock of the methodologies and data underpinning existing assessments enabled the Marine AoA to provide reflections and insights about how to develop a regular process for keeping the world's marine areas under on-going review. Producing a global marine assessment is seen to be a fruit of that new process.

This is also the case for the EE-AoA where priority has been given to an appraisal of the environmental assessment enterprise across Europe as a prerequisite to the development of a sustainable process in the future. Thus, the EE-AoA is not a new assessment of environmental issues but an analysis and assessment of existing methods and underpinning information.

1.3 The EE-AoA in practice

This section explains how the EE-AoA was implemented in practice. It overviews a number of key elements involved, approaches taken and assumptions made. This includes an overview comparison with the Marine AoA and lessons learnt from EE-AoA process.

1.3.1 Key elements of the EE-AoA

The key elements of the EE-AoA are underlined below emphasising, *inter alia*, the novelties of the approach compared with the Marine AoA.

Links to SEIS

Since its launch, the EE-AoA process established a close link with the ongoing development of a SEIS in the pan-European region, seeking coherence with the main SEIS components and adherence to its guiding principles. The conceptual framework of the EE-AoA process is built around:

i) governance: as it is concerned with institutional arrangements and networking, scope and objectives, interaction and communication;

ii) infrastructure and services: as it deals with the support available for data management, sharing and exchange, and any INSPIRE/GMES/Reportnet compatible developments; and

iii) content: as it concerns information and data, indicators and assessment tools, priority concerns, needs and/or emerging issues, as well as information and/or knowledge gaps.

Distributed participation and ownership

Individual countries had a lead role in the EE-AoA process by providing the information input into the process and by being involved in the critical evaluation of the information. Countries were asked to coordinate at the national level the selection of relevant assessments and their uploading in the virtual library through existing network representatives. The EE-AoA process relied heavily on these existing governance structures to legitimise the process and without which the comprehensive participation of the stakeholders of the European UNECE countries/territories would not have been possible (see Box 1.5).

UN agencies (UNECE, UNEP, UNDP), the EEA and other international organisations such as OECD, actively contributed to the process thereby making it a concerted effort at the pan-European level. At the regional level, the Regional Environmental Centers (RECs) delivered concrete contributions as writers of the regional modules.

Multiple scales

One of the key features and novelties of the EE-AoA is its multi-scalar approach. With little or no adjustment, the rationale behind the EE-AoA process can be applied at the national level and upwards, through an aggregation procedure that leads to 'regional assessments'. By implementing the AoA methodology at various geographical scales, four sub-regional AoA components were developed for Central Asia, the Caucasus, Eastern Europe and the Russian Federation, each providing significant regional input to the main assessment. Similarly, the AoA process has the potential to be disaggregated, from the national level downwards to the sub-national/local level, an ability that may prove to be important for large countries such as the Russian Federation.

Box 1.5

EE-AoA: Experience from Finland

From a country perspective, the first major task in the EE-AoA process was to identify a set of assessments and enter some of the information included in these assessments in two platforms: the virtual library and the AoA review template. Both platforms were made available online by the EEA. At the request of Finland, the EEA arranged for such platforms to migrate into a national sub-system, identical to the main one but dedicated to the assessment process at the country level.

Relevant assessments related to water resources and the green economy are produced by a number of experts in a number of organisations, and the existence of a national sub-system allowed Finland to better coordinate the process of identification of relevant assessments, their screening and the inclusion of relevant information on to the two platforms. The process could thus be considered as work in progress at the national level up to the time the final deliverables were completed by all actors concerned. Once the process was finalised the information was transferred into the EEA system.

Separate national platforms framing the process at the national level have several advantages:

i) national coordinators keep better control of the process in terms of expert contribution and selection of relevant assessments, since internal evaluation and adjustments can continue until the best possible selection of assessments is obtained;

ii) countries monitor the production of deliverables and decide on amendments and adjustments of draft products as often as needed, and in a flexible way, i.e. from when experts first become involved up to when it is decided that the information is 'good enough' to be made publicly available on the main EEA platform;

iii) the EEA is released from the responsibility of coordinating a very large number of countries, leaving the Agency with a supervisory role, through the quality check of the virtual library and the review template, and a 'depository' role for the knowledge produced by individual countries.

From the IT point of view, the creation of sub-systems identical and fully compatible with the main system ensures inter-operability and smooth transfer of the information from the national level to the EEA.

Diverse content

The EE-AoA dealt with two complex and totally different themes. The main challenge was to understand and capture their complexity at both national and regional levels through the use of common tools, necessarily kept as simple as possible to be effectively used by a wide range of contributors. The review template was designed as the common instrument for the extraction of information related to both water and the green economy; theme-specific questions were not included and, instead, the selection of types of analysis addressed within each assessment under review, by theme/area/topic, was preferred.

Modular structure

The EE-AoA is based on a modular approach, where different parts are developed within an overall framework setting common procedures, standards and tools. This modular approach was essential to adapt to the political agenda of the Astana Conference and to the diverse geographical sub-regions which had to be covered (see Figure 1.2 for details).

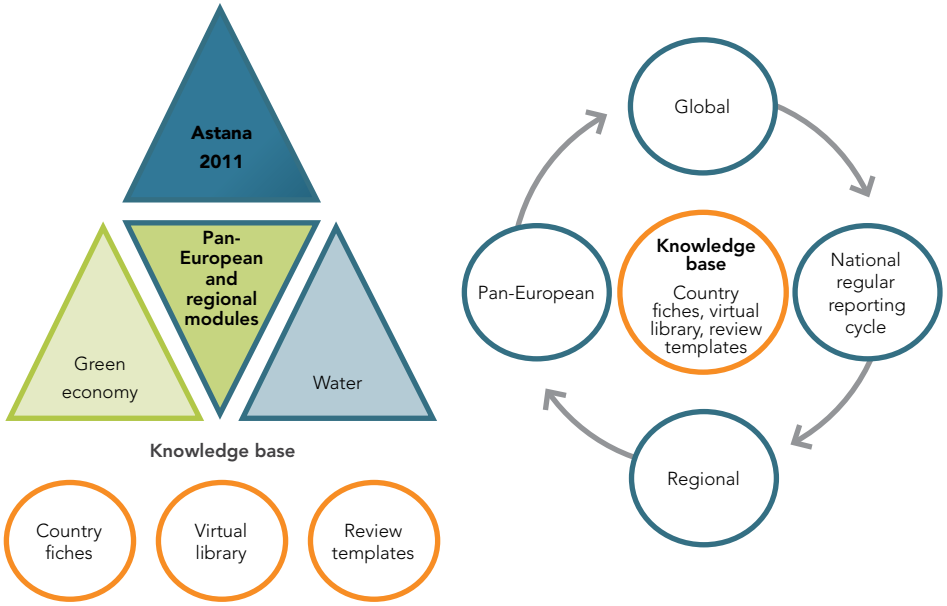


Figure 1.2 Modular structure of the EE-AoA (Source: EEA).

While the production of the EE-AoA report for Astana was a once-off exercise for the Ministerial Conference (left figure), the knowledge base created during the process will remain to support future regular reporting cycles at different scales (right figure).

Capacity building

As a result of the country nomination process, a very heterogeneous and wide group of people became directly involved in the assessment process. Consequently, the production of guidelines to ensure a common understanding of the process and of the objectives to be tackled became an imperative. Training sessions were also carried out for those expected to make the largest contribution to the process.

Common IT infrastructure

The high number of stakeholders involved in the assessment process made it essential to rely on a common platform for both the uploading and sharing of information. The EE-AoA portal was established to act as a repository of the knowledge, with an information window for both the contributors and for the general public, plus a processing/analytical instrument for the generation of summary overviews and statistics. Much of the information hosted on the portal is designed to be kept updated, so as to play a continuous supporting role in a regular reporting process. Figure 1.3 shows the sitemap of the portal.

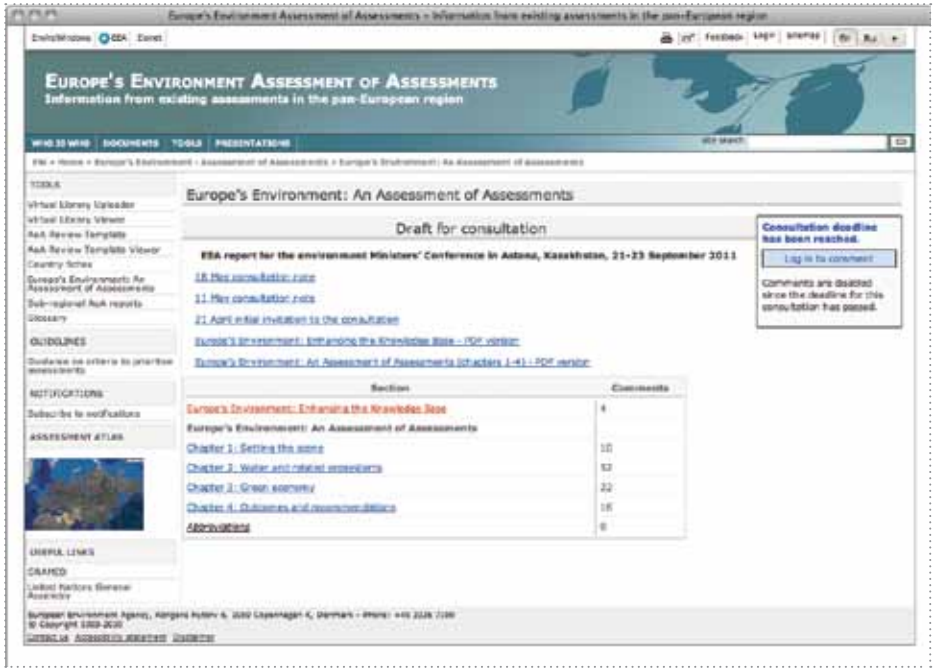


Figure 1.3 EE-AoA Portal (Source: EEA).

Tools for implementation

An overview of the tools used to implement the EE-AoA process is found in Table 1.1 including their development path and description. These tools can also be considered as outcomes and products of the process for use in ongoing work. All are characterised by innovative features compared with the Marine AoA (see also Annex 1.1).

Table 1.1 EE-AoA: tools for implementation

Glossary	**Development path** Compiled starting from the definitions agreed upon within the UN-led process of the Marine AoA, the EE-AoA glossary has been enriched with terms and concepts related to UN and EU processes, institutions and organisations. **Description** The list of acronyms/concepts is a dynamic tool meant to expand further as needs arise. It includes around 130 definitions (31 May 2011).
Criteria to prioritise assessments	**Development path** These were built in particular on the selection protocol developed within the SOER 2010 AoA pilot module run by the EEA. **Description** A distinction is made between general and specific criteria. The general criteria recall the Marine AoA definition of 'assessment'. The specific criteria guide selection towards: the most recent assessment reports, possibly published within the last 5 years; the last published report in case of a regularly published series; assessment reports covering topics poorly addressed by other assessments in order to tackle the most comprehensive coverage of the topics under the two main themes; assessment reports covering emerging issues within the topics/themes; assessment reports covering geographical areas that are poorly covered by the other assessments in order to tackle the most possible comprehensive geographical coverage at national, regional and transboundary levels.
Virtual library	**Development path** Originally developed within the framework of the EE-AoA assessment process. **Description** An online web-based library (hence, the reference to 'virtual') where registered contributors upload assessments considered relevant to the AoA process (see http://aoa.ew.eea.europa.eu). Registering in the library through the virtual library uploader requires little assessment-related information and the provision of the hyperlink to the report, if available on the web. The specification of the geographical location of the institutions conducting the assessments allows the generation of an assessment atlas (Figure 1.4). By mid-2011 the virtual library included over 900 assessments, evenly covering both green economy and water themes and with more than 70 per cent addressing national or local levels.

Country fiches	**Development path** Originally developed within the framework of the EE-AoA assessment process. **Description** Country fiches (see: http://aoa.ew.eea.europa.eu) are summaries of the main sectoral reports, environmental statistics and indicator sets, as well as relevant performance reviews and major institutional players involved in environmental reporting. Developed to obtain an overview and to encourage the uploading of relevant assessments into the virtual library, they were submitted to country contact points and NFPs to correct and improve and then to highlight the five most important products. This was to help develop a balanced sample for the exercise, ensuring that a minimum set of information per country was uploaded into the EE-AoA portal and contributed to the AoA process. Country fiches are intended as dynamic overviews foreseen to be kept regularly updated and going beyond the AoA process, since they may represent models for the development of dynamic country profiles that may be supportive of future assessment exercises.
Review template	**Development path** Building on the template used for the review of individual assessments within the Marine AoA, on the lessons learnt while developing the 'general template' within the SOER 2010 AoA exercise, and on the feedback and comments received during and after the AoA training workshop. **Description** The review template (see http://aoa.ew.eea.europa.eu) is structured into eleven main parts and around the three main components of governance, infrastructure and services, and content. The review template is required to be filled only on the basis of the information explicitly stated and contained in the assessment reports under review. This means that 'background' information that may be known by the person filling out the templates, but that cannot be found in the assessment report, could not be included. This approach was taken due to the importance of transparency for effective assessments concerning the process, methods and about the underpinning data and information used. If these are not made explicit in the assessment then they are not open to scrutiny so cannot be taken into account in the AoA. Each review template uploaded by contributors underwent a quality control that ensured minimum quality standards for all 'approved' templates.

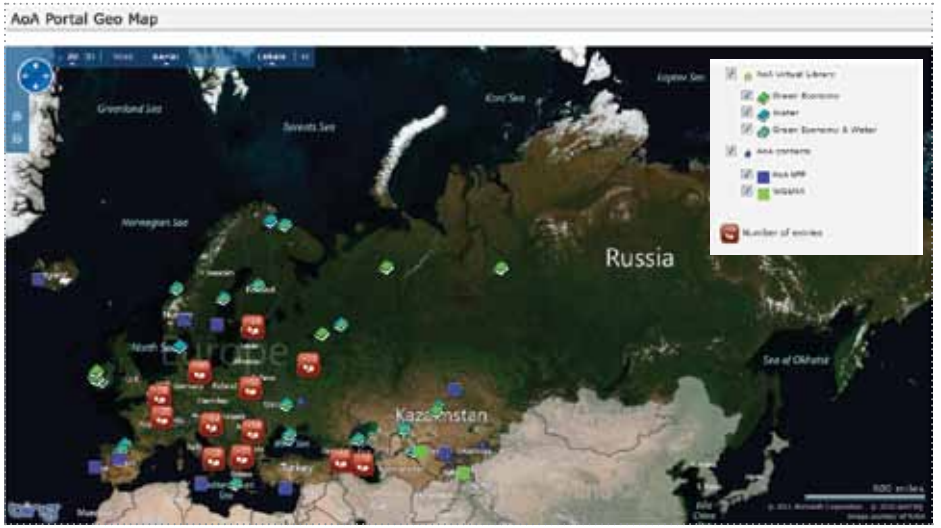


Figure 1.4 Assessment atlas (Source: EEA, EE-AoA portal, http://aoa.ew.eea.europa.eu/portal_map).

1.3.2 Lessons learnt from EE-AoA process

Some important lessons learnt during the implementation of the EE-AoA are recorded here. These findings may provide the basis for a reflection on future assessment needs, with a view to the way forward towards a regular assessment process.

Considerations relevant to the initiators of the process:

- the conceptual part of the assessment of assessments process needs to provide clear instructions to participating countries and organisations on the type of literature, reports and documents to be included in the process. The broad definition of 'assessment' used by the Marine AoA and adopted within the EE-AoA should be tailored to needs, especially with regard to the environmental policy priorities guiding the assessment process. For example, the selection of literature within the EE-AoA was perceived by some to be insufficiently focused on the two priority themes and analysis, and not always coherent across countries. The distinction between descriptive reports and assessments proved to be difficult to define;

- the review template needs to be developed further in terms of the clarity of the queries and of its ability to extract content-related information from the assessment.

Considerations relevant to countries:

- a better standardisation of the selection of literature by countries would increase the reliability of the process, ensuring more balanced contributions. Notwithstanding the outlining of common prioritisation criteria, each country was given the freedom to decide on the literature to be screened, leading to an unsystematic coverage of themes and topics across countries and regions.

On the other hand, the process revealed some important features and approaches that are worthy of consideration in maintaining or strengthening in a future exercise:

- inclusiveness of the process, engaging all players not only in the process itself but also in the conceptualising phase and in the shaping of the methodological approach;

- flexibility of the modular approach, allowing for aggregation and disaggregation of assessment processes at different scales as well as adaptation to different themes;

- transparency of the process, with high visibility achieved along all steps through continuous interaction, by virtual means (portal, internet-based conferences, etc.) and physical consultation (meetings) with major players;

- continuous process, initially intended to deliver to one major event (the Astana Conference) but laying down the foundations (conceptual framework, methodologies, main players, capacities, IT infrastructure and implementation tools) to serve multiple needs in an ongoing process and future events;

- building on existing networks and institutions/bodies, thus strengthening existing governance structures and, at the same time, facilitating future exercises since the main institutions and players have been already identified;

- enhancing the capacities of relevant stakeholders in contributing to the process in an objective and disciplined manner, thus adding to the sustainability of the process by empowering major players to actively participate to the process. Capacity building was specifically addressed to the Regional Environmental Centres (responsible for the sub-regional components), to all main players through the dissemination of the guidelines, and to all those uploading review templates into the portal, through the approval procedure of the templates (quality control);

- being closely linked to the establishment of SEIS a win-win situation is set up since SEIS will contribute in any future exercise to content development, networking and analysis development through a more efficient use of the information, more readily available and comparable information, and a virtual environment for sharing and processing.

Europe's environment
An Assessment of Assessments

2 Water and related ecosystems

Key findings

The first key theme of the Astana Ministerial Conference is 'Sustainable management of water and water-related ecosystems'.

Water issues are serious and worsening in many parts of Europe, making water management complex. While water is abundant in much of Europe, large areas are affected by water scarcity and droughts — particularly in Southern Europe and Central Asia with their severe lack of, and high demand for, water. Europe is also suffering from floods, with an increasing number of deaths, displacement of people and economic losses. Climate change is projected to exacerbate this, with more frequent and severe droughts or floods projected for many parts of Europe.

An estimated 120 million people in the pan-European region do not have access to safe drinking water or adequate sanitation, making them more vulnerable to serious water-related diseases. Despite progress over the past 15 years, especially those living in rural and remote areas in Eastern Europe, the Caucasus and Central Asia remain at risk. Water quality has improved in many parts of Europe over the past 20 years, the result of better regulation and enforcement together with investment in wastewater treatment plants.

At both the global and European scale a multitude of inland water assessments is available, with, in many ways, Europe leading the way in producing water assessments. This is partly driven by the production of EEA water assessments over 15 years as part of the 'state of the environment' (SoE) reports, supplemented by water assessment activities by OECD, UNECE and the World Health Organization and water statistics produced by Eurostat and OECD. The EU water policies, including their reporting obligations, also add relevant assessments on the status and pressures affecting EU waters. Finally, the establishment of Transboundary Water Commissions that produce assessments for the waters under their mandate have helped in developing a solid knowledge base on water assessments.

The information on water produced by European countries has markedly increased over the past 20 years, well documented by the information presented in the national freshwater assessments. For instance, the AoA review template contains 319 SoE and

water reports from 48 countries covering the period 2005–2010. The increase in the production and dissemination of such reports is due to an increased understanding that environmental monitoring and information systems are crucial for developing environmental policy.

In many countries, a variety of national assessments that, *inter alia*, relate to water and water-related ecosystems are produced in the form of SoE reports, environmental statistics, environmental performance reviews, 'state of water' assessments, indicators, yearbooks and a range of thematic water reports.

Much attention has been paid to making the presentation of information inviting to the reader; the use of diagrams, graphs, charts and maps within the reports has much improved over the years. Moreover, the increased use of indicators has resulted in more targeted and compact information.

Nevertheless, producing factual, timely and easy-to-understand SoE assessments remains a challenge for several countries. In many cases the assessments are largely descriptive, being a compilation of different water issues with a strong focus on status and pressures. Some improvements over the years are visible. The information presented in assessments has changed from presenting the status of a few basic parameters on a limited number of locations to presenting status, sources, effects and policy measures on a much wider range of parameters, making them much more integrated. However, in most cases only limited information on policy performance, water management, implementation of measures, new challenges, etc., is provided, although this information is imperative to make the information useful for decision-makers.

The timeliness of relevant water information has also improved over the last ten years; often the data and information in the water assessments are only a few years old. However, for some countries part of the assessments are based on old data, in some cases more than ten years old. Regional and international assessments often have difficulty in collecting timely information.

Depending on the country, some freshwater environmental issues are more important than others and therefore the focus of the assessment varies between the countries. While all countries report about general water quantity and water quality issues, little reporting was found about newer issues including hazardous substances, impacts of water scarcity and drought, or water management.

Many water and water management issues that are important at the national level are related to similar issues that are important at the European level. Although the

country information would be valuable for European water assessments to support and better document the analysis, the current data and information flows from country to European level are not optimal and not always based on the information and knowledge available nationally. To improve this situation, a consistent common approach and close cooperation between international organisations and countries is needed.

Main findings of the water assessments

The analysis of SoE and water assessments has revealed a multitude and variety of products, containing a wealth of information. At the same time, the analysis also revealed that much information is lacking and the policy relevance of the information remains weak. This is not only true of national assessments but also of regional ones.

In general, the regular assessments help to improve the quality of the data and information. An important flaw in many of the reports analysed is that they are generally rich in statistical data but are of limited use in the state-of-water assessment and in the policymaking process. To improve this situation, the analytic part of the assessments has to be improved, making the assessments more relevant in the policymaking process.

Assessments are currently too restricted to environmental status and trends and have to focus more on measures and management. Indicators help in simplifying the communication of various environmental issues to policymakers and the general public. Frameworks (e.g. the Driving Forces-Pressures-State-Impacts-Responses (DPSIR) framework) help in making assessments comparable between issues and countries. To improve future assessments it is recommended to work towards more integrated assessments. These provide information about the status and trends but also provide future outlooks based on policy directions.

More and more, countries are opening up their databases to public access and make water information readily available on the Web for reasons of accountability and trustworthiness. Where countries are providing information through web-based databases, the procedure of the international programmes collecting information through questionnaires becomes obsolete. The SEIS principles enable a situation in which national and regional assessments can be developed with up-to-date information. This exchange should be based on the SEIS principle that the data and information is managed as close as possible to its source.

2 Water and related ecosystems

The first key theme of the Astana Ministerial Conference is *Sustainable management of water and water-related ecosystems*. This chapter assesses the current state of the many assessments of water and water-related ecosystems that are currently produced. This chapter aims to identify options for a more focused pan-European reporting and assessment process to support decision-making, and in particular examines how a gradual extension of the Shared Environmental Information System (SEIS) across the region can contribute to this.

Section 2.1 contains an introduction and background on water assessments and a description of the methodology used. In Section 2.2 there is an overview of global and European water assessments, while Section 2.3 provides an overview of the wealth of national water assessments. In Section 2.4 there is a discussion of the type of analysis covered by water assessments, including water issues covered, data and information coverage, the information chain for policymaking and the linking of national water information to European level. Finally, in Section 2.5 there is a description of how these findings can be used to improve the pan-European reporting and assessment process.

2.1 Introduction and background

2.1.1 Setting the scene

Water issues are serious and worsening in many parts of Europe making water management even more complex (EEA, 2010a, b, c; Dalcanale et al., 2011). At the same time water is abundant in much of Europe, large areas are also being affected by water scarcity and droughts, particularly in Southern Europe and Central Asia where there is both a severe lack of, and a high demand for, water. Climate change will simply exacerbate this situation. The increase in frequency of water scarcity will have severe consequences on most sectors, particularly irrigated agriculture, tourism, energy production and the provision of drinking water (EEA, 2009). The unusually cold winter of 2008, for instance, left hydropower-dependent Kyrgyzstan and Tajikistan without electricity. In many locations, water demand often exceeds availability and over-abstraction is causing low river flows, lowered groundwater levels and the drying-up of wetlands, with detrimental impacts on freshwater ecosystems.

Europe is also suffering from flooding, with an increasing number of deaths, displacement of people and economic losses. Again climate change is projected to exacerbate this through an increase in the intensity and frequency of floods (EEA, 2008; 2011; Kundzewicz et al., 2010). Most of the observed upward trend in cost of flood damage can be attributed to socio-economic factors such as increases in population, more assets (buildings, industry, infrastructures etc.) and urbanisation in flood-prone areas, and to land use changes, such as deforestation and loss of wetlands and natural floodplain storage.

An estimated 120 million people in the pan-European region do not have access to safe drinking water and adequate sanitation, making them more vulnerable to serious water-related diseases. Despite progress over the past 15 years, those living mainly in rural and remote areas in Eastern Europe, the Caucasus and Central Asia (WHO/UNICEF, 2010) remain vulnerable, making the Millennium Development Goal (MDG) of *reducing by half the proportion of people without sustainable access to safe drinking water and basic sanitation* a challenge.

Water quality has improved in many parts of Europe over the past 20 years, the result of better regulation and enforcement together with investment in wastewater treatment plants, mainly in Western Europe (EEA, 2010c). In Eastern Europe, economic transition since the early 1990's has helped as production has become cleaner, resulting in a decrease of pollution from industrial facilities.

To meet the needs of a resource efficient future, sustain human and economic development and maintain the essential functions of our water ecosystems, an integrated and knowledge-based approach to water resource management is required. Adequate information is imperative to enable the identification of water management problems and to be able to monitor and evaluate the changes brought about by management measures.

Figure 2.1 shows that the number of measurements of the status and quality of Europe's rivers, lakes and groundwater bodies as reported to the EEA over the period 1965–2008 has increased markedly. It should be noted that this figure only shows the increase in water quality information as reported to EEA — many countries have much more data available than they report to the EEA, while the EEA has generally only asked for information after 1990.

The core objective of any water-related SoE assessment is to identify and quantify the current state of, and impacts on, the water environment, how these are changing over time and whether the measures taken at different administration levels are proving to be effective. To fulfil this objective, the information collected and disseminated needs to reflect the following issues:

- *water management*: what are the ecological, social and economic aims and goals of water management;

- *state of water*: how is it polluted (nutrients, pesticides, heavy metals, ecological quality, etc.) and how much is there (availability, runoff, water stress, etc.);
- *time trends*: is the state getting better or worse, within or outside agreed limits, and responding to measures or to other factors;
- *pressures:* what is causing the problem, issues relating to water abstraction and use, water pollution, threats by sectors (household, industrial, agricultural), climate change and natural factors, etc.;
- *state of action on policies*: what measures have been taken on national/regional level and are they working towards targets?

To build a comprehensive picture that addresses these issues on a national, regional, or international level, a wide range of information needs to be compiled and aggregated. The information for the assessment of the environmental state of European waters is collected/produced by numerous regional and national authorities. The EEA and other international organisations ([8]) have the mandate to produce global, European, and regional overviews of the state of water, pressures affecting the state and recommendations to manage water better.

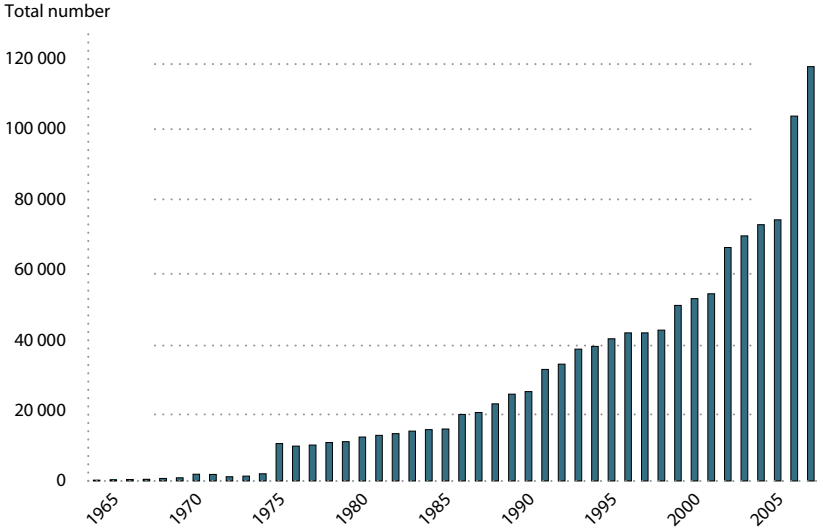


Figure 2.1 Total number of measurements on the status and quality of Europe's rivers, lakes and groundwater bodies as reported by countries to the EEA over the period 1965–2008 (Source: EEA Waterbase, 2011).

([8]) UN-Water, UNEP, World Water Assessment Program, UNESCO, IPCC, OECD, UNECE, etc.

2.1.2 Methodology

This chapter provides an overview of the available water assessments in the European region. To this end, the virtual library, the review template, and country fiches as described in Chapter 1, covering the time period 2005–2011, were used. Selections from the virtual library and the review template were made filtering on water related issues. The country fiches were used to develop an assessment of reporting by country and to assess individual reports. Box 2.1 lists the theme priorities covered by the review. These priorities were

Box 2.1

Theme priorities to be covered ([9])

Water resources
- Water quantity and vulnerability (including extreme natural events)
- Desertification
- Water quantity (including glaciers and extreme events)
- Water consumption
- Vulnerability

Structural measures
- Infrastructure (including financial aspects, energy production, wastewater, desalinisation, pipes/channels/reservoirs)

Water quality and pollution
- Water quality and vulnerability
- Water pollution control
- Socio-economic aspects (e.g. access to drinking water)

Ecological state
- Living resources (fisheries)
- Habitat characterisation
- Ecosystems and biodiversity
- Protected and migratory species and protected areas
- Invasive species
- Ecosystem services and restoration

Water management
- Water management (including efficiency and adaptation measures)
- Governance (including transboundary issues)

([9]) As endorsed by the Steering Group of the AoA.

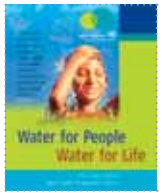
endorsed by the first Steering Group of the AoA in order to serve as the basis for organising the available literature to be assessed by the countries in the framework of the AoA methodology. Assessments by international organisations were also analysed. Information from the recently published EEA SOER (2010) in particular was used.

Additionally, a more in-depth analysis was made of a random selection of individual reports as a full assessment of all the available reports was in practice impossible. The analysis entailed a detailed overview of the issues addressed in the selected reports, the organisations involved and the use of indicator frameworks. The overviews of water assessments were documented in a simple template that provides a first overview for each international organisation and country of the availability of water assessments. The focus was on the 'state of water' reports, environmental water-related indicator sets, statistical reports, and water chapters within 'state of the environment' reports and environmental performance reviews (EPRs).

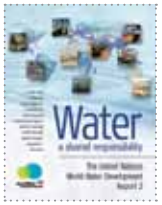
2.2 Global and European water assessments

2.2.1 Global water assessments

Global water assessments generally included an extensive compilation of information, drawn from multiple sources, documenting the state of water, the resource and its uses. Reports may be a cooperation between different agencies/organisations such as the UN World Water Development Report or reports produced by one organisation.



2003: World Water Development Report 1.



2006: World Water Development Report 2.

2009: World Water Development Report 3.

2010: Joint Monitoring Programme on Water Supply and Sanitation reports.

2010: UN-Water Global Annual Assessment of Sanitation and Drinking-Water (GLAAS)

On the global level, the United Nations is coordinating the water activities via UN-Water ([10]) composed of representatives of 28 United Nations organisations. Other organisations outside of the United Nations are partners in UN-Water. A brief description of the global water activities and assessments are provided in Box 2.2.

([10]) UN-Water, http://www.unwater.org.

Box 2.2

Water activities and assessments at the global level

- UNEPs *Global Environmental Outlook* (e.g. GEO-4) has a chapter assessing the state of water.
- The World Water Assessment Programme (WWAP) has produced the *World Water Development Report* (WWDR) every three years since 2003. These provide a comprehensive assessment of the state of the world's freshwater resources. The fourth *World Water Development Report* will be published at the sixth World Water Forum (Marseilles, 22 March 2012).
- WHO/UNICEF *Joint Monitoring Programme on Water Supply and Sanitation Reports*. The JMP reports assess the progress being made toward reaching the MDG water and sanitation targets.
- The *Global Annual Assessment of Sanitation and Drinking-Water* (GLAAS) is a UN-Water initiative implemented by WHO. The objective of UN-Water GLAAS is to provide policymakers at all levels with a reliable, easily accessible, comprehensive and global analysis of the evidence to make informed decisions in sanitation and drinking-water. WHO produces several assessments related to water and health including sanitation aspects and access to safe drinking water.
- UNESCO water family includes the International Hydrological Programme (IHE); UNESCO-IHE Institute for Water Education (UNESCO-IHE) World Water Assessment Programme (WWAP); and Water Centres. UNESCO is hosting a water portal and producing a series of thematic assessment reports. In UNESCO's publication database there are 119 water publications.
- Freshwater is one of the main areas covered by UNEP with more than 70 water publications being produced over the last ten years.
- The United Nations GEMS/Water Programme provides data and information on the state and trends of global inland water quality.
- FAO Water is a portal for FAO activities in relation to water. FAO Water has a multitude of water publications.
- The World Bank's latest water publications include *Sustaining Water for All in a Changing Climate* (2010) and Chapter 3, *Managing land and water to feed 9 billion people and to protect natural systems* in the 'World Development Report' (2010).
- UNDP's *Human Development Report 2006 Beyond Scarcity: Power, poverty and the global water crisis*.
- The *Hydrology and Water Resources Programme* of the WMO has many activities related to observation of the water cycle.
- The IPCC assessments contain much information on observed trends and projections on water resources, water quality and aquatic biodiversity, the main assessments being the *Fourth Assessment Report*: *Climate Change* (AR4, 2007) and *the Technical Paper on Climate Change and Water* (2008).
- UNEP's International Resource Panel. Water quantification and measurement, water efficiency and productivity (2011/2012).

One of UN-Water's key responsibilities is to monitor and report on the progress being made toward reaching internationally agreed water and sanitation targets, with particular focus on the targets set by the MDGs and the 2002 World Summit on Sustainable Development.

Global water statistics

At the global scale, there are several institutions publishing water statistics, graphs and maps (Box 2.3).

Box 2.3

Organisations involved in making water statistics available at the global level

- UN-Water (Statistics) and WWAP (Facts and Figures) homepages present statistics related to water.
- The Environment Statistics Section of the UNSD is engaged in the development of methodologies, data collection, technical cooperation, and coordination in the fields of environmental statistics and indicators. The International Recommendations for Water Statistics (IRWS) were adopted by the UN Statistical Commission (UNSC) at its 41st Session (2010).
- The System of Environmental-Economic Accounting for Water (SEEAW) was developed to address the need for integrated information on water resources and their management. It was recognised that the SEEAW provides a much-needed conceptual framework for organising hydrological and economic information in support of Integrated Water Resource Management (IRWM). UNSC adopted the SEEAW as an interim international statistical standard at its 38th Session in 2007.
- FAO Aquastat database provides data and information on water and agriculture by country.
- Waterwiki as a joint activity of several UN organisations provides water profiles per country.
- The JMP for Water Supply and Sanitation provide maps, graphs and tables related to the MDG on water supply and sanitation.
- World Bank Water Data and Statistics
- UNEP-GEMS provide via GEMS Water and GEMStat access to water quality data from national river monitoring sites.
- The Global Runoff Data Centre (GRDC) provides data sets on river flows.
- WRI, *Earthtrends* provides data tables on water resources and freshwater ecosystems
- International Benchmarking Network for Water and Sanitation Utilities (IBNET) has datasets with water utilities.

Global water indicator initiatives

At the global scale, there are several initiatives to establish water indicator sets; examples are listed in Box 2.4.

Box 2.4

Examples of global water indicator initiatives.

- Indicators have been established to illustrate the MDG Target 7.C: 'Halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation'.
- UNSD Environmental Indicators disseminate global environment statistics on 10 indicator themes compiled from a wide range of data sources including indicators on inland water resources.
- The first edition of the *World Water Development Report* (2003) included more than 160 indicators. The plan was to update them in the forthcoming WWDRs but in the 2009 edition less than 60 of the indicators were updated. A World Water Assessment Programme Expert Group on Indicators, Monitoring and Data/Metadata Bases has been established with the aim of ensuring regular, updated indicators for the WWDR reports.
- The indicator set for sustainability development produced by the UNCSD (revised in 2006) contains several water indicators.

Other global water assessments

The *Millennium Ecosystem Assessment* (2005) covered freshwater in the Current State and Trends Assessment, Chapter 7 Fresh water and Chapter 20 Inland water systems, and in the Responses Assessment Chapter 7 Freshwater ecosystem services.

The Convention on Biological Diversity (CBD) has produced several assessments of inland water biodiversity.

The Worldwatch Institute produces its annual *State of the World reports*, often with a focus on water issues and its *Vital Signs* indicator factsheets cover many water aspects. Worldwatch also has several reports on water management.

The Pacific Institute is one of the leading actors in producing global and United States water assessments. The main assessment from the Pacific Institute is a biennal book of global freshwater resources, *World's water*. Data tables from the book are available online.

During the last 10 years much focus has been on establishing a water footprint for countries and products. The Water Footprint Network ([11]) has recently developed a global water-footprint standard.

The World Water Council (WWC) has produced around 35 water assessments since 2006 and the Global Water Partnership (GWP) has several publications in particular focused on integrated water resource management.

A key activity of WBCSD is water; it has produced several water publications over the last years. The 2009 Water Facts and Trends provides an overview of some basic facts and societal challenges related to water, while global water resource scenarios are included in the 2006 report: *Business in the World of Water: WBCSD Water Scenarios to 2025.*

2030 Water Report: Charting our water futures, produced by the 2030 Water Resource Group, describes future water resource problems.

2.2.2 European water assessments

European water assessments should generally:

a) provide the basis for identification and assessment of environmental problems and the dominant threats at regional and European levels;

b) provide information necessary to enable actions/policies to be taken to improve the environmental state of the water bodies and ensure sustainable development;

c) be based on the most relevant time and space scales to meet the above two objectives.

The amount of water information and number of assessments produced at European level has increased markedly since the publication of the Dobris Assessment (EEA, 1995). Assessment of the status of water and pressure has always been an important part of the EEA state and outlook reports (SOERs).

The EEA has the mandate to produce objective, reliable and comparable information to allow the EU, countries and the general public to judge the effectiveness of policy and the needs for policy development. To this end, the agency has produced:

- several 'state of environment' reports with chapters and sections describing the state and management of water;

([11]) http://www.waterfootprint.org.

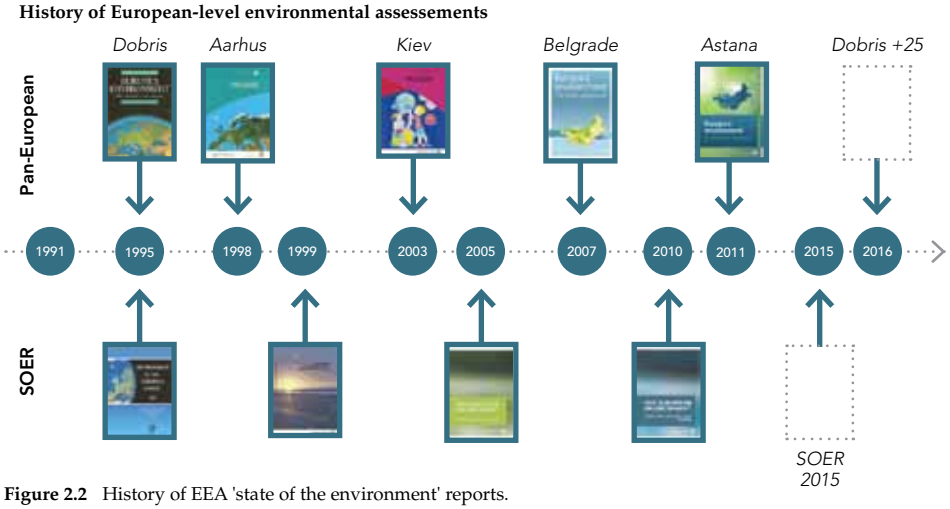


Figure 2.2 History of EEA 'state of the environment' reports.

- the recently published SOER 2010 which has water sections in its Synthesis on freshwater; two separate thematic assessments: water quality and water resources: quantity and flows. The 38 EEA member and cooperating countries also produced separate natural freshwater assessment describing the main freshwater issues in each country as part of the SOER process;

- seven (core set) water indicators that are updated annually. Water indicators also appear in other indicator sets such as the agri-environmental, SEBI and climate change impact, and data on European waters can also be retrieved and visualised through WISE;

- EEA has published more than 70 water assessments ([12]), including:

EEA, 2010d: *Quality of bathing water — 2009 bathing season*

EEA, 2010e: *10 messages for 2010 — freshwater ecosystems*

EEA, 2009: *Water resources across Europe — confronting water scarcity and drought*

EEA, 2003: *Europe's water: An indicator-based assessment*

([12]) http://www.eea.europa.eu/publications#c9=all&c14=&c12=&c7=en&b_start=0&c5=water.

The data and information EEA uses for its 'state of environment' assessments of Europe's waters are generated through national and river basin monitoring networks set up for national or EU level purposes, such as the monitoring activities established in relation to the Water Framework Directive. Up to 38 European countries ([13]) report a sub-sample of national results and results generated in relation to EU water directives to the EEA each year. These are made widely available through the Water Information System for Europe (WISE) ([14]).

In several previously described global water assessments and global 'state of the environment' reports there are chapters or sections describing the state of Europe's water. The World Water Development Reports (WWDR) include, for example, a number of European cases studies. The WWDR4, to be published in March 2012, will have a European chapter. Similarly, many of the global state of the environment/thematic assessments, for example, GEO4, the *Millennium Ecosystem Assessment*, and IPCC's AR4 (Working Group II), have European chapters/sections.

Under the UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Water Convention), and its Protocol on Water and Health ([15]) and working groups, several publications on water have been produced. In 2007 the *First Assessment of Transboundary Rivers, Lakes and Groundwaters* was published — the first ever in-depth report produced on transboundary waters in the UNECE region covering 140 transboundary rivers and 30 transboundary lakes in the European and Asian parts of the region, as well as 70 transboundary aquifers. The assessment aims to inform, guide and stimulate further action by Parties to the Convention to improve the status of transboundary waters. UNECE is working on a second assessment for the Astana Ministerial Conference. In addition, the first reporting exercise under the UNECE/WHO-Euro Protocol on Water and Health was conducted during autumn 2009/spring 2010 leading to the first regional implementation report of the Protocol.

European Union institutions — the EU Commission (DG Environment, Eurostat and the Joint Research Centre (JRC)) and European Parliament — have produced several water assessment reports over the last 10 years.

The EU Commission DG Environment publishes water directive implementation reports, staff working documents and studies. These include reports related to the implementation of the urban wastewater treatment, nitrate and water framework directives and reports on water scarcity and droughts.

([13]) EEA member and cooperating countries.
([14]) http://water.europa.eu.
([15]) http://www.unece.org/env/water/whmop2_documents.htm.

Eurostat databases include information on water abstraction, water use and wastewater treatment, collected every two years from countries through the joint Eurostat-OECD questionnaire. Eurostat uses the information in a variety of publications such an annual environmental indicator report and the EU sustainable development indicators. Examples of relevant Eurostat water publications and indicator sets are the Environmental statistics and accounts in Europe (2010), the *Energy, transport and environment indicators* (2011), and the *Environmental statistics in the Mediterranean countries: compendium 2005*.

UNECE, 2007:
First Assessment of Transboundary Rivers, Lakes and Groundwaters

Eurostat, 2010:
Environmental statistics and accounts in Europe

CEC, 2009:
5th Commission Summary on the Implementation of the Urban Waste Water Treatment Directive

European Parliament, 2008:
Climate change–induced water stress and its impact on natural and managed ecosystems.
Study report

The World Health Organization European Office produces assessments on water and sanitation regularly and aims at developing an environment and health indicator system including relevant water indicators.

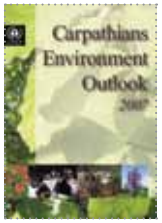
DEWA/GRID-Europe is part of UNEP's global network of environmental information centres, known as the Global Resource Information Database (GRID). During the last ten years UNEP DEWA/GRID-Europe has produced several water-related assessments.

Examples of WHO-Europe and UNEP-DEWA water assessments are:

WHO/Europe and EEA, 2003:
Water and health in Europe

WHO, 2010:
Progress and challenges on water and health: the role of the Protocol on Water and Health

UNEP/DEWA, 2005:
Freshwater in Europe — Facts, figures and maps



UNEP/DEWA, 2007:
'Carpathians Environment Outlook 2007' (KEO) — Section 3.5: *Water resources*

Over the past 20 years the OECD has produced several water assessments covering the following policy areas: water and multilevel governance; water resource management; agriculture and water management; drinking-water supply and sanitation; water supply and sanitation programme in EECCA countries; private sector participation in the water and sanitation sector; and aid for water and sanitation.

Examples of recent OECD water assessments are:

OECD, 2008a:
OECD Environmental Outlook to 2030, including assessment of water scarcity

OECD, 2008b:
Environmental Data Compendium 2006–2008

OECD, 2008c:
Environmental Performance of Agriculture in OECD Countries since 1990

OECD, 2009:
Managing water for all: An OECD Perspective on Pricing and Financing

Other organisations that produce European water assessments are:

- World Bank: Water resources in Europe and Central Asia (2003);
- NATO programme for Science for Peace and Security has published several assessments on water issues;
- EUREAU is the European Federation of National Associations of Water and Wastewater Services. In 2009 EUREAU published a comprehensive statistical overview of the water sector in Europe and of each EU Member State.
- the PlanBleu — covering states bordering the Mediterranean Sea — has over the years produced several water assessments including *A Sustainable Future for the Mediterranean: the Blue Plan's Environment and Development Outlook* (2005) and *the State of the Environment and Development in the Mediterranean* — 2009;
- in 2009, the Alpine Convention produced a comprehensive assessment of waters in the Alps;
- European environmental NGOs, including the World Wide Fund for Nature, the European Freshwater Programme and the European Environment Bureau, produce water assessments.
- UNEP/GEF's Global International Water Assessment produced several reports describing the status of European seas, including information on river catchments.

International cooperation in Central Asia is described in Box 2.5.

WWF and EEB, 2009:
What future for EU's waters

EUREAU, 2009:
EUREAU statistics overview of water and wastewater in Europe 2008

Plan Bleu, 2009:
State of the Environment and Development in the Mediterranean — 2009

Alpine Convention, 2009:
Water and water management issues Report on the State of the Alps

Box 2.5

International cooperation in Central Asia

The UN system plays a crucial role in supporting national authorities and institutions in Central Asia in the field of the environment and water management. Such international organisations as ADB, SIWI, UNEP, UNDP and USAID provide support in developing assessments of, amongst others, the state of sub-regional ecosystems with a focus on transboundary water-resource management. Additionally, a number of institutions established by Central Asian countries develop sub-regional assessments. These include:

- the Interstate Commission for Water Coordination (ICWC) annually establishes the water-quantity quota for each participating country within the main water courses (Amu Daria and Syr Daria);
- the Interstate Commission for Sustainable Development (ICSD) coordinates sub-regional cooperation in the field of environment and sustainable development;
- the Regional Environmental Centre for Central Asia (CAREC), a sub-regional professional organisation established by five of the Central Asia countries, the European Commission and UNDP, has implemented a number of sub-regional assessments;
- the Central Asia countries, as part of the Pan-European region, benefit from participation in the EECCA cooperation process, in which the UNECE and OSCE play a significant role by assisting countries in the integration of progressive environment- and water-management tools. This includes the development of environmental compendiums and a set of environmental indicators for EECCA by UNECE and UNEP, which are actively used by Central Asian countries.

Finally the establishment of Transboundary Water Commissions (see Box 2.6 for an overview of several European transboundary commissions) that produce assessments for the waters under their mandate helped develop a solid knowledge base on water assessments.

Box 2.6

Listing of European Transboundary Water Commissions dealing with freshwater *(not exhaustive)*

- Border River Commission between Finland and Sweden (Finland, Sweden);
- Commission for the Implementation and Development of the Convention on Cooperation for the Protection and Sustainable Exploitation of Waters from Luso-Spanish River Basins (Portugal, Spain);
- Commission on the Use of Water Management Facilities of Intergovernmental Status on the Rivers Chu and Talas (Kazakhstan, Kyrgyzstan);
- Finnish Norwegian Transboundary Water Commission (Finland, Norway);
- Franco-Swiss Genevese Aquifer Management Commission (France, Switzerland);
- International Commission for the Protection of the Danube River (Austria, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Germany, Hungary, Moldova, Montenegro, Romania, Serbia, Slovakia, Slovenia, Ukraine);
- International Commission for the Protection of the Elbe (Germany, Czech Republic);
- International Commission for the Protection of Italo-Swiss Waters (Italy, Switzerland);
- International Commission for the Protection of Lake Constance (Austria, Germany, Switzerland);
- International Commission for the Protection of Lake Geneva (France, Switzerland);
- International Commission for the Protection of the Oder against Pollution (Czech Republic, Germany, Poland);
- International Commission for the Protection of the Rhine (Germany, France, Luxembourg, the Netherlands, Switzerland);
- International Commission for the Scheldt (Belgium, France, the Netherlands);
- International Commissions for the Protection of Mosel and Saar Against Pollution (France, Germany, Luxembourg)
- International Meuse Commission (Belgium, France, the Netherlands, Germany, Luxembourg);
- International Sava River Basin Commission (Bosnia and Herzegovina, Croatia, Slovenia, Serbia);
- Interstate Commission for Water Coordination of Central Asia (Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan);
- Peipsi Center for Transboundary Cooperation (Estonia, Russia).

2.3 Overview of national water assessments

In many countries, a variety of national assessments that, *inter alia*, relate to water and water-related ecosystems are produced in the form of SoE reports, environmental statistics, environmental performance reviews, 'state of water' assessments, indicators, yearbooks and a range of thematic water reports. Beyond these, contributions are made to international assessments. The data and information needed for such assessments come from a limited set of data collections, monitoring networks, and statistical tables, etc.

Figure 2.3 shows how water assessments are produced by countries. Where traditionally water information was reported in the form of tables, with the increasing amount of information now available (see Section 2.1.1) and the possibilities of managing information through ICT, reporting is changing. Nowadays, more and more countries use diverse ways of disseminating the information. The available data and information are, on the one hand aggregated for assessments, reports and indicators, and, on the other, are published through homepages as, for example, indicator factsheets, and internet services such as databases and GIS-maps. A still modest but growing tendency is to produce reports that provide aggregated information, while the more basic, disaggregated information is accessible through websites and online databases.

2.3.1 Organisation of national water assessments

National environmental assessments are, in general, produced or commissioned by governments and government related institutions (Lovett et al., 2007). Annex 2.1 provides an overview of the national/sub-national institutions that produce SoE assessments, statistical yearbooks, and national water reports.

Annex 2.1 shows that mostly environment ministries or environment (protection) agencies, which usually fall under the responsibility of these ministries, are responsible for producing SoE reports. Exceptions include the Czech Republic and Estonia, where SoE assessments are carried out by environmental information centres.

Statistical yearbooks are usually produced by statistical offices that are often the responsibility of ministries of the interior.

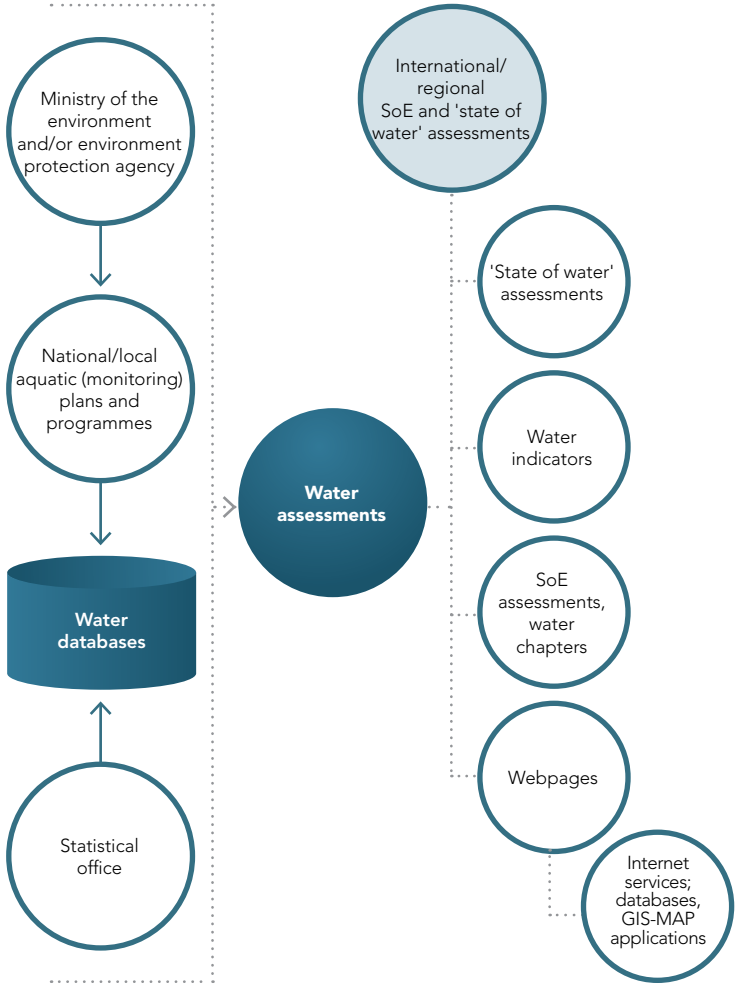


Figure 2.3 Water assessments.

Many reports are published as paper reports, but are usually also available online. Figure 2.4 gives an overview of the ways SoE and water assessments are made available.

Water reporting is done by environment ministries, the water department in these ministries, or environment (protection) agencies. In the latter case, this is mostly the same institute as the one producing the SoE assessment. In several countries regional sub-units also produce SoE reports. These include the United Kingdom (England and Wales, Scotland, Northern Ireland), Belgium (Flanders, Wallonia, and Brussels) and Poland (voivodships).

Approximately one third of national assessments are produced through cooperation with other ministries, for example, in the Russian Federation and Georgia; other national institutes, as in Norway, Portugal, Slovakia and Tajikistan; regional offices or institutes, as in Italy and Portugal; or international organisations as in Kazakhstan and Serbia. Most of the assessments are concerned with the national level, but approximately one fifth of them target the sub-national level.

A range of detailed thematic reports, such as assessments of climate impacts on water or diffuse pollution, are produced. Such water assessments are often used for water chapters in SoE reports, in environmental statistics yearbooks and for water indicators in environmental/sustainable development indicator sets. During the last years, several countries have established internet-based services — many of the environment ministries and their collaborating institutions have water topic websites that provide information to the interested public on water resources, water pollution and state of water, usually in the form of downloadable publications and increasingly in the form of access to monitoring results such as (aggregated) data, databases and web-GIS functionality.

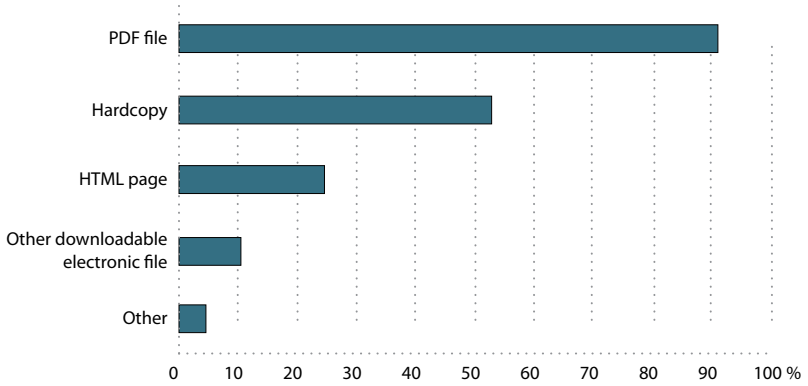


Figure 2.4 Different ways of publishing SoE and water assessments based on 220 approved review templates — filtered on water-resources and water-resource management topics (Source: EEA, EE-AoA portal, as of 31 May 2011).

Box 2.7

National assessments in the southern Caucasus

- The Environmental Impact Monitoring Centre of the Ministry of Nature Protection of Armenia publishes monthly and annual bulletins in Armenian language, which contain data on surface water quality.
- The Armenian State Hydro-Meteorological Service of the Ministry of Emergency Situations publishes annual hydrological reference books including information on surface water quantity.
- A *Study for Improvement of Rural Water Supply and Sewage Systems in the Republic of Armenia* was prepared in 2009 within the frameworks of a project, funded by the Japanese International Cooperation Agency (JICA).
- An assessment report *Water Utility Service Quality Monitoring for Water Systems in Armenia* was prepared in 2008 within the USAID Program for Institutional and Regulatory Strengthening of Water Management in Armenia.
- The Ministry of Ecology and Natural Resources of the Republic of Azerbaijan periodically publishes bulletins on surface water quality. In addition, special bulletins, which are disseminated through mass media and are placed on the internet, are prepared on the monitoring results from the transboundary rivers.
- The Georgian National Environmental Agency of the Ministry of Environment Protection publishes monthly and annual bulletins, which contain data on surface water quality and quantity.
- A report *Fisheries and Aquaculture in Georgia — Current Status and Planning* was prepared by FAO in 2006 within the Strengthening the Capacity of the Department of Fisheries to Support Fisheries Sector Rehabilitation technical assistance project.
- A report *Integrated Coastal Zone Management Strategy for Georgia* was prepared in 2009, within the European Commission funded Environmental Collaboration for the Black Sea project, which was implemented in Georgia, Moldova, Russia and Ukraine, providing analytical information on the ICZM process in Georgia and assessing the natural and socio-economic factors related to the coast.

2.3.2 Water assessments as part of wider 'state of the environment' reports

'State of the environment' reports

'State of the environment' reports are produced by almost all countries, usually by ministries of environment or associated institutions (Section 2.3.1). These reports include a wide range of issues. While most SoE reports largely focus on reporting about the status and trends of environmental issues, some take a much broader perspective looking at environmental issues in the broader context of socio-economic issues.

Most countries produce SoE reports every 1–5 years and the majority of SoE reports assessed for this report have been published recently, between 2008 and 2010. The information included is typically not more than two years old, although in some of the reports, four year old data is used. This indicates that the countries are aware of the importance of up-to-date environmental information. Almost all reports contain texts complemented by statistics in the form of graphs and/or tables. Approximately half of the countries also use indicators to describe their environmental status.

The size of the SoE reports in the pan-European countries varies from some 100 pages for the Czech Republic, France, Italy and the United Kingdom, through 300 pages for Ireland to more than 500 pages for the Russian Federation. The volume of SoE reports is in general reduced when information is available in the form of indicators or statistics. Some of the SoE reports are complemented by websites with additional information. In such cases, the chapters merely summarise the findings from the available information and do not have to explain the information used to produce the report as that information is accessible on the web.

Approximately half of the countries published their reports in English or include an English summary.

Environmental issues are seldom discussed from an integrated perspective, for example, by relating environmental quality to socio-economic activities and their interactions. This applies for water assessments that usually consider rivers, lakes, groundwater, bathing water, etc. separately. For example, the interaction between groundwater and surface water is rarely discussed, while socio-economic activities are often only mentioned as sources of pressure. The lack of integration is connected to the limited mandates of the institutions responsible for the assessments. However, policy relevant water assessments would benefit from integration across the various topics.

The state of environment of the Republic of Belarus

The latest national SoE report *The state of environment of the Republic of Belarus* (Minpriroda, 2010 ([16])), covering the years 2005 to 2009, was published in 2010. It was prepared for government organisations involved in environmental management and research, public organisations, the public at large and foreign partners, providing objective information about the state of the environment, natural resources and the Republic of Belarus' state of protection.

Water is covered in Part 4: Water resources, which includes sections on renewable freshwater resources, freshwater data, domestic water consumption per person, the quality of drinking water, water loss, re-use and recycling of freshwater, waste water discharge into water bodies, surface water, biochemical oxygen demand in river water, the concentration of ammonia nitrogen in the river water, nutrients in rivers and the capacity of waste-water purification facilities.

([16]) http://minpriroda.by/en/nac_dokl/new_url_1244680181.

Water chapters in 'state of the environment' reports

Mostly, SoE reports have separate chapters dealing with water. These usually present some hydrological characteristics and the water-quality status. Additionally, depending on the focus of the report, various issues such as water-management objectives, legislation, drinking water, fisheries, other water uses and pollution sources are discussed. In addition to the water chapters, other chapters also cover water aspects such as:

- water use of sectors and influence of sectors on water, e.g. wastewater discharge, irrigation, cooling water, or use of fertilisers;
- natural hazards, dealing with floods and droughts;
- environment and health, e.g. drinking and bathing water quality;
- climate and climate change, dealing with precipitation, droughts, floods, and impact of climate change on water quality;
- ecosystems, dealing with wetlands and other water-related issues like desiccation.

Some examples include:

BiH, 2010:
The 2010 *State of the environment in the Federation of Bosnia and Herzegovina* has a chapter on environmental indicators dealing with water quality, water protection and protection against water. Aspects of water are also discussed in the chapters on nature protection, soil protection, energy, and waste generators.

SYKE, 2008:
The Finnish 2008 *State of the environment* gives a very short overview on various topics within 20 pages. It has a chapter on water pollution and a chapter on surface waters. Aspects of water are dealt with in chapters on climate change, energy, and biodiversity, amongst others.

GIOS, 2010:
The 2008 *Report on the state of the environment in Poland* has a sub-chapter on the quality of water as a part of 'Environment and Health' chapter. In addition, aspects of water are dealt with in the chapters 'Use of materials, energy and water', 'Protection of the natural heritage' and 'Land and soil'.

The space allocated to water and water-related topics as part of recent SoE assessments varies; Croatia and Czech Republic allocate the least, 9 per cent of the report; France, 15 per cent and Italy at 14 per cent are in the mid-range; while Kosovo with 27 per cent, Ireland with 28 per cent, Kyrgyzstan, 33 per cent and Poland, 28 per cent, devote up to a third of the available space to water — Finland even devotes 41 per cent of its SoE assessment to water and water related topics. On average, some 15 per cent of SoE assessments deal with water issues.

Environmental indicators

Indicator sets are used by many countries ([17]). Many of these sets include selections of parameters, that are considered indicative for specific water management issues, as used for example by Croatia, Denmark, Estonia, Luxembourg, the former Yugoslav Republic of Macedonia, Moldova, Russian Federation, Serbia and Slovenia. Others, including the Czech Republic, use the EEA core set of indicators or use indices, Azerbaijan and Portugal use composite indicators or, like Armenia, focus on socio-economic issues. The national water indicators are often complemented with statistical data, such as indicators related to water abstraction and use, and wastewater treatment. Some examples of environmental indicator sets include:

SPW, 2010:
Belgium's Wallonia region produces an annual *Environmental Scoreboard* (230 pages). The scoreboard report contains 158 indicators of which 30 are water indicators. All the indicators including assessment text, graphs and data are available on line.

AZO, 2010:
Croatia's *The Environment in Your Pocket* is a 44-page, annually produced environmental indicator publication. The report has 30 indicators of which six describe water aspects.

EnviroPortal:
The Slovak Republic has set up an information system on environment — EnviroPortal. This includes water chapters and indicator sets. Slovakia has two indicator sets, one on the environment, the other a sustainable development set, with 78 and 17 water indicators, respectively.

([17]) National sets of environmental indicators were found for Armenia, Azerbaijan, Belarus, Belgium, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, the former Yugoslav Republic of Macedonia, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Moldova, the Netherlands, Norway, Poland, Portugal, Russian Federation, Serbia, Slovakia, Slovenia, Spain, Switzerland, Ukraine, and the United Kingdom.

Topics addressed in water chapters of SoE reports

Figure 2.5 presents an overview of the topics addressed in the SoE reports of a selection of countries ([18]). This overview shows that:

- water management issues, describing the water management context, are included in all reports;
- EEA member countries and cooperating countries (Western Balkans) do not always include socio-economic issues in their SoE reports;
- information on infrastructural measures are reported by all countries;
- information on floods and/or droughts is, however, much less reported.
- information on water quantity and water quality is provided by all countries;
- most EEA and Western Balkan countries provide information about wastewater treatment;
- it is noticeable that the ecological status is not reported by some EU Member States who would be expected to deal with this within the framework of the Water Framework Directive;
- while most EEA member countries do, only a few countries in Eastern Europe, the Caucasus and Central Asia report on emissions to water, which may be due to the limited availability of data.

Omissions of topics may not be a matter of missing information but may be due to the opinion that these topics are not so much part of SoE reporting but rather ought to be reported though thematic reports.

This overview of topics only provides a rough indication of what is reported, with the level of detail varying substantially between countries. On the whole, however, the fact that countries do report on such topics as the water management context and emissions to water shows that increasing attention is being paid to information related to water policy implementation.

([18]) Armenia, Belarus, Belgium, Bosnia and Herzegovina, Croatia, Czech Republic, Estonia, Finland, the former Yugoslav Republic of Macedonia, France, Ireland, Italy, Kazakhstan, Kosovo under UNSCR 1244/1999, Kyrgyzstan, Luxembourg, the Netherlands, Poland, Serbia, Slovak Republic, Sweden, Ukraine, the United Kingdom.

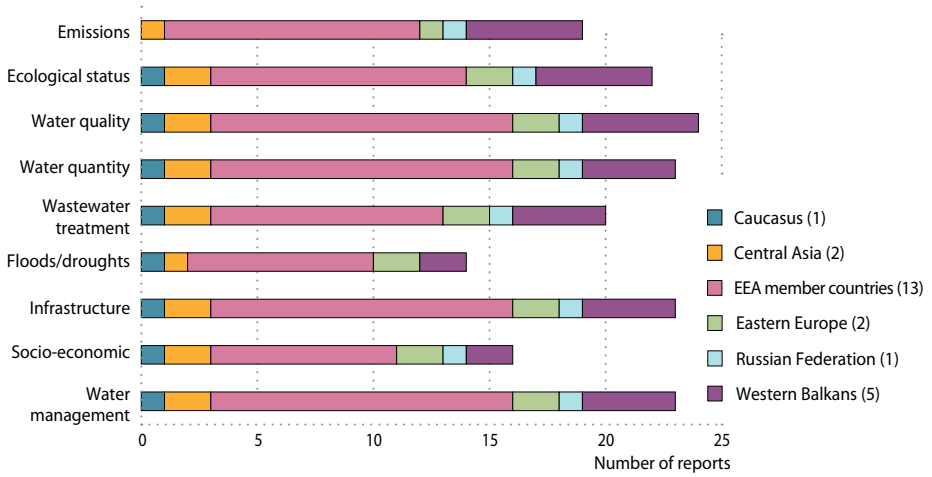


Figure 2.5 Number of SoE reports in which topics are covered for EEA member countries, Eastern Europe, the Caucasus, Central Asia, the Russian Federation, and Western Balkans. Data from water assessments presented in the country fiches, based on 24 reports. The total number of reports included in the assessment per region is indicated in brackets. (Source: EEA, EE-AoA portal).

2.3.3 Environmental statistics

The national statistical offices often collect environment-related statistical data following methods that were introduced 10–20 years ago, with only minor changes over the years. In relation to water and related ecosystems the collected statistics cover the following:

- water abstraction by source and sector;
- water use by socio-economic sectors;
- wastewater treatment and discharge of pollutant;
- costs of environmental protection; and
- payments for environmental pollution.

Environmental statistical yearbooks often report data in the form of tables. Examples are:

Russian Federal Service on State Statistics, 2010:
Every second year a statistical compendium is published, *Environmental Protection in Russia*, 2010. The report contains information that characterizes the state of the environment, the availability and the use of natural resources, including water resources and water quality.

The former Yugoslav Republic of Macedonia, State Statistical Office, 2009:
An annual environmental statistic report is published. Around 20 per cent of its 152 pages are used for statistical tables on water (water abstraction and use, water quality, wastewater treatment and emissions to water).

The Italian National Institute of Statistics, 2009:
An environmental yearbook, *Statistiche ambientali*, is produced. Forty-two of the 350 pages in the latest (2009) edition are devoted to water tables.

In some cases water statistics are published as small publications (briefings, statistics in focus etc.) and water statistic tables are made available through databases. In some cases, however, statistical offices produce sustainable development indicators or more assessment oriented publications.

The purpose of environmental statistical reports usually differs from the purpose of SoE reporting.

- SoE reports focus on the environmental situation (status), the problems and issues and how these problems can be overcome. This is reflected in the SoE reports where status, pressures and impacts are important elements, and policies and measures are described.

- Statistical reports on the other hand, focus more on the socio-economic aspects of the environment, looking at use, processing, waste, implementation of policies and costs, and revenues from, for example, payments for wastewater treatment from different sectors. From these reports, information can often be derived about drivers, pressures and responses.

The statistical reports typically provide additional information that is often not included in SoE reports and are therefore potentially important sources of information for integrated assessments.

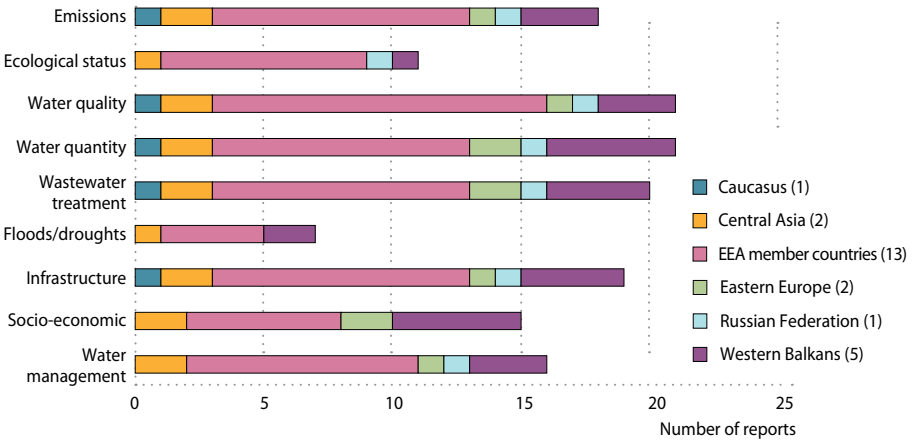


Figure 2.6 Number of statistical yearbooks in which topics are covered, divided over EEA member countries, Eastern Europe, the Caucasus, Central Asia, the Russian Federation, and the Western Balkans. Data from water assessments presented in the country fiches, based on 24 reports. The number of reports included in the assessment per region is indicated in brackets. (Source: EEA, EE-AoA portal).

2.3.4 'State of water' reports

Most countries produce specific 'state of water' assessments on a regular basis, in addition to the more general SoE assessments. Here are some examples:

UBA, 2006:
The *2006 Water quality in Austria — Annual Report* provides an overview of the state of water over the past 15 years.

Nordemann Jensen et al., 2010:
Denmark's *Aquatic environment and nature* provides an overview of the state of water over the past 20 years.

Ministerie van Verkeer en Waterstaat, 2010:
Netherland's *Water in Focus 2010* provides information on water management in the Netherlands.

DSI, 2009:
Turkey water report 2009 provides an overview of the state of water with water quantity data dating back to 1935, and information on transboundary water policy.

As shown in the above examples, the topics discussed in the various water assessments reports are diverse, depending on the water management situation in the respective countries. A range of issues could be identified that are included in these reports, but not every issue is discussed in every report. Figure 2.7 provides an overview of issues that are discussed in the 'state of water' reports as well as some sources of the information.

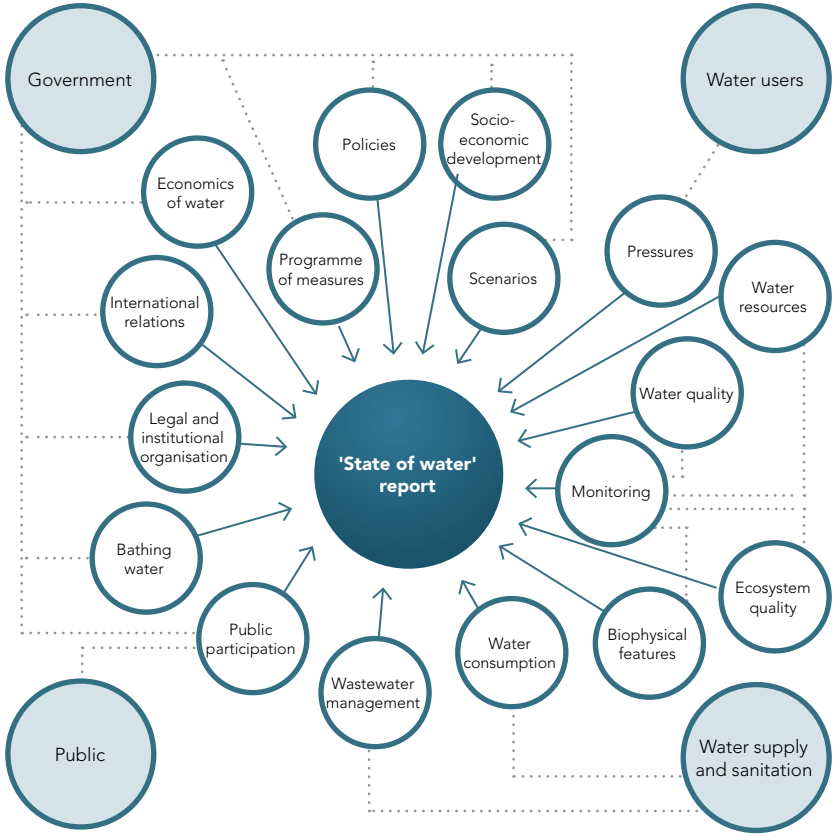


Figure 2.7 Overview of topics that are included in 'state of water' reports and an indication of the sources of information.

Most of the 'state of water' reports assessed for this report were published in recent years (2008–2010) reporting on data four years old and less. The size of the reports varies from some 20–30 pages through some 100 pages as in the case of the Czech Republic and up to 175 pages for Croatia. Water-management plans, including 'state of water' information, amount to some 280 pages (the Netherlands). However, increasingly 'state of water' reports are concise documents that contain condensed information while data are provided in separate reports — alongside the Netherlands' *Water in focus*, a separate volume *Water in data* was published — or through webbased applications. The water indicators used in the water assessments are usually subsets of the indicators used for SoE assessments.

2.3.5 Water statistics

Many countries also publish water statistics. These appear in the form of publications (Austria, Azerbaijan, Belgium, Bulgaria, Italy, Kosovo under UNSCR 1244/1999, Kyrgyzstan, Malta, Romania, the United Kingdom, Uzbekistan) or as statistical tables, made available through websites (Belarus, Bosnia and Herzegovina, Denmark, Estonia, Germany, Greece, Ireland, Liechtenstein, Lithuania, Moldova, Montenegro, the Netherlands, Norway, Poland, Portugal, Russian Federation, Serbia, Spain, Switzerland, and Turkey). Some of the statistical tables include downloadable elements as in the cases of Belarus, Portugal, Spain, and Turkey, or searchable databases available for the Netherlands and Romania, for example. Some countries, as Cyprus, Latvia, and Switzerland, require login procedures to access their statistical data.

Various industrial organisations and NGOs produce publications on water, such as on water supply and/or waste water treatment in Austria, Czech Republic, Denmark, France, Germany, Greece, Ireland, Italy, the Netherlands and Sweden; on energy in the Russian Federation; on nature conservation in Cyprus, Montenegro, Turkey and Uzbekistan; on governance in Kazakhstan and Tajikistan; on water pollution in Estonia; hydrological yearbooks for Austria, Czech Republic, Finland, France, Hungary, Norway, Slovakia, Slovenia and Switzerland; and on water regulations in Liechtenstein.

The water statistics often provide hydrological data and, increasingly, chemical parameters. Sometimes, when statistics are provided on line, real-time hydrological data are shown. By collecting information on a website, a data source is developed that can be used to produce water assessments. However, the water statistics are sometimes separated from the water assessment data.

2.3.6 Specific water thematic assessments

In addition to the general 'state of water' assessments, many countries produce reports on specific water themes — the Austrian Ministry of Agriculture, Forestry, Environment and Water Management, for example, lists about 130 publications on water on its website, the Danish Environment Ministry lists more than 200, and the Danish Environmental Protection Agency more than 1 000 that include water, and the Slovenian online library of the Environment Agency lists 227 titles when using the search word 'water'. Such reports provide more in-depth descriptions and detailed data and information related to the theme.

Many of these thematic reports, including hydrological yearbooks, annual reports on bathing water quality, biannual reports on developments in waste water treatment and drinking water quality, are part of regular reporting schemes.

Other regular publications include national reports related to water policies. Such reports include river-basin management plans, WFD Article 5 reports, reports related to the nitrate directive, the urban waste water treatment directive, the bathing water directive, the drinking water directive, and national communications to UNFCCC.

Additionally to these obligatory reports, some countries also perform studies and produce assessments on specific issues that are important for that country, or report on *ad-hoc* studies, such as *Oil Spill in the Kerch Strait — Ukraine Post-Disaster Needs Assessment*' (Ukraine) and *Dioxine in bottom sediments in the Southern Part of Baikal Lake* (Russian Federation) or specific assessments for the national part of individual rivers or lakes, for instance, *Baseline Conditions and Pressures on for Integrated Water Resources Management in the Marmarik River Basin of Armenia* (Armenia) or *State of the environment of Balkhash Lake* (Kazakhstan). As well as the water thematic assessments, water and water-related ecosystems topics are discussed in other thematic assessments, such as reports on climate change, biodiversity, or energy.

The above shows that the collected data and information is used for a range of assessments alongside general environmental assessments. Also specific data and information collection takes place to develop thematic assessments. Such specific information is, however, often not stored in a way that makes it accessible to a wider audience, let alone make it available for SoE or 'state of water' assessments. Such data and information run the risk of being lost after use in one or two thematic assessments.

2.3.7 Country water profiles

The EEA 'State and outlook 2010' report on the European environment (SOER 2010) included country assessments on different environmental issues including freshwater. Countries were responsible for producing these assessments of the status and pressures affecting their freshwaters. Overall, the activity of producing freshwater assessments was a success with 37 countries providing a freshwater assessment. These national freshwater assessments provide a good overview of freshwater issues relevant for the European countries.

Many international organisations provide water information by country (Annex 2.2) including country profiles and data fact-sheets providing an overview of country-specific water issues. The annex shows that all countries appear in one or more water assessments. It also shows that the information available at the international level is often rather outdated. For instance, the latest information collected by GEMS Water, which is used in the World Water Assessment Programme, is already six years old while much of the information is much older. To improve the assessments that are based on these datasets, updating of information is needed.

UNECE ([19]) and OECD ([20]) have made substantial efforts to produce environmental performance reviews to help countries upgrade their environment through improving policies, strategies and tools. Annex 2.3 provides an overview of the countries in the pan-European region involved in these reviews and the year in which the reviews were published.

Currently, international information collection is based on programme-specific questionnaires. As each programme uses its own format and asks for a different set of data, countries have started to suffer from questionnaire fatigue and are becoming less willing to provide their data to international programmes, even more so as these sometimes add little to national water management in terms of improved understanding of national water systems. As the available information for the international programmes becomes outdated, this effect increases. Innovative ways of data collection are therefore needed to improve the information that is internationally available.

2.3.8 Findings from the assessments

Some general developments can be found from the assessment of the various assessments as described in this section. These findings are described briefly here and will be further discussed in the following sections.

- Many different assessments are produced, often with different purposes. A general grouping is that of SoE assessments, statistical yearbooks, water assessments, water statistics, and thematic reports. Where the SoE and water assessments build upon the same information, the statistical yearbooks often provide different information. Thematic reports sometimes build on specifically collected information that is not made available for general assessments. These differences lead to redundant and sometimes wasteful information collection.

([19]) http://www.unece.org/publications/environment/epr/welcome.html.
([20]) http://www.oecd.org/document/22/0,3746,en_2649_34307_46271382_1_1_1_1,00.html.

- The environmental status usually changes slowly. Assessments produced annually often report information that shows little changes over the years.

- There is a tendency to reduce the amount of information provided in an assessment by producing summaries and findings and by putting the background information on websites and online databases.

- The range and type of information reported is wide and varies between countries. Applying indicators that are internationally harmonised can help by reducing and streamlining the amount of information that is reported and in communicating between countries about the state of the environment (Smeets and Weterings, 1999). The use of indicators has increased over the last decade.

- International organisations also collect country information and produce assessments. These, however, run the risk of being outdated, as the information reported is often several years old. Streamlining of the national reporting with the international reporting would help to overcome this problem.

- Despite the broad topics included in SoE and water assessments, the analysis provided is seldom integrated across the different aspects of water. Mostly reporting is done on the separate aspects with some cross-reference if there are influences.

2.4 Highlights of water assessments

2.4.1 Type of analysis covered by the water assessments

A multitude of national water assessments is available

The information on water produced by European countries has markedly increased over the past 20 years, well documented by the information presented in the national freshwater assessments. For instance, the AoA portal review template contains 319 SoE and water reports from 48 countries covering the period 2005–2010. The increase in the production and dissemination as shown in Section 2.1.1 is due to an increased understanding that environmental monitoring and information systems are crucial for developing environmental policy. Over the years, many countries have developed or improved their systems to produce environmental information and, maybe even more importantly, have opened up this information to the wider public. International legislation such as the Aarhus Convention and the EU Directive on access to information has helped this process.

Much attention has been put into making the presentation of information inviting to the reader; the use of diagrams, graphs, charts and maps within the reports has much improved over the years. Moreover, the increased use of indicators has resulted in more targeted and compact information.

Nevertheless, producing factual, timely and easy-to-understand SoE assessments remains a challenge for several countries. In many cases the assessments are largely descriptive, being a compilation of different water issues with a strong focus on status and pressures. Indicators used are typically a selection from the available information. They, too, focus on status, pressures and impacts, and neither reflect the policy-relevant drivers, nor suggest responses. Only limited information on policy performance, water management, implementation of measures, new challenges, etc. is provided, although this information is imperative to make the information useful for decision-makers. As the information is consequently not presented in an integrated manner, decision-makers consider the assessments only partly useful at best.

Many European and regional water assessments are produced

At both the global and European scale a multitude of inland water assessments is available. In many ways, Europe is leading the way in producing water assessments. The AoA virtual library, for instance, contains more than 110 regional and European SoE and water reports for the period 2005–2010. The increase in European water assessment is partly driven by the 15-year tradition of EEA in producing water assessments, supplemented with water assessment activities by OECD, UNECE, and WHO (focusing on water supply and sanitation) and water statistics produced by Eurostat and OECD.

The EU water policies, including their reporting obligations in relation to the WFD and the implementation of other water policies, such as the urban wastewater treatment, nitrate, bathing water and drinking water directives, also require relevant assessments on the status and pressures affecting the EU waters.

The OECD and UNECE environmental performance reviews have, since 1992, developed and improved the assessment methodology in the region. This was also done by the WHO Regional Office for Europe that, since 1999, has produced country health-system profiles (HiTs) as part of the European Observatory on Health Systems and Policies. These profiles provide a detailed description of health systems and of policy initiatives, in progress or under development, including water supply and sanitation.

Finally, the establishment of Transboundary Water Commissions (see Box 2.6 for an overview) that produce assessments for the waters under their mandate helped in developing a solid knowledge base on water assessments. Despite this experience, many of the European and regional assessments are not always based on up-to-date and available information.

Timeliness of information

The timeliness of water information has improved over the last ten years; often the data and information in the water assessments are only a few years old. However, for some countries many water indicators are based on old data, in some cases more than 10 years old. Regional and international assessments have even more difficulty in collecting and using timely information where countries take time to provide the necessary information.

Some countries have regular updates of SoE water chapters and environmental/water statistics, often annually and often as part of the national legislative requirements. For instance, in Resolution No. 53 of 1993, the Government of the Russian Federation has stated that the SoE report 'should act as ground for a more precise definition of priority areas of environmental protection activities and programmes directed to improvement of the environmental situation in the Russian Federation'. Reporting cycles range between one and four years, using relatively recent information. Figure 2.8 shows the number of assessments included in the AoA virtual library from 2005 onwards (older reports are included in the virtual library, but not considered in the figure). The figure shows that most of the assessments were produced very recently. The time-series included in the assessments range up to over 20 years (Figure 2.9).

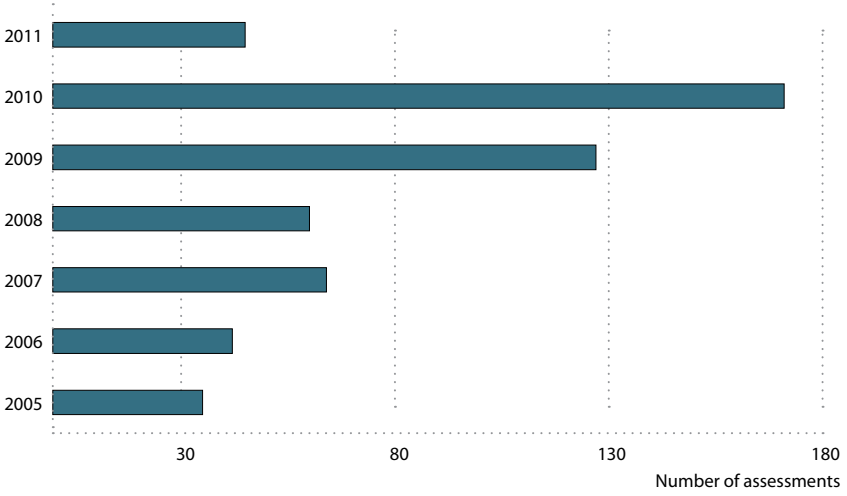


Figure 2.8 Number of SoE and water assessments included in the AoA virtual library per year from 2005 onward (older reports are not included). In all there are 544 reports (Source: EEA, EE-AoA portal, as of 31 May 2011).

Regular assessment cycles are beneficial. It is important to keep the information up-to-date, to sustain and improve its quality, through regular evaluations and updating of the information production process (Timmerman et al., 2010a). The iterations also allow for the development of information procedures that will improve the quality of the information (e.g. Timmerman et al., 1996; UNECE, 2006; Ward et al., 1990). However, the policy relevance of environmental statistical yearbooks could be questioned as, usually, there are only minor changes year on year.

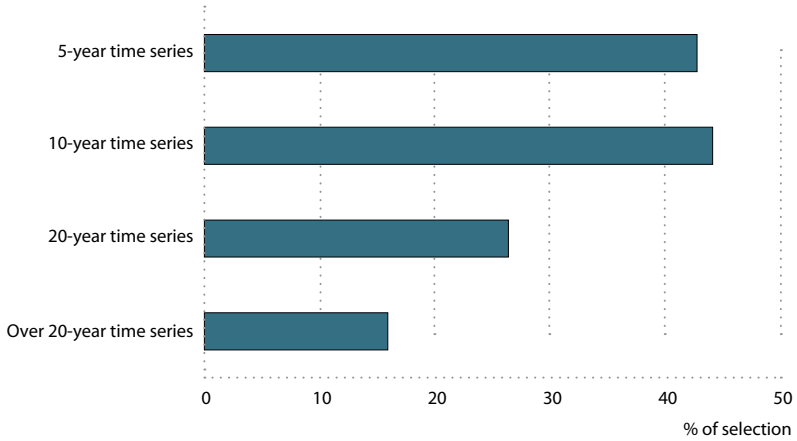


Figure 2.9 Length of time series of SoE and water assessments based on 220 approved review templates — filtered on water-resources and water-resource management topics (Source: EEA, EE-AoA portal, as of 31 May 2011).

Coverage of freshwater issues

Depending on the country some freshwater environmental issues are more important than others and therefore the focus of the assessment varies between the countries. Figure 2.10 shows the various purposes of the reports in the AoA review. The figure shows that status and trend assessments and thematic assessments take the largest shares, followed by integrated and sectoral assessments.

Looking at the thematic priorities listed in Box 2.2, it appears that all topics are included when all assessments are taken into account. Figure 2.11 shows the number of reports in which individual elements are discussed. It also shows if these themes are discussed from a policy perspective, a legal perspective, if it discusses trends or hot spots, and if transboundary aspects are discussed. The numbers are averaged over

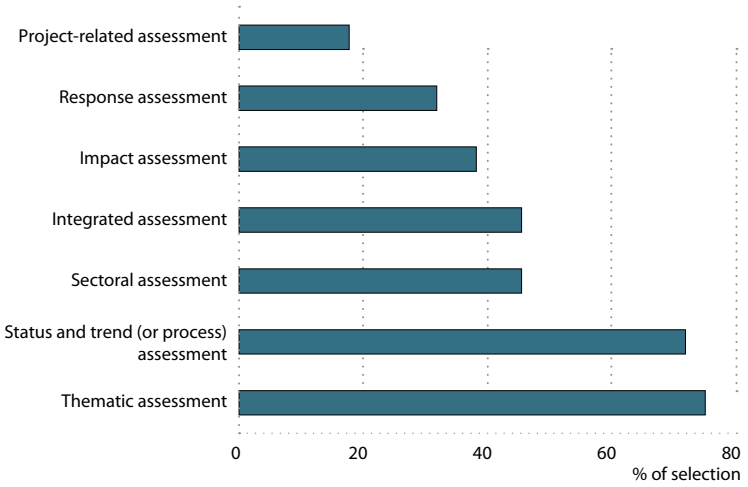


Figure 2.10 Various purposes of SoE and water assessments based on 220 approved review templates — filtered on water-resources and water-resource management topics (Source: EEA, EE-AoA portal, as of 31 May 2011).

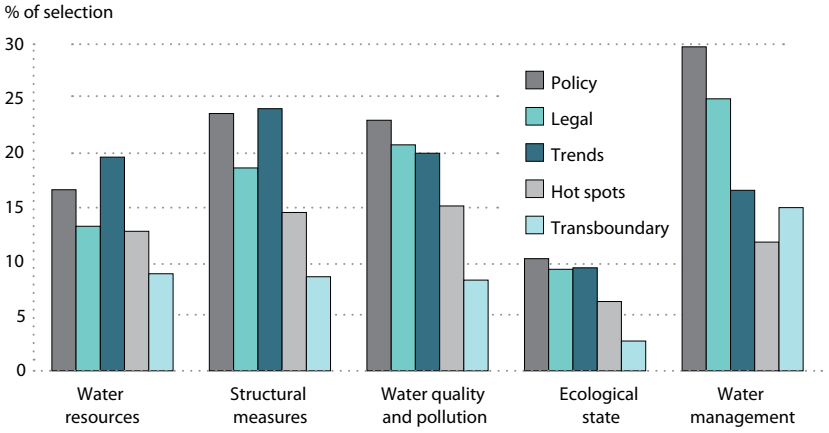


Figure 2.11 Overview of the aspects of the priority themes covered in SoE and water assessments based on 220 approved review templates — filtered on water-resources and water-resource management topics (Source: EE-AoA portal, as of 31 May 2011).

the various sub-themes under one theme. In general, policy issues as well as legal issues on the themes are included in the assessments. Trends are important parts of the assessments; hot spots are included a little less and transboundary issues are least discussed. Of the themes, the ecological state is least discussed. In view of the title and subject of this chapter, looking at water and water-related ecosystems, improvement of this situation is needed.

Within these themes, there is a difference in what sub-themes are discussed and how they are discussed. The traditional issues are included, but there is much less coverage of new issues:

- nearly all countries cover water quantity (water availability and water demand) and water quality, including water pollution, in their assessments;
- structural measures and ecological status are least discussed;
- vulnerability, for example, is not much discussed, nor are ecosystem services and restoration.

As this lesser attention to new issues may be due to a lack of knowledge, regional assessments can provide support. With the available knowledge, it should be possible to develop indicators and methodologies for such assessments on a regional level to give an overview of the situation. Countries can then use these regular assessments to improve their policies, but also to collect better information that, in turn, leads to an improved understanding of the national situation.

Little attention is given to transboundary issues. As many water management issues have a transboundary aspect, this is a clear omission, possibly due to lack of information from neighbouring countries. Regional assessments and exchange of information between countries could help to improve this situation. One of the few exceptions in this regard is the UNECE Convention on the protection and use of transboundary watercourses and international lakes in the UNECE region which focuses specifically on transboundary waters.

Data/information coverage

Figure 2.12 shows the various sources of data that are used for SoE and water assessments. The figure shows that statistical information is used in over 80 per cent of the assessments, regular data flows account for more than 70 per cent. Other sources are ad hoc collection exercises and project based initiatives. This shows that various sources are used for the assessments.

Information gaps were identified in almost half of the assessments. For instance, a review of assessment reports in the Eastern Europe countries found that some 29 per cent of the information needs could not be met either due to a lack of information or insufficient access to information. The gaps include:

- lack of or poor quality of data;
- lack of longer time series;
- lack of knowledge on analysis methods and tools, cost benefit analyses, water-quality monitoring, etc.;
- lack of financial resources;
- lack of harmonised procedures for international water bodies;
- lack of biological monitoring and groundwater monitoring;
- lack of legal acts or contradictions between existing legal acts;
- differences in the interpretation of the observations and lack of documented methods; and
- only 20 per cent of the assessments had an information system to support data management, data sharing, and/or data exchange was used.

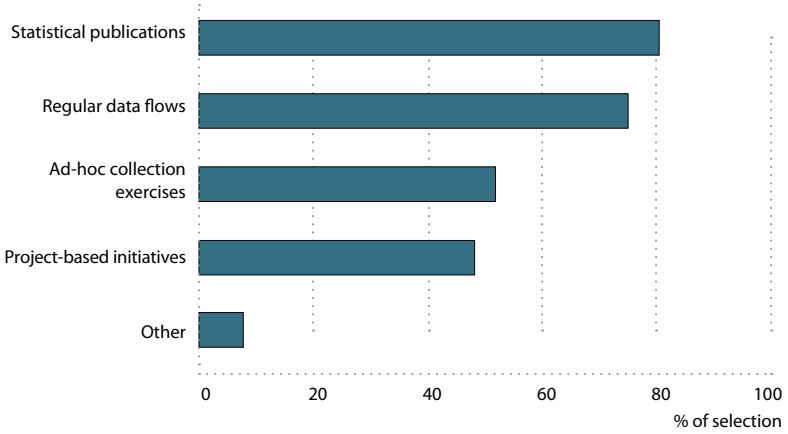


Figure 2.12 Sources of data for SoE and water assessments based on 220 approved review templates — filtered on water-resources and water-resource management topics (Source: EE-AoA portal, as of 31 May 2011).

All these issues hinder the analysis of trends and comparability of data, both between countries and within countries (see also Landsberg-Uczciwek and Zan, 2004).

Moreover, the capacity of both personnel and infrastructure to produce integrated assessments is limited and varies widely across the countries, and relates to the above-mentioned gaps. From this listing it becomes clear that the data and information collecting systems are not always sufficiently implemented. Additionally, working across national boundaries poses specific challenges to making assessments and different interpretations of existing data. Internationally coordinated activities could help reduce these problems.

Using a structured procedure to develop assessments is necessary if these are to be legitimate and credible. This entails issues such as having consistent time series of data, having representative data, both spatial (river stretch, lake area, etc.) and temporal (seasonality), together with harmonised sampling and analysis strategies, and proper data management. Peer review of assessments should be part of the quality procedures. Approximately 60 per cent of the assessments had been reviewed or put out for public consultation before publishing.

While all countries report about general water quantity and quality issues such as nutrients and heavy metals, little reporting was found about newer issues including hazardous substances, impacts of water scarcity and drought, or water management such as water pricing.

Information chain for policymaking

Over these years there has been a growing awareness of the importance of involving decision-makers and stakeholders in setting objectives and defining the scope of assessments and in targeting them as the recipients of the resulting assessments. In many assessments however, the link between the assessment and decision-makers is weak. The monitoring and data collection results are, to varying extents, reported to decision-making bodies and made available to the general public and the international community but the assessment objectives are often not clearly articulated and only a few assessments include analyses of future policy options, their potential outcomes and risks in a given situation. Moreover, linkages between socio-economic activities, status and trends, and measures that, especially when supplemented with possible futures, are most informative for decision-makers, are missing from most assessments. In the draft AoA report for the Russian Federation, for example, it explicitly says that while the status and impacts are reported, no assessment is made of possible measures and their impacts.

Some progress has been made, mostly due to the establishment of regular SoE reporting and the production of environmental statistics. Partly helped by these developments, especially the first SoE reports, countries have made progress in

improving public access to environmental information. The spreading use of the DPSIR assessment framework, that provides a methodology for an integrated analysis and sets international standards, and indicators to compare status and trends internationally and over time underpin these developments. Figure 2.13 shows the use of indicators from the DPSIR indicated framework used for the SoE and water assessments as derived from the information contained in the AoA review templates The figure shows that overall state indicators are used most, pressure and impact indicators are used much less, drivers and response indicators are used least. The use of the indicators is rather evenly distributed over the priority themes; most information is provided on water quality and pollution, at least on the ecological state.

Fifty-three per cent of the indicators used in assessment reports are produced on the basis of standard/agreed methodologies and another 20 per cent is partially based on such standards and/or agreed methodologies. These standards and/or methodologies mostly originate from internationally agreed approaches while only a quarter of the methodologies have a national origin (Figure 2.14).

The widespread use of international standards and methodologies for indicators is important to improve the assessments. However, the assessments still largely focus on status, pressures and impacts, while little information is provided on the activities that cause the pressures or on water-management measures, let alone information on the water-management objectives or the level of implementation of water-management measures. There is limited evidence that the findings of the water assessments have ever been used in environmental policymaking.

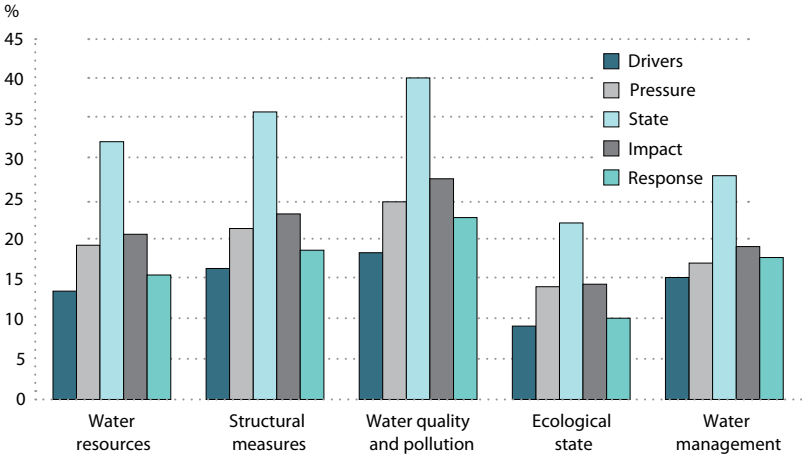


Figure 2.13 Overview of the use of indicators in the DPSIR framework for the priority themes covered in SoE and water assessments based on 220 approved review templates — filtered on water-resources and water-resource management topics (Source: EEA, EE-AoA portal, as of 31 May 2011).

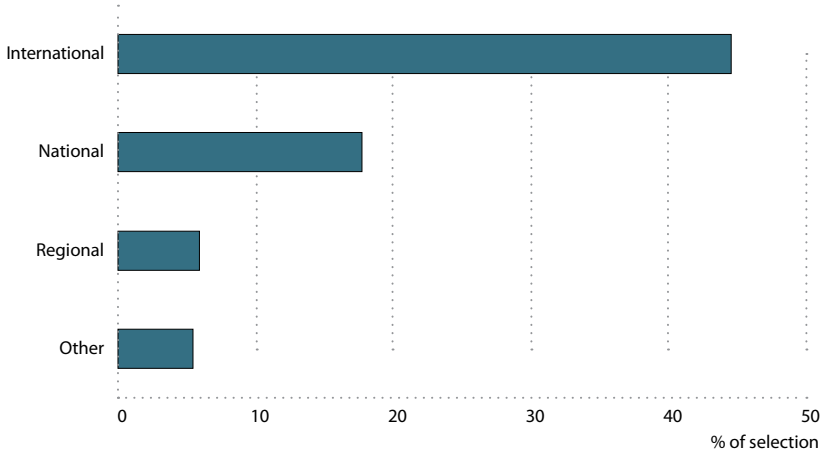


Figure 2.14 Overview of the origin of standards and/or methodologies for indicators used in SoE and water assessments based on 220 approved review templates — filtered on water-resources and water-resource management topics (Source: EE-AoA portal, as of 31 May 2011).

Integrated assessments

Assessments should not only cover the status and trends in the environment and in pressures on the environment, but also the status of implementation of (inter)national policies and measures in the area of environmental protection as well as integrate over various disciplines (Timmerman et al., 2010b). Some improvements over the years are visible. The information presented in assessments has changed from only presenting the status of a few basic parameters on a limited number of locations to presenting status, sources, effects and policy measures on a much wider range of parameters, making them much more integrated. Also, the various stages in policymaking are addressed by the assessments (Figure 2.15).

Nevertheless, in many assessments only limited information on policy performance, water management, implementation of measures, new challenges etc. is provided. Moreover, modelling and scenario tools, that can be very helpful in producing policy-relevant information, were only used in some 21 per cent of the assessments. As a consequence, little information is provided to policymakers on possible future effects of the policies.

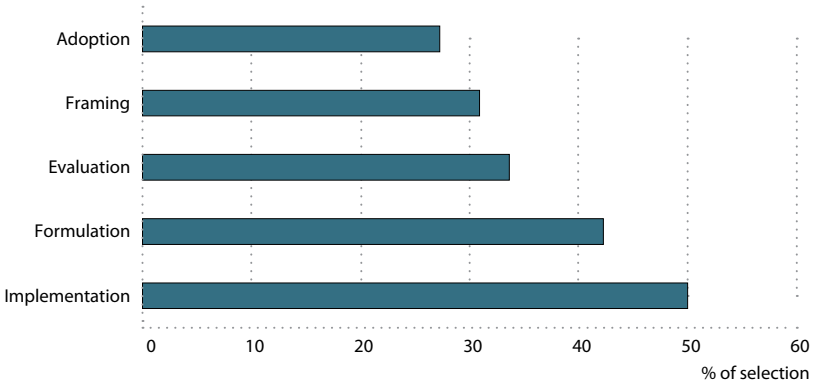


Figure 2.15 Overview of the policymaking stages that are targeted in the SoE and water assessments based on 220 approved review templates — filtered on water-resources topics and water-resource management topics (Source: EEA, EE-AoA portal, as of 31 May 2011).

The design of an integrated assessment process will be helpful in raising awareness (Timmerman et al., 2000) and will improve the assessments' perceived relevance, legitimacy and credibility (UNEP and IOC-UNESCO, 2009). Capacity to develop the modalities for such a process is available at international level. For instance, Guidance is available from the European Commission (EC, 2003) and from UNECE (UNECE, 2006). Moreover, by producing regional assessments similar to the EEA SOER 2010, international organisations can, in cooperation with countries, set directions and standards for assessments, thus providing examples and support to countries that struggle with these processes. Regional assessments as produced by international organisations like EEA, OECD and UNECE, consequently help developing capacities in setting a standard and providing methodologies.

By mandating international organisations to develop integrated assessments, such organisations, with the support of countries, can work towards improving the integration. This is done by supporting data and information collection across various sectors, setting database standards that include the countries involved. Selection of indicators is helpful in this respect as it focuses on a limited amount of information which is helpful when resources are limited.

If assessments are produced in cooperation between countries and international organisations (EEA, UNECE, etc.) it would also imply more cross-referencing of the results. European results could be used by countries in their national assessments and case studies and national examples could be more used in European assessments. Country and international cooperation on assessments could also be supportive in reducing the range of sources from which data and information is currently derived.

Moreover, regional and international assessments can be helpful to improve the information on ecosystems.

Finally, international assessments help in developing a regional view of water management, which, from the river basin management perspective, is an important but often overlooked aspect. International assessments provide for a view on the river basin level and help in harmonisation across administrative borders. Countries could find substantial support from such assessments.

Linking national information to European level

The analysis presented in the previous sections shows that many water management issues that are important at the national level are related to similar issues that are important at the European level (Figure 2.16). Most data and information is collected by countries for national action/implementation, but this information is also relevant at European and global level. Therefore international water assessments are not always based on the information and knowledge available and accumulated nationally.

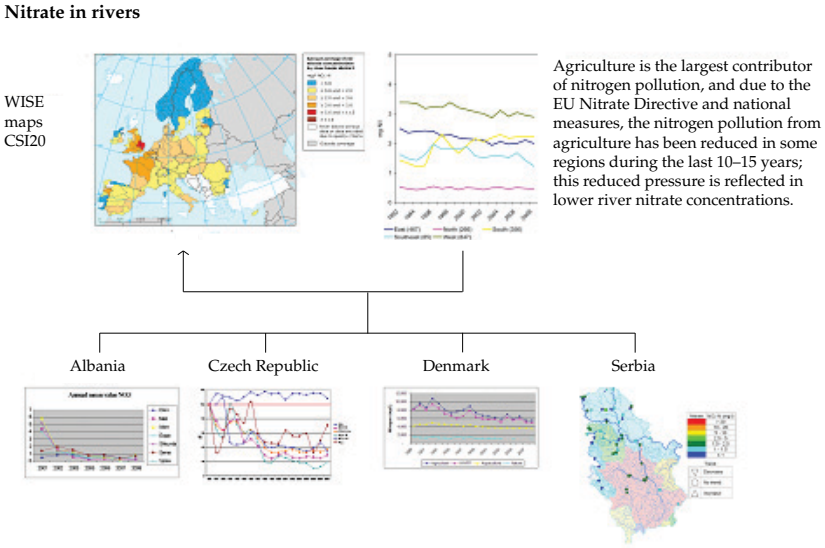


Figure 2.16 Example of linking information from country assessments to European information.

In the future a better data and information supply from the national water assessments to European assessments has to be ensured. The current data flows from national to European level only cover a part of the information needed and do not take sufficiently take stock of the results that come from national water assessment. By improving the access to national assessments and data, European water assessments would be based on the more specific and detailed information that is available at a country level. Moreover, the timeliness of the data and information used at the European level could be improved. An improved procedure to ensure the access of information is needed for this.

Figure 2.17 gives an impression of how a SEIS-based system could function. The benefits of such an approach lie not only at the European level, but also at the national level. The strategic objectives of the SEIS are:

- to improve the availability and quality of data and information to design and implement environment policy in the region;
- to reduce the administrative burden on countries and institutions and modernise reporting;
- to foster the development of information services and applications that all stakeholders can use and profit from.

To achieve this, the information should be managed as close as possible to its source, be collected once and shared with others for many purposes, be readily available and easy accessible, enable users to make comparisons at the appropriate geographical scale, be available to the general public at national level in the relevant national language(s), and be supported through common, free open software standards.

Table 2.1 gives an overview of how European assessments could be improved by a SEIS-based system in which the data and information were available at their (national) source, where results from national assessments were directly used, and in which national and European assessments cross-reference between each other.

While SoE assessments at the national level are sometimes well-elaborated, their quality varies substantially between countries. Also, while the legitimacy and credibility of many assessments is sufficient, in most cases their relevance is limited. Regional assessments could improve national assessments, but often lack the detailed national information that is available in the country. To improve this situation, a consistent common approach and close cooperation between international and national organisations is needed. The following priority challenges need concerted attention and have to be explored and discussed in the coming years:

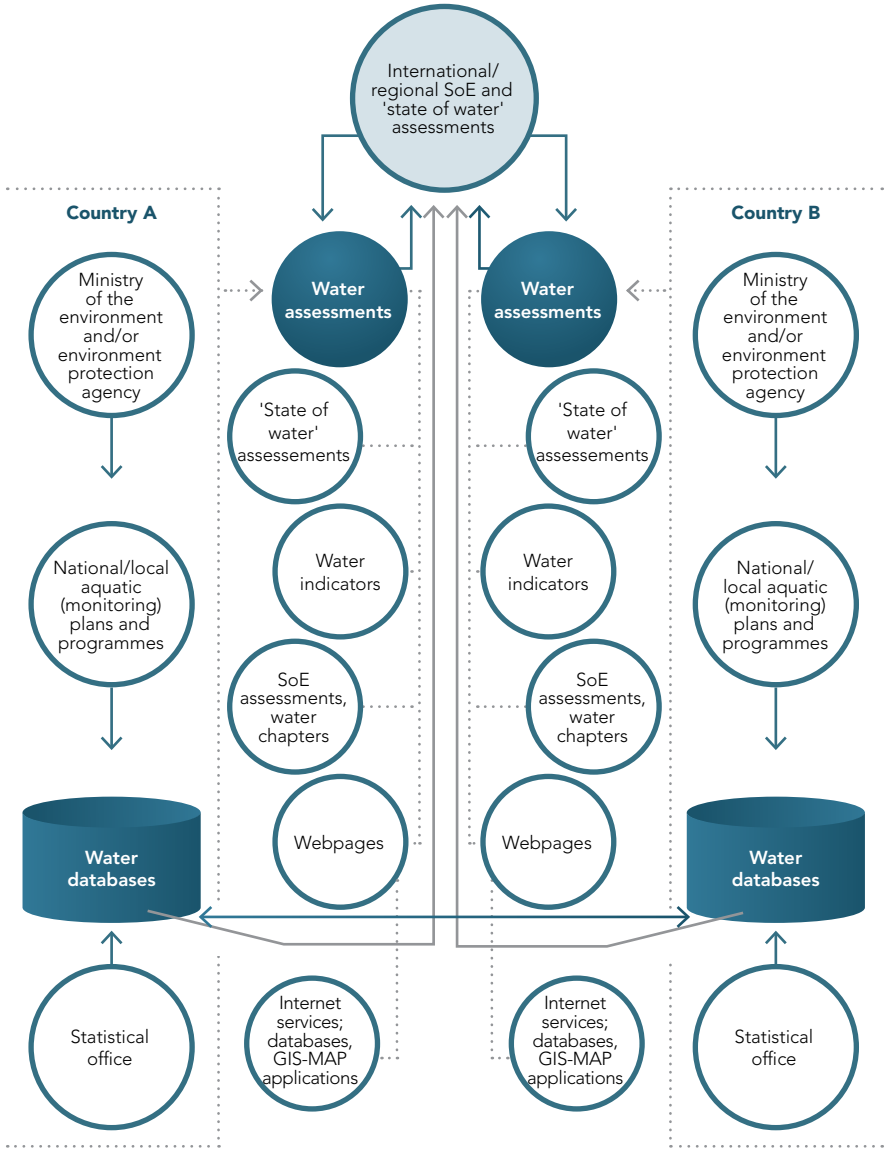


Figure 2.17 Scheme of the SEIS-based system in which each country manages its own databases but from which other countries and international organisations can draw information.

- ensure that assessment processes are well designed and structured, preferably harmonised on an international level, and clearly link them to policy processes;

- ensure that assessments contain information beyond status and trends and include integrated, policy relevant information. Development and promotion of a comprehensive set of indicators by international organisations, such as the DPSIR indicator framework as promoted by EEA, could support such improvements;

- ensure that data and information are accessible and comparable by harmonising databases on an international level so that assessments can be extended and scaled up or scaled down between national and regional levels. The Water Information System for Europe (WISE) is a good example of such a harmonised system ([21]).

- ensure improvement of ecosystem assessment by providing relevant indicators and support to countries in producing ecological information through international organisations;

Table 2.1 Comparison between the current situation for producing national and European assessments with a possible future situation based on the SEIS principles in which results from national assessments are directly used, and where national and European assessments cross-reference between each other

	Current	Future
Data	• A (representative) subset of national data • Data reported annually — more up-to-date data may be available on national homepages • Annual and seasonal aggregated data reported	• Access to all relevant monitoring results • Always the latest update available • Timely (sampling dates) dis-aggregated data are available, suitable aggregations for analysis
Assessment	• International organisations produces European assessments — countries comment on assessments • European assessments partly disconnected from results and interpretations at national level	• Assessments produced in cooperation between countries and international organisations • More ownership of assessments • Close connection between European and national assessments • Results from national assessments used in European assessments • Countries can use European and neighbouring countries assessments in national assessments

([21]) Water Information System for Europe (WISE): http://water.europa.eu.

- ensure that institutions are mandated to perform integrated assessments. Mandates should be given to EEA and UNECE to continue their work on regional assessments;

- EEA and UNECE should be mandated to support the development of capacities within countries to enable the implementation of procedures and methodologies for integrated assessments.

2.4.2 Priority concerns, specific needs, emerging issues, options for future action

From the assessment of SoE and water assessments, a range of issues that play an important role in water management in various countries emerges, with each country having its specific priority concerns. These range from more technical problems of water storage or purification to institutional issues, including the implementation of international agreements such as WFD or the UNECE Water Convention, the development of bilateral or multilateral river-basin agreements, and coordination between institutions. Several countries have problems with water shortage ranging from maintaining wetlands to a shortage of drinking water and water for irrigation.

An estimated 120 million people in the pan-European region do not have access to safe drinking water and adequate sanitation (WHO/UNICEF, 2010). As a result, they are more vulnerable to serious water-related diseases. Climate change is expected to aggravate this situation. Progress has been made over the past 15 years, especially for vulnerable populations and those living in rural and remote areas in Eastern Europe, the Caucasus and Central Asia. Many of the national assessments provide limited information on drinking water quality and management of drinking water. Examples of national assessments information on drinking water quality are listed below:

- Information on drinking water quality in the UNECE EPR for Uzbekistan from 2010: 'The current quality of the country's water resources remains extremely unsatisfactory, resulting in the increase in morbidity rate (kidney disease, oncological and acute infectious diseases), and adult and child mortality rates' and 'Given that main water streams can no longer be used as sources for drinking water supplies, adequately providing the population with good quality fresh drinking water is one of the country's most serious problems.'

- UNECE EPR for Kazakhstan, 2008: 'The drastic under-investment in the maintenance of all water infrastructure since the 1990s is a matter of increasing concern. Eighty per cent of infrastructure is obsolete in some of the major cities, and the inter-oblast distribution network has even collapsed in some areas. Since the Programme on drinking water and the Programme for rural development were adopted in 2002 and 2003 respectively, State funds have been increasingly spent on rehabilitating drinking-water infrastructure (increasing from approximately USD 5 million in 2000 to USD 200 million in 2007).'

- Ministry of Health, France, 2008: 'Quality of drinking water in 2006, Key figures: 310 000 samples taken under the sanitary control; 96 per cent of samples comply with the bacteriological criteria; 98 per cent of controls on nitrate in accordance with regulations; 97.7 per cent of controls on lead in accordance with regulations and 99.3 per cent of controls on fluoride in accordance with regulations.'

- UBA Umweltdaten, Germany, 2009: 'The data reflect an overall good to very good quality of drinking water in Germany.'

Water quality in most parts of Europe has improved in the past 20 years. This is due to better regulation, enforcement and investment in wastewater treatment plants, mainly in Western Europe. In the Eastern Europe, in addition to these, the economic transition since the early 1990's has helped. Moreover, throughout the region production has become cleaner, resulting in a decrease of pollution from industrial facilities. These statements are supported and described in more detail in European assessments:

- EEA SOER 2010 (EEA, 2010c): Freshwater quality thematic assessments: Implementation of the urban waste water treatment directive, together with comparable non-EU legislation, has led to improvements in wastewater treatment across much of the continent. This has resulted in reduced point discharges of nutrients and organic pollution to freshwater bodies.

- EEA SEBI16: Pollution of rivers with oxygen-consuming substances and nutrients is decreasing. This reduces stress on freshwater biodiversity and improves ecological status.

Most of the national water assessments in the EEA area have information on trends in water quality and pollution sources, while the information on inland water quality and pollution sources is more scattered in Eastern Europe, the Caucasus and Central Asia.

- Information on wastewater treatment in the UNECE EPR for Uzbekistan from 2010: 'Although the in-stream disposal of public-utility wastewater has been decreasing in recent years, the purification rate is not sufficiently high. The low operating efficiency of wastewater treatment plants results in an increased concentration of pollutants in surface water streams and depression reservoirs.'

- UNECE EPR for Kazakhstan 2008: 'The eight River Basin Organisation's (RBO's) transmit information on quantities of water used to the Committee on Water Resources, as was done in the past, but provide limited information on water quality and corrective measures. National water management authorities therefore do not have sufficiently detailed information to develop coherent national policy.'

- Environmental Indicators, Slovenia, 2007: 'The levels of pesticides in groundwater have been decreasing, but in the flat lands of Slovenia (the basins of the Drava and Mura rivers), for which intensive agricultural activities are typical, these levels are still exceeding the quality standards.'

- Environmental Indicators, Flemish Region, Belgium, 2010: 'In the course of the last two decades the biological quality of the Flemish surface waters has improved slowly but surely. The percentage of measurement locations with an extremely or very bad quality decreased significantly and the percentage with a moderate or good quality increased significantly. The positive developments are the result of the expansion and improvement of the public waste water treatment system and the efforts made by companies and agriculture.'

International legislation, together with international implementation programmes, has helped countries to improve their water management and as a result improve their water quality situation. Assessment systems are in place to identify the status and trends. As however water management has become more complex, more sophisticated assessment methodologies are needed to assess the issues and the effectiveness of water management. Also here, guidance from the international level can help countries to improve their assessment, both in terms of methodology as well as from viewing the information from neighbouring countries.

2.5 Conclusions and recommendations

The analysis of SoE and water assessments has revealed a multitude of products, containing a wealth of information. At the same time, the analysis also revealed that much information is lacking and the policy relevance of the information is weak. This is not only true of national assessments but also regional ones.

In general, the regular assessments help to improve the quality of the data and information. An important flaw in many of the assessments is that they are generally rich in statistical data but are of limited use in relation to state-of-water assessments and policymaking. To improve this situation, an enhanced process is needed that supports integrated assessments and that ensures exchange of data and information.

Improve the process

The assessment process involves setting objectives for the assessment, collecting relevant data and information, analysis and aggregation of the data and information, and disseminating the results of the analysis. Issues to be dealt with in improving the process include enhancing the capacity of personnel and infrastructure, upgrading data and information collection, developing and improving integrated analyses and strengthening the links to water policy. Both European and national assessments would benefit from a closer co-operation between European organisations (EEA, UNECE and others) and countries in improving this process by supporting the harmonisation of the process and methods across the countries. INSPIRE has already supported harmonising data management. In the coming years a data exchange system, with direct access to information/assessments stored at national and river-basin levels, compliant with the SEIS principle that information should be managed close to its source is being developed. This system will, amongst others things, ensure that, through the shared water assessment system, there is access to relevant national assessments which can be used for up-to-date European assessments. The direct access may reduce data reporting and transfer costs and ensure that there is access to disaggregated data.

Support integrated assessments

Assessments are currently over-restricted to environmental status and trends. What is needed are assessments that take an integrated approach to water issues. Especially from the river-basin management perspective, information from different countries and authorities needs to be combined. Indicators help in simplifying the communication between the different issues. The DPSIR indicator framework helps to reduce efforts for collecting data and information by focusing on a few elements. It also helps in making data comparable between institutions and countries because they are well defined. Also, including ecological information in the integrated assessments is supported in this way. Finally, it provides the structure to connect the various elements and make assessments more integrated.

Ensure exchange of data and information

Over the past 20 years, the availability of data has increased substantially. More and more, countries open up their databases for public access for reasons of accountability and trustworthiness. Where countries increasingly change to providing information through web-based databases, the procedure of the international programmes collecting information through questionnaires becomes obsolete. The SEIS principles enable a situation in which national and regional assessments can be developed with up-to-date information and without deviations between the numbers. The quality of assessments will be improved through this approach, while the ownership, especially of regional assessments, will be better shared between the international organisation and the countries involved. Moreover, the individual countries will benefit from the information coming from neighbouring countries.

To improve future assessments, based on the findings from the analysis carried out in this study, it is recommended to work towards more integrated assessments. These provide information about the status and trends but also provide future outlooks based on policy options and directions. It is also recommended to improve the sharing and exchange of data and information through improved access to such resources. This exchange should be based on the SEIS principle that the data and information is managed as close as possible to its source. EEA, UNECE and international organisations should be mandated to further develop this approach. Through this mandate and in close cooperation with the countries they are able to:

- improve the data and information production process in the region, *inter alia* through frequency of data and trend assessments (for prognoses and foresight in a broader sense);
- promote and enhance the exchange of data and information in the region and enable and improve assessments on the river-basin level, *inter alia* through joint collection of quality and quantity data;
- improve the integrated character of the assessments by providing standards, approaches and methodologies to combine data and information from different sources, *inter alia* through WFD classification;
- improve policy-relevance of assessments in order to support better decision-making, *inter alia* through collection of information for strategy development;
- improve ecological assessments by supporting indicator development and ecological information production.

Europe's environment
An Assessment of Assessments

3 Green economy

Key findings

The second theme of the Astana Ministerial Conference is 'Greening the economy: mainstreaming the environment into economic development'. The term 'green economy' is not consistently defined as it is still an emerging concept. The most widely used and authoritative green economy definition comes from UNEP.

[A] green economy [is] one that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities ([22]).

The concept of green economy, in the context of poverty eradication and sustainable development, will attract further attention as it will be one of two key themes at the United Nations Conference on Sustainable Development to be held in Rio in 2012 (Rio, 2012).

Green economy can refer to sectors (e.g. energy), topics (e.g. pollution), principles (e.g. polluter pays) or policies (e.g. economic instruments). It can also describe an underpinning strategy, such as the mainstreaming of environmental policies or a supportive economic structure.

Resource efficiency is a closely related concept, since the transition to a green economy depends on meeting the twin challenges of maintaining the structure and functions of ecosystems (ecosystem resilience) and finding ways to cut resource use in production and consumption activities and their environmental impacts (resource efficiency).

Whatever the underlying approach of green economy is, it stresses the importance of integrating economic and environmental policies in a way that highlights the opportunities for new sources of economic growth while avoiding unsustainable pressure on the quality and quantity of the natural assets. This involves a mixture of measures ranging from economic instruments such as taxes, subsidies and trading schemes, through regulatory policies, including the setting of standards, to non-economic measures such as voluntary approaches and information provision.

([22]) UNEP (2011), 'Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication' (advance copy available from http://www.unep.org/greeneconomy).

Although no comprehensive assessments covering the priority themes of green economy and resource efficiency as applied in the EE-AoA exist, broad strategies for greening the economy (a dynamic rather than static process) or specific theme-based assessments have been undertaken at national, regional and global levels by a range of public and private sector organisations.

Most assessments cover well-established themes, such as energy, industry and governance (green economy), and use of natural capital (resource efficiency). However, far fewer cover other important (often newer) aspects of green economy, including futures and scenarios, environmental impact assessment/strategic impact assessment (EIA/SIA), corporate social responsibility (CSR), life-cycle analysis (LCA), and finance, trade and tourism.

Assessments are overwhelmingly focused on the state of different priorities, and this is particularly the case for the more well-established or traditional themes. Other aspects of the DPSIR framework (drivers, pressures, state, impacts and responses) are discussed much less frequently.

Countries worst affected by the global recession emphasise green jobs and growth in their recent assessments. Assessments covering the energy sector are widespread and focus on renewable energies and energy efficiency. In addition countries dependent on primary and extractive sectors also tend to emphasise natural resource efficiency.

Effective assessments require a green economy strategy to be at the very heart of the national or regional decision-making process. Currently, assessments address policy questions in specific but generally narrow areas, for example, related to an increased proportion of renewable energy, to green public procurement or to green jobs. It is less clear how assessments, even those of the more strategic variety, are being used to drive economic policy in general. If the green economy is about transforming the way a nation produces and consumes, trades and is governed, then assessments should be at the very heart of economic and political strategies, rather than at the fringes.

Main findings of green economy related assessments

Although there are no fully integrated green economy assessments in the pan-European region, the following findings can be drawn from the mainly theme-based assessments:

- A framework to promote a green economy is lacking. Currently, assessments are largely driven from the bottom-up and do not generally form part of a clear 'top-down' framework.

- Green economy is not defined clearly and consistently. It is still a novel concept and refers to a mix of existing and emerging sectors, topics, principles and concepts. Most assessments focus on one or more of these topics, but very few take a more integrated approach, encompassing a range of concepts or the whole of the DPSIR framework.

- There is often no clear link between an assessment and the decision-making process, and many assessments do not articulate objectives or key questions to address, following rather than informing policymaking.

- Institutional arrangements are unclear, with a wide range of organisations and ministries involved but limited coordination either between or within regions and countries, or between the public and private sectors. This leads to some overlap in assessments and reduces effectiveness in policymaking.

- The objectives of the assessments are not always clearly defined. This contributes to a lack of focus in many assessments. There are also relatively few *ex-post* assessments that evaluate policy or consider how assessments have led to adoption of policies.

- Assessments are numerous, but often large and unfocused, producing a mosaic of fragmented, overlapping and divergent assessments. In addition, the assessment universe is constantly expanding, but in an uncontrolled way and there is currently a lack of consistency in and comparability of the basis, format and frequency of data being collected and used.

- There are clear regional differences in assessments, with some themes (e.g. sustainable consumption and production (SCP), innovation) concentrated in EEA member countries and others (e.g. governance, energy) most prevalent in Eastern Europe, the Caucasus and Central Asia and the Russian Federation.

A large number of assessments also identified concerns and emerging needs including:

- Countries and organisations tend to be selective in the themes considered. This flexibility may 'water down' the green economy concept to the point that it becomes almost meaningless.

- Institutional complexity associated with undertaking assessments leads to poor coordination, overlapping competencies and lack of effective change.

- Progress towards a green economy is hampered by insufficient financing, a limited use of economic instruments or political emphasis on other issues.

- There are information gaps at both spatial and temporal levels, partly due to the lack of monitoring systems, inconsistent data and inadequate data flow mechanisms.

3 Green economy

The second key theme of the Astana Ministerial Conference is *Greening the economy: mainstreaming the environment into economic development*. The objective of this chapter is to review the current state of assessments relating to the green economy and to resource efficiency. This will help lay the foundations for focused pan-European reporting and assessment processes, and aid decision-making in the region within these broad overarching concepts central to environmental improvement.

There is first a review of how these concepts are defined and the various institutions — national, regional and international, public and private — involved in assessments (Section 3.1). Then a consideration of the detail of currently available assessments (Section 3.2), how they are developed and how they are used. In Section 3.3 there is a discussion of how assessments might evolve in the future to address current concerns, emerging issues and key gaps and, finally, some conclusions are given and recommendations made (Section 3.4).

3.1 Introduction and background

3.1.1 Setting the scene

There are 675 reports in the EE-AoA portal relating to elements of the green economy or resource efficiency but, as yet, there are no integrated assessments that bring together all relevant elements in a coherent fashion in the pan-European region. This is largely because there is no widely accepted definition of the green economy and its scope.

The term 'green economy' was first coined in *Blueprint for a Green Economy* (Pearce et al., 1989), a key text for proponents of this still emerging discipline which is principally concerned with the economics of sustainable development.

Since the launch in 2008 of the United Nations' Green Economy Initiative (GEI), one of nine joint crisis initiatives ([23]), there has been a proliferation of interpretations and definitions. A number of other terms, including 'green growth' and 'greening the economy', have also been widely adopted and used interchangeably in connection with an ever increasing number of economic sectors, such as energy and water; topics for example, mobility and consumption; and concepts such as the polluter pays principle and life cycle analysis.

The most widely used and authoritative definition comes from UNEP (2011a):
[A] green economy [is] one that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities.

The important links between green economy and sustainable development are also well-recognised:
The concept of a 'green economy' does not replace sustainable development, but there is a growing recognition that achieving sustainability rests almost entirely on getting the economy right. Decades of creating new wealth through a 'brown economy' model based on fossil fuels have not substantially addressed social marginalisation, environmental degradation and resource depletion. In addition, the world is still far from delivering on the Millennium Development Goals by 2015 (UNEP, 2011a).

Indeed, the green economy, in the context of poverty eradication and sustainable development, will be one of two key themes at the Rio 2012 Summit ([24]).

The concept of green growth stresses the importance of integrating economic and environmental policies in a way that highlights the opportunities for new sources of economic growth while avoiding unsustainable pressure on the quality and quantity of natural assets (OECD, 2011a and 2011b). The transition towards a green economy involves a mixture of measures ranging from economic instruments such as taxes, subsidies and trading schemes, through regulatory policies including the setting of standards to non-economic measures such as voluntary approaches and information provision.

The green economy can also be viewed as a set of principles, aims and actions, which generally include (ECLAC, 2010; EEA, 2010; UNEP 2011a; and OECD, 2011a):

- equity and fairness, both within and between generations;
- consistency with the principles of sustainable development;
- a precautionary approach to social and environmental impacts;
- an appreciation of natural and social capital, through, for example, the internalisation of external costs, green accounting, whole-life costing and improved governance;
- sustainable and efficient resource use, consumption and production;
- a need to fit with existing macroeconomic goals, through the creation of green jobs, poverty eradication, increased competitiveness and growth in key sectors.

([23]) See: http://www.undg.org/index.cfm?P=1316; probably the most well-known outputs of these initiatives are the Green Jobs report (UNEP, 2008) and the Green Economy Report (UNEP, 2011a).

([24]) See http://www.uncsd2012.org/rio20/index.php?menu=14.

Resource efficiency is implicit in the green economy's principle of sustainable and efficient resource use, consumption and production. In this context, the EEA *State and outlook 2010* (EEA, 2010) argues that the transition to a green economy depends on meeting the twin challenges of maintaining the structure and functions of ecosystems (ecosystem resilience) and finding ways to cut resource use in production and consumption activities and their environmental impacts (resource efficiency).

More specifically, resource efficiency means achieving a desired increased level of output with a reduced level of human, natural or financial inputs. It is a necessary criterion for a green economy, although it may not be sufficient, as it may still allow resource use to increase in absolute terms, which indeed has been the case for most countries in recent decades (OECD, 2011c).

Compared to green economy, measures of resource efficiency are easier to define (UNEP, 2010a). At the macroeconomic level, indicators such as gross domestic product (GDP) per resource use highlight the relationship between resource use and economic output. Nevertheless, differences in interpretation remain, with only a few countries formally defining the term 'resources' in policy. Some include both renewable and non-renewable resources, while others use a narrower term 'raw materials' which includes fossil fuel reserves. Neither a clear definition nor a common understanding of the term 'resource efficiency' appears to be in place (EEA, 2011).

Any green economy model needs to define what the concept means and includes. Box 3.1 lists the priority areas for green economy and resource efficiency as developed by the UNECE Committee for Environmental Policy (CEP) and Annex 3.1 sets out a brief explanation of these priorities, how they are related to the green economy and some examples showing how it is being advanced in Europe.

Some key observations emerge from Annex 3.1:

- some priorities are easier to define than others. For example, renewable energy and tourism are sector specific, even though their impact is felt elsewhere. Others such as mobility and sustainable consumption and production (SCP) are more topic-based and not associated with any specific sector;

- some priorities, energy efficiency for example, are characterised in some regions at least by clear policy frameworks and targets and some, including Environmental Impact Assessment (EIA), are the subject of international conventions and/or legal instruments. Others — life cycle analysis (LCA) for example — are less clearly identified and are therefore more difficult to measure or target and are typically associated with broad strategies or action plans;

Box 3.1

Theme priorities regarding green economy and resource efficiency

Green economy
- Renewable energy (including hydropower, biofuels and biomass);
- Energy efficiency;
- Mobility (air quality, emissions and noise);
- Industry (emissions and waste);
- Innovation;
- Environmental Impact Assessment (EIA) and Strategic Impact Assessment (SIA);
- Governance (including institutional arrangements and multilateral environmental agreements) and environmental performance reviews;
- Corporate Social Responsibility (CSR) and environmental reporting;
- Mining.

Resource efficiency
- Use of natural capital (including forestry, agriculture, urbanisation linked to the use and degradation of land, soil, water and biodiversity);
- Water efficiency in industrial, rural and urban areas;
- Life-cycle analysis;
- Environmental accounting;
- Sustainable consumption and production patterns;
- Tourism.

Note: The two priority areas 'innovation' and 'mining' were added by the EEA in view of their relevance for the topic and geographical coverage addressed by the report (Source: Steering Group on Environmental Assessments (http://www.unece.org/env/efe/Astana/SGEA/1stMtg/OutlineAoA_e.pdf).

- policy drivers can be roughly grouped as either environment-related such as pollution reduction, or economics-related resource costs, economic reform, trade, for example. Such EU policy initiatives as the Europe 2020 Strategy are a strong driver in many countries, including candidate countries;

- green economy priorities have a wide range of drivers, including climate change, economic recovery, protection of biodiversity and demographic change.

Given the current lack of integrated green economy assessments, the analysis of the green economy related reports included in the EE-AoA portal is organised according to the priority areas agreed by the UNECE Steering Group on Environmental Assessments. This approach enables the consideration of all assessments that address at least one of the priority areas.

3.1.2 National green economy related assessments

No country in the pan-European region has yet produced an assessment specifically focused on the green economy. Nonetheless, many countries are developing broad strategies for greening the economy, or have undertaken sectoral or topic-based assessments.

The breadth of interpretation of the green economy concept at a national level, and the fact that it encompasses a range of sectors and priorities, is reflected in the diversity of institutions involved in its promotion. Some of these are responsible for different aspects of the priority areas, while others coordinate production of the selected assessments.

Environment ministries typically take the lead, have an overview of green economy and resource efficiency, and are charged with bringing different priorities within these concepts together. However, the scope and areas of responsibility of these ministries alone vary enormously and reflect broader national priorities and political boundaries. For example, an environment ministry may be largely responsible for nature protection (Armenia) or may also be responsible for tourism (Bosnia and Herzegovina) and natural resources, including mining and oil (Belarus) or agriculture (Austria, Hungary and the United Kingdom).

Depending on the institutional arrangements of the country, other ministries may also be involved in the contribution of particular elements of broader green economic goals. Indeed, 65 per cent of assessments related to the green economy involve more than one national organisation.

Other ministries involved include transport, agriculture and forestry particularly in more rural-based economies. Furthermore, the ministries of finance and economy are playing a decisive role in the green economy discussion, for example in the Republic of Moldova the Ministry of Economy oversees the country's Energy Strategy; as well as a Ministry of Energy in countries with natural energy reserves or which are developing renewable energy. In the Russian Federation, the Ministry of Natural Resources has come together with the Federal State Statistics Service, the Ministry of Agriculture, the Ministry for Economic Development and others to develop natural resource accounting and promote inter-agency coordination and cooperation.

A number of other departments and ministries are also starting to play a greater role in a few countries, reflecting the increase in cross-sectoral strategies and action plans. These include housing, culture, business and trade, skills and innovation and education.

In most countries, the national environment agency also plays a significant role in monitoring progress using environmental indicators related to the green economy and in producing or contributing to national assessments.

In several countries, assessments are also undertaken at a devolved administrative level. For example, assessments related to air quality in Belgium include an *Air and Climate Plan for Brussels, a Flemish Climate Policy Plan, and a separate State of the Environment Report*, with an assessment of air quality, for Wallonia.

Assessments by national organisations not part of the pan-European geographical area

The UNECE member countries which are not part of the pan-European geographical area also undertake green economy assessments, and can offer some valuable insights and lessons.

In the United States of America, assessments focus on the contribution of green growth to wider economic recovery, as part of the 2009 American Recovery and Reinvestment Act (US Department of Commerce, 2010). This committed the federal government to invest USD 90 billion to promote innovation and growth in green business and jobs. Similar definitions, such as pollution control, resource conservation and environmental assessment, are used but a distinction is drawn between *narrow* and *broad* definitions — the latter including nuclear energy and other products and services which are in general not considered green.

In Canada too, growth and jobs are central to the debate around the green economy (e.g. UNEP, 2008 and 2011a). However, given the importance of primary industries to much of the economy, natural resource protection also plays a prominent role in the green economy debate (e.g. Globe Foundation, 2010).

Discussion of the concept of a green economy can also be found beyond the UNECE region and member countries (e.g. UNEP, 2010b). In Latin America and the Caribbean, green economy is framed largely in terms of helping to address poverty and inequality, and in delivering basic infrastructure and services for a growing population (ECLAC, 2010). These regions are at the forefront of putting green economy concepts into action in some sectors. For example, Costa Rica, which is heavily dependent on its natural ecosystems for tourism, has been a pioneer in the use of economic instruments and payments for environmental services to promote activities that preserve ecosystem functions (Russo and Candela, 2006; and OAS, 2010).

3.1.3 Assessments by public organisations

Although the number of dedicated green economy assessments produced by national organisations is limited, other publicly funded, pan-European and international organisations are interested in the green economy and involved in producing assessments related to the priority areas.

Broadly, three types of organisation can be distinguished: global players, including UN organisations such as the FAO, UNEP and UNDP; regional UN bodies, including UNECE; and other regional organisations.

i) Global players

Most currently available international assessments are global in nature, with international organisations playing a key role in developing thinking on the green economy and resource efficiency issues. UNEP has produced a number of these, notably the Global Environmental Outlook (GEO) series. This is a process that builds capacity for conducting global environmental assessments and for reporting on the state and trends of the environment, future outlooks and policy options. GEO-5 will be published in 2012, as a key input to the Rio 2012 Summit.

UNEP's *Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication* (2011a) is the most recent and definitive work to date on global green economy. It argues that a two per cent injection of global GDP into ten key economic sectors would kick-start a transition towards a low carbon, resource efficient green economy. The underlying concept of starting the process through a fiscal stimulus package is drawn from the UN call for a Global Green New Deal ([25]). The assessment also includes global indicators of progress on relevant priorities showing how these link to GDP using case studies from around the world.

UNEP also works in collaboration with other bodies on specific issues. For example, a joint report with the International Labour Organisation (ILO) assembles quantitative and conceptual evidence on existing green jobs (UNEP, 2008). Another example is the forthcoming report on organic agriculture revealing that organic agriculture can re-vitalise the farm sector and create employment opportunities (UNEP, 2011b).

Another UN body, UNDP, plays an important role in green economy related assessments in several countries, notably in Eastern Europe, the Caucasus, Central Asia and the Western Balkans. Here, assessments are driven by the desire to build capacity

([25]) In 2009, UNEP called for a Global Green New Deal in response to the financial and economic crisis. This recommended a package of public investments and complementary policy and pricing reforms aimed at kick-starting a transition to a green economy while reinvigorating economies and jobs and addressing persistent poverty (UNEP, 2011a) — see also http://www.unep.org/greeneconomy/GlobalGreenNewDeal/tabid/1371/language/en-US/Default.aspx.

and to enhance competiveness from the more efficient use of natural capital through technical or financial assistance programmes.

A recent assessment in the Russian Federation provides a detailed analysis of the situation in the energy sector, makes forecasts and examines options for overcoming current negative trends in supply and consumption of energy resources (UNDP, 2009). Another report looks at the opportunities for Georgia in a new green economy (UNDP, 2010).

Other relevant global organisations include FAO, the World Bank and the IMF. The FAO is exploring the global resource and health footprints of agriculture and food systems as part of its ongoing Greening the Economy with Agriculture (GEA) initiative. The World Bank is developing national indicators that can be used by finance ministries in green national accounting. The World Bank's latest publication in this area *The Changing Wealth of Nations* (World Bank, 2011) shows a clear link between the careful management of natural capital and increasing levels of wealth and economic wellbeing. Box 3.2 shows some of the work being done by global organisations.

Whilst global organisations focus on global assessments, they also consider regional priorities and topics. Two examples are UNEP's assessment of aquatic ecosystems in the Baltic Sea (UNEP, 2005) and UNEP's assessment of mining and the environment in the Western Balkans (UNEP, 2009a).

ii) Regional UN players

The UNECE area covers a pan-European region including all 53 countries included in the EE-AoA exercise ([26]). Work on the green economy is driven mainly through the Environment for Europe partnership and regular environmental performance reviews. Furthermore, UNECE Timber Committee and FAO European Forestry Commission are jointly preparing an action plan for the forest sector in the green economy.

The other key regional UN player is UNESCAP ([27]). This has been at the forefront of the green economy debate in the Asia-Pacific region since the Ministerial Conference on Environment and Development in Asia and Pacific in Seoul in 2005, when the Seoul Initiative on Environmentally Sustainable Economic Growth (Green Growth) was established.

([26]) This includes 32 EEA member countries — all 27 EU Member States plus four EFTA countries (Iceland, Norway, Liechtenstein and Switzerland) and Turkey — EEA cooperating countries (seven Western Balkan countries), Central Asia (five countries), the Caucasus (three countries), Eastern Europe (three countries) and the Russian Federation. Other UNECE member countries are Canada, Israel and USA.

([27]) This has a membership of 62 Governments, 58 of which are in the region, and a geographical scope that stretches from Turkey in the west to the Pacific island nation of Kiribati in the east, and from the Russian Federation in the north to New Zealand in the south. The following countries are members of both UNESCAP and UNECE: Armenia, Azerbaijan, France, Georgia, Kazakhstan, Kyrgyzstan, the Netherlands, the Russian Federation, Tajikistan, Turkey, Turkmenistan, the United Kingdom, USA, Uzbekistan (http://www.unescap.org/about/member.asp).

Box 3.2

Global organisations and the green economy

FAO — Greening the Economy with Agriculture (GEA) ([28])
Greening the Economy with Agriculture refers to increasing food security (availability, access, stability and utilisation) while using fewer natural resources, through improved efficiencies throughout the food value chain. This can be achieved by applying an ecosystem approach to agriculture, forestry and fisheries management in a way that addresses the multiplicity of societal needs and desires, without jeopardising options for future generations to benefit from all goods and services provided by terrestrial and marine ecosystems.

Using 60 per cent of world's ecosystems and providing livelihoods for 40 per cent of today's global population, the food and agriculture sector is critical to greening the economy. For FAO, there will be no green economy without agriculture.

World Bank — Changing Wealth of Nations ([29])
This is the latest assessment by the World Bank to estimate comprehensive wealth — including produced, natural and human/institutional assets — for more than 100 countries.

The report presents wealth accounts for 1995, 2000, and 2005, providing the first longer-term assessment of global, regional, and country performance in building wealth. This assessment is complemented by chapters detailing individual components of wealth, as well as how countries and the World Bank are using comprehensive measures of wealth for policy analysis.

IMF — Green Growth ([30])
The IMF has spoken of the need for a low-carbon model for growth as the world rebuilds from the global economic crisis.

To help finance this shift in the global economy, the IMF is working on proposals to create a multi-billion dollar Green Fund that would provide the huge sums, which could climb to USD 100 billion a year in a few years, needed for countries to confront the challenges posed by climate change.

([28]) http://www.fao.org/fileadmin/user_upload/suistainability/docs/GEA__concept_note_3March_references.pdf.
([29]) http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/ENVIRONMENT/0,,contentMDK:22812374~pagePK:210058~piPK:210062~theSitePK:244381,00.html.
([30]) http://www.imf.org/external/pubs/ft/survey/so/2010/NEW013010A.htm.

A key aspect of UNESCAP's work on green economy is the Astana Green Bridge Initiative (UNESCAP, 2010; and UNECE, 2011). This promotes green economy principles in relation to changing political and economic conditions, environmental priorities and the growing needs of the countries of Europe, Asia and the Pacific. A proposed partnership programme to implement the initiative will introduce specific targets, funding and evaluation (UNECE, 2011).

UNESCAP recently funded the only existing national green growth assessment in Central Asia (Box 3.3).

UNESCAP is also active in the resource-efficiency debate (UNESCAP, 2011). A forthcoming report will consider the regional use of key resources, and what that means for economies in the Asia-Pacific Region (UNEP, 2011c).

Box 3.3

National report on integration of green growth tools in the Republic of Kazakhstan, 2010

This assessment, prepared by the Network of Experts for Sustainable Development of Central Asia (NESDCA), reviews approaches to and principles of the green growth concept, analyses the use of its instruments in Kazakhstan by, for example, assessing eco-efficiency, and provides conclusions and recommendations on their integration into strategic planning processes.

Recommendations of the assessment include:
- the introduction of green growth principles into the system of strategic planning and taxation;
- the introduction of economic green growth tools;
- the development of green business and infrastructure;
- the introduction of sustainable production and consumption.

Source: http://www.nesdca.narod.ru/publications_eng.html.

iii) Other regional players

Other institutions with a regional (i.e. covering more than one country) interest in or perspective on the green economy range from the relatively small, such as the Baltic Agenda 21, to the very large, the OECD and European Union.

These players vary in terms of their governance, geographical interest, scope for undertaking assessments and decision-making powers. In general, smaller organisations are involved in topic specific assessments, on, for example, air pollution or solar power generation, while larger organisations tend to look across such topics as SCP, or produce broad pan-regional topic- or sector-based assessments.

The drivers for assessments from these bodies also vary markedly. Some stem from the desire to transfer resources, technologies and environmental protection programmes to new areas (OECD, 2010, 2011a and 2011b), others by the need for environmental compliance or in response to specific threats from pollution. For example, Helcom ([31]) produces integrated assessments on eutrophication and other issues of concern in the Baltic Sea area.

In Eastern Europe, the Caucasus and Central Asia, the Regional Environment Centres (RECs) have taken a leading role in producing and coordinating strategies, action plans and regional assessments.

The OECD published an *Environmental Outlook to 2030* (OECD, 2008). This represented a shift in attitude and outlook from a traditionally free-market based and growth-driven organisation. It recognises the importance of natural capital, resource efficiency and other green economy related concepts in delivering sustainable growth. Indeed, the organisation is increasingly at the forefront of attempts to embed the concepts of natural capital, resource efficiency and greener growth into economic development across much of the pan-European region (OECD, 2011c and 2011d). Furthermore, the OECD launched its green growth strategy at the OECD Ministerial Council Meeting in May 2011 (OECD, 2011a and b).

The EU and other European institutions ([32]) are involved in various aspects of the green economy and produce regional and country assessments. The EU produces an annual monitoring report on the implementation of its sustainable development strategy, which covers most of the priority areas related to the green economy and resource efficiency (Eurostat, 2009). It also uses the EU Cohesion Policy to invest in priority areas which are part of the green economy in the Balkans and other regions.

([31]) Helsinki Commission, The Baltic Marine Environment Protection Commission
([32]) For example, the European Bank for Reconstruction and Development and the European Investment Bank.

Most recently, the European Commission is preparing a *Roadmap to a Resource Efficient Europe*, part of the wider Europe 2020 Strategy ([33]). This encompasses a number of initiatives, including energy efficiency, carbon and commodity markets. It identifies increasing resource efficiency as key to securing improvements in productivity, competitiveness, growth and jobs.

EEA regularly produces 'State and outlook' reports (SOER) covering its member countries and more recently cooperating countries. The most recent SOER (EEA, 2010) includes consideration of aspects of the green economy. The EEA has also supported the EfE process since the beginning and produced upon the ministers' request pan-European *State of environment* report which also examined aspects of the broader green economy such as energy, SCP, water, waste, etc. The most recent report was published for the 2007 EfE Belgrade Conference.

USAID undertakes assessments in many pan-European countries and has recently assessed biodiversity in Belarus, Moldova and Ukraine, identifying threats, actions necessary to address them, and the extent to which USAID actions meet these needs ([34]).

3.1.4 Assessments by the private/voluntary sector

A large number of private or voluntary, non-governmental organisations are involved in assessing aspects of the green economy. These broadly fall into four categories:

- non-governmental organisations, charitable foundations and lobby groups. These generally have a specific remit or cause. For example the *Living Planet Report* produced by the World Wide Fund for Nature measures the health of the world's biodiversity in relation to humanity's demands on the Earth's natural resources (WWF, 2010);

- think-tanks and multinational organisations — for example the World Resources Institute. These are primarily concerned with improving the knowledge base and ensuring latest thinking is brought into decision-making, e.g. the climate analysis indicators tool ([35]);

- national, regional and international trade associations. These are generally interested in promoting specific viewpoints and influencing decision-making. An example is the role of steel in reducing energy use and greenhouse gas emissions (World Steel Association, 2010);

([33]) See http://ec.europa.eu/resource-efficient-europe.
([34]) See, for example, USAID, 2007.
([35]) http://www.earthtrends.wri.org.

- research bodies, including universities and research institutes which may attract funding from private sector sources (e.g. The Agency for Rational Energy Use and Ecology in Ukraine and the Stockholm Environmental Institute, 2009).

Again, there is very little consistency across regional non-governmental organisations in terms of the size or type of region they cover, and in their interests, which include trans-boundary ecosystem issues, the Baltic Sea 2020 for example, through to a broad range of trans-regional economic issues in the case of the Asian Development Bank.

Increasingly, organisations from the private or voluntary sectors are working in partnership with publicly funded organisations to produce assessments. For example, the global insurance industry worked with UNEP to improve understanding of the role of that industry in a greener economic future. The report (UNEP, 2009b) concluded that *… through the systematic integration of material environmental, social and governance factors into core insurance processes, insurance companies will be able to sustain their economic activities and play their roles in the creation of a more sustainable global economy that invests in real and inclusive long-term growth, genuine prosperity and job creation, in line with UNEP's Green Economy Initiative.*

The European Investment Bank is at the forefront of other public-private partnerships (PPP). It has invested significantly in renewable energy, energy efficiency, transport, the protection of biodiversity and many other areas in EU Member States, candidate countries and other parts of the pan-European region. Assessments focus on the effectiveness of specific PPP projects that protect and improve the natural and built environments and foster social well-being, in support of EU policy (Ecologic, 2011).

3.1.5 Overview of key green economy and resource efficiency assessments

In summary, very few assessments specifically focused on green economy have been undertaken to date. Those that have tend to have been produced by large global or regional organisations. Table 3.1 provides an overview of the coverage of the key assessments from a selection of these organisations in relation to the priority areas of green economy and resource efficiency.

At this level, assessments are reasonably consistent in their interpretation of green economy, although there are some differences at the edges. This interpretation is rather broad and typically characterises a green economy as one which is low carbon, resource efficient and socially inclusive, and sees it as mainly driven by private and public investment.

Table 3.1 Key assessments and their coverage

Priority area	EC (2011)	OECD (2011)	TEEB (2010)	UNEP (2008)	UNEP (2011)	EEA (2010)
Regional coverage	27 EU Member States	34 members (25 in Europe)	Global	Global	Global	32 EEA member countries plus 7 Western Balkans (cooperating countries)
Green economy						
Renewable energy	•	•	•	•	•	•
Energy efficiency	•	•	•	•	•	•
Mobility	•	•	•	•	•	•
Industry	•	•	•	•	•	•
Innovation	•	•	•	•	•	•
EIA/SIA			•		•	•
Governance	•	•	•	•	•	•
CSR and environmental reporting						
Futures and scenarios	•	•	•	•	•	•
Mining		•		•	•	•
Resource efficiency						
Use of natural capital	•	•	•	•	•	•
Water efficiency	•	•	•	•	•	•
Life-cycle analysis			•	•	•	•
Environmental accounting	•	•	•	•	•	•
SCP	•	•	•	•	•	•
Tourism		•	•		•	•

Note: The two priority areas 'innovation' and 'mining' were added by the EEA.

EC (2011): *A resource-efficient Europe — Flagship initiative under the Europe 2020 Strategy*
OECD (2011): *Green Growth Strategy Synthesis Report*
TEEB (2010): *The Economics of Ecosystems and Biodiversity*
UNEP (2008): *Green Jobs: Towards decent work in a sustainable, low-carbon world*
UNEP (2011): *Towards a Green Economy: Pathways to Sustainable Development & Poverty Eradication*
EEA (2010): *The European environment — state and outlook 2010: synthesis.*

3.2 Overview of green economy related assessments

In this section, the general findings of Section 3.1 are built on to provide a more detailed analysis of green economy and resource efficiency priorities in assessments. This section is mainly based on information in the EE-AoA virtual library, review templates and country fiches, and on Annex 3.2, which provides an overview of assessments in *each priority area*, covering:

- number and frequency of assessments (is the area well served by assessments and how often are they produced?);
- size and type of assessments (for example, are they strategic or developed in response to specific policy priorities);
- main developments (for example, do they follow DPSIR assessment framework? ([36]) Do they identify new or emerging threats and opportunities?);
- basis of assessments (for example, whether they show progress over time);
- geographical aspects (are some parts of the pan-European region better covered by assessments in the area than others?).

Out of the total number of entries in the EE-AoA portal related to the green economy or resource efficiency, 257 assessments were reviewed in detail using the EE-AoA review template ([37]). Furthermore, from these 257 reviewed assessments, only 56 per cent are part of a regular process for assessment — generally as part of a 'state of the environment' report — with most of the remainder produced on a more *ad-hoc* basis.

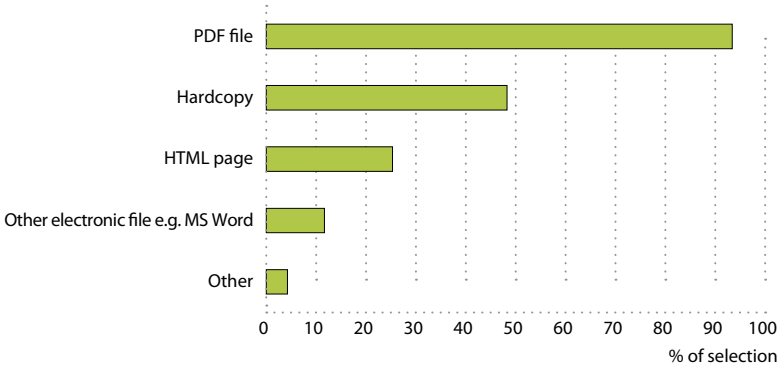


Figure 3.1 Different ways of publishing green economy assessments, 257 review templates (Source: EEA, EE-AoA portal, as of 31 May 2011).

([36]) 'DPSIR' is an assessment framework for analysing and showing the interplay between the environment and socio-economic activities. DPSIR stands for: Driving forces — Pressures — State — Impacts — Responses (see Chapter 1, Box 1.4).

([37]) The following analysis is based on the reports included in the virtual library/review templates as of 31 May 2011.

Nearly all assessments are now made available online (93 per cent in pdf format), although hard copies are still made available in 48 per cent of cases. Figure 3.1 shows the different ways assessments in this area are made available.

The breakdown of the assessments by geographical coverage is shown in Figure 3.2.

Figure 3.2 shows that the majority of assessments are undertaken at a national level, with a smaller number undertaken at either local or regional level, and only very few at a global level.

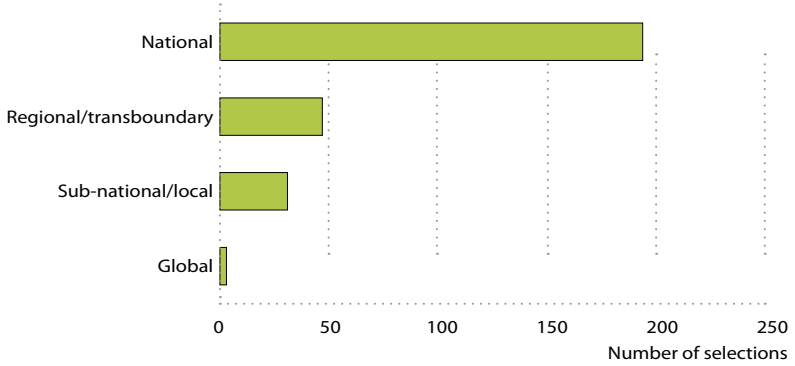


Figure 3.2 Geographical coverage of green economy related assessments, 257 review templates (some assessments allocated to more than one geographical category) (Source: EEA, EE-AoA portal, as of 31 May 2011).

Figure 3.3 summarises the sources of data that are used for green economy assessments. This shows that statistical publications are the most widely used data source, followed by regular data flows, *ad-hoc* collection exercises and project-based initiatives.

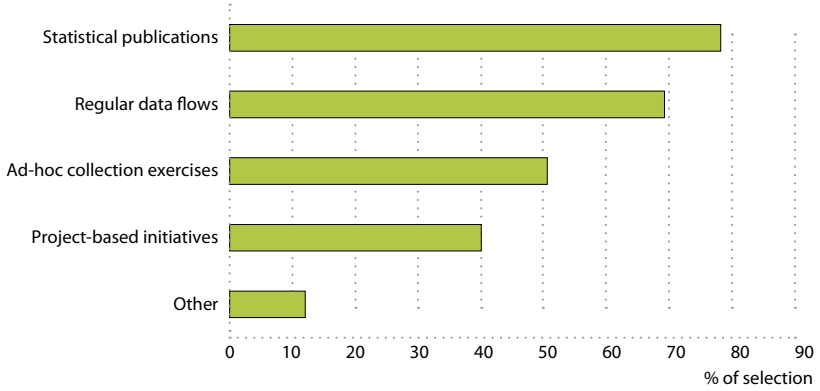


Figure 3.3 Sources of data for green economy related assessments, 257 review templates (Source: EEA, EE-AoA portal, as of 31 May 2011).

Around three-quarters (72 per cent) of green economy related assessments consider options for the future. Figure 3.4 summarises the kind of policymaking options that are considered in assessments. The figure shows that around half of green economy assessments that consider policy options look at formulation and implementation of policy. Rather fewer look at policy adoption, framing and *ex-post* evaluation.

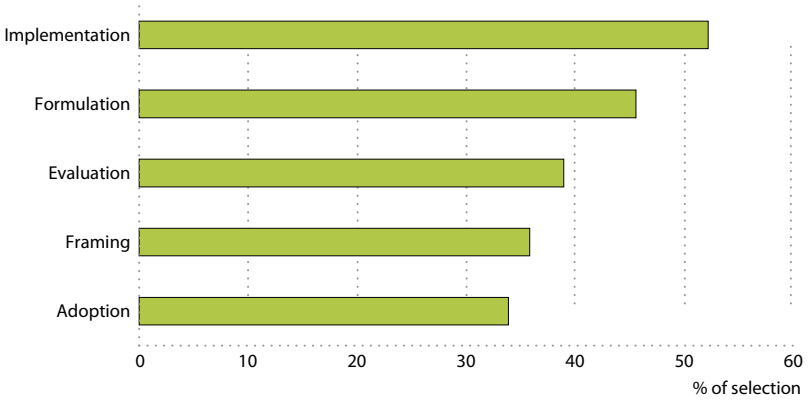


Figure 3.4 Policymaking cycles considered in green economy related assessments, 257 review templates (Source: EEA, EE-AoA portal, as of 31 May 2011).

3.2.1 Assessments as part of wider reports

As seen in Section 3.1, there are a variety of ways of defining green economy and resource efficiency. Figures 3.5 and 3.6 summarise the priority areas covered under green economy and resource efficiency assessments across each part of the pan-European region ([38]).

Figures 3.5 and 3.6 show that, in terms of the topics covered, there is high consistency within the priority areas but low consistency and high variability between the priority areas of green economy and resource efficiency as presented in Box 3.1.

Most assessments discuss the well-established themes of energy, industry and governance (green economy), and use of natural capital (resource efficiency), with regular and detailed assessments as highlighted in Annex 3.2. For example, many countries produce an annual progress report on renewable energy generation. On energy efficiency, Georgia has recently completed a review of the potential for

([38]) Included in Figures 3.5 and 3.6 are 45 assessments in the Russian Federation, 74 in Central Asia, 54 in the Caucasus, 43 in Western Balkans, 61 in Eastern Europe and 111 in EEA member countries. Some regional and global assessments may be included in more than one region.

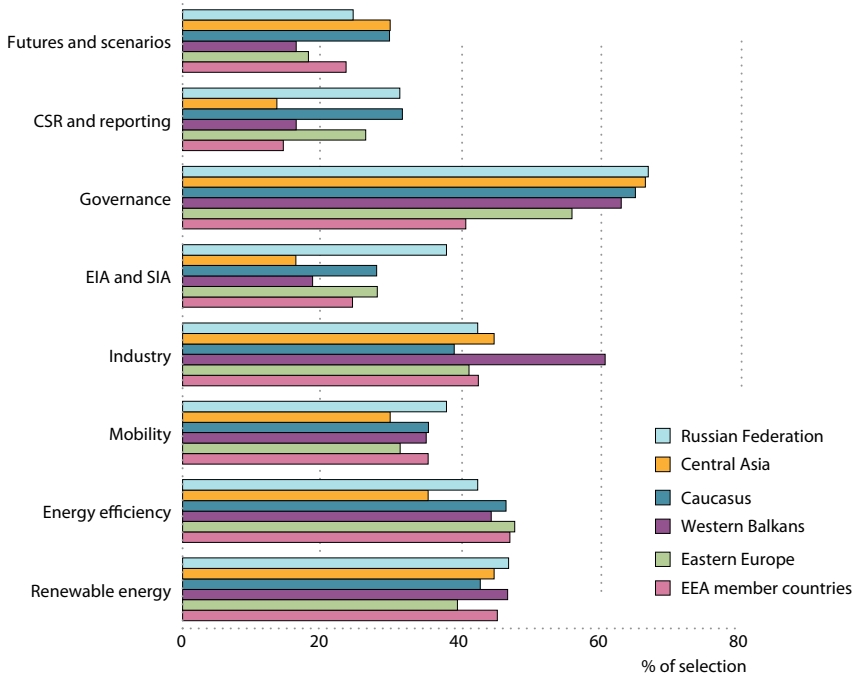


Figure 3.5 Percentage of assessments covering green economy priority areas, review templates (Source: EEA, EE-AoA portal, as of 31 May 2011).

growth and policy options (World Enterprise for Georgia, 2008). However, far fewer discuss other important aspects of green economy, including futures and scenarios, Environmental Impact Assessment/SIA (green economy), LCA and tourism (resource efficiency). Likewise there is much poorer coverage of newer aspects, such as CSR and environmental accounting. As well as national level assessments, a significant number come from global or regional organisations, for example, IISD (2011) or from private bodies such as the Carbon Disclosure Project ([39]).

Part of the reason for this is that some of these environment-related areas have only relatively recently been added to the more traditional aspects of assessments and may be voluntary or unrelated to specific policy or legislative drivers. Examples include the Russian Federation's and Portugal's 'state of the environment' reports, which now include information on the areas under organic farming, and Serbia's, which discusses gross nutrient balance. Other topic areas gaining more attention include natural capital and green accounting, green skills, and linking the green economy to competitiveness.

([39]) www.cdproject.net.

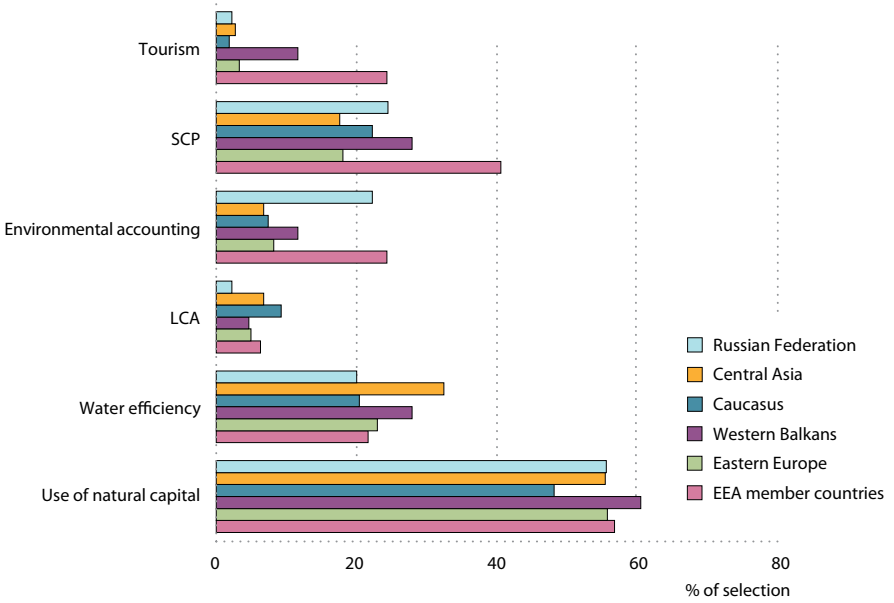


Figure 3.6 Percentage of assessments covering resource efficiency priority areas, review templates (Source: EEA, EE-AoA portal, as of 31 May 2011).

Assessments in Central Asia, the Caucasus, the Russian Federation, Eastern Europe and Western Balkans tend to focus on organisational and compliance issues (i.e. governance) as well as on more traditional economic issues such as industry (particularly in the Western Balkans). Less attention is generally given to such aspects as energy efficiency, SCP and environmental accounting. This may be a by-product of the transition to the market economy; with these countries not yet stable and mature enough in economic terms to focus on or commit to obligations beyond the bare minimum.

In general, EEA member countries are more likely to discuss key aspects of resource efficiency in assessments, particularly tourism, SCP and environmental accounting. However, tourism is also important in the Western Balkans.

The space dedicated to the green economy and resource efficiency in recent SoE assessments varies markedly, from around 10 per cent for the United Kingdom to more than 90 per cent for Serbia and Belgium (see EE-AoA portal for more details of these reports). On average, the twin themes account for about 55 per cent of reviewed 'state of environment' reports, compared to 63 per cent of environmental performance reviews and 38 per cent of statistical yearbooks or sets of indicators.

Analysis shows that the amount of attention given to the green economy and resource efficiency issues is related to national priorities and policies. For example, as one leading tourism destination in the Adriatic Sea, Croatia's 'state of the environment' report (see EE-AoA portal) includes a discussion of tourism, which is not such a high priority in other countries' reports. In other countries, certain aspects of the green economy are considered particularly important, mining in Kazakhstan, for example. Many aspects of the green economy or resource efficiency also feature in generic chapters or discussions, for example on water efficiency, which is discussed in relation to households, agriculture and industry.

A number of assessments are very large and detailed, often running to hundreds of pages. This is true of 'state of the environment' reports Belgium — Wallonia, 698 pages, with the green economy or resource efficiency issues accounting for 91 per cent of this; environmental performance reviews — Uzbekistan, 201 pages with 43 per cent

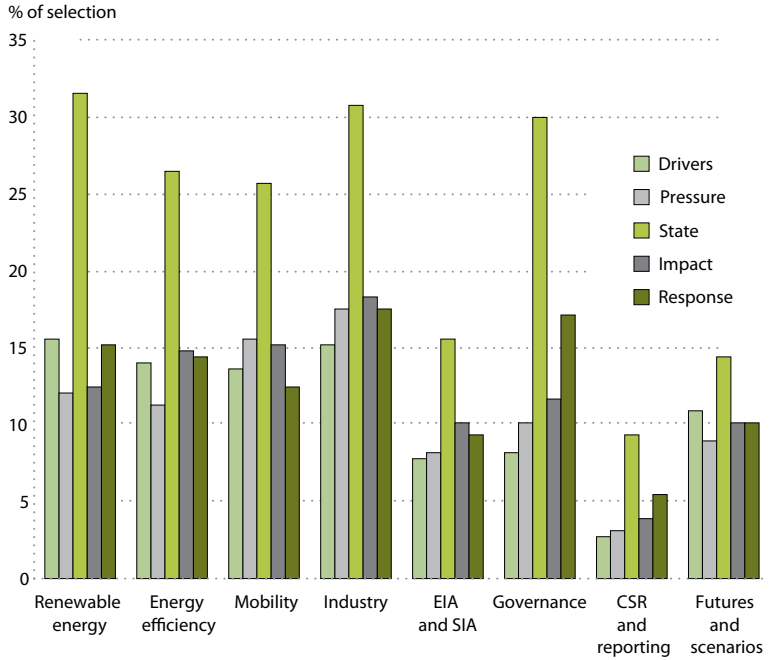


Figure 3.7 DPSIR analysis of priority areas (green economy), 257 review templates (Source: EEA, EE-AoA portal, as of 31 May 2011).

dedicated to green economy/resource efficiency issues; and statistical yearbooks — Belarus, 559 pages, 27 per cent of which is on green economy or resource efficiency. Despite the often great detail of some of these assessments, relatively few provide a summary (only 22 percent in the case of 'state of the environment' reports).

Most countries produce statistical assessments annually. Some countries, including Armenia, Belarus, Croatia and Ireland, produce more detailed 'state of the environment' reports less frequently, typically every three to five years, although the most recent such report for Azerbaijan dates from 2005.

The kinds of analysis contained in assessments generally follow some variation of the DPSIR assessment framework. Figures 3.7 (green economy) and 3.8 (resource efficiency) summarise the kinds of analysis undertaken for each of the priority areas.

Figures 3.7 and 3.8 corroborate earlier observations on the coverage of priority areas and illustrate other interesting points:

- some aspects of green economy (industry, energy, governance, mobility) are more commonly discussed in assessments than others (Environmental Impact Assessment (EIA) and Strategic Impact Assessment (SIA), Corporate Social Responsibility (CSR), futures and scenarios);

- some aspects of resource efficiency (use of natural capital) are more commonly discussed in assessments than others (LCA, environmental accounting);

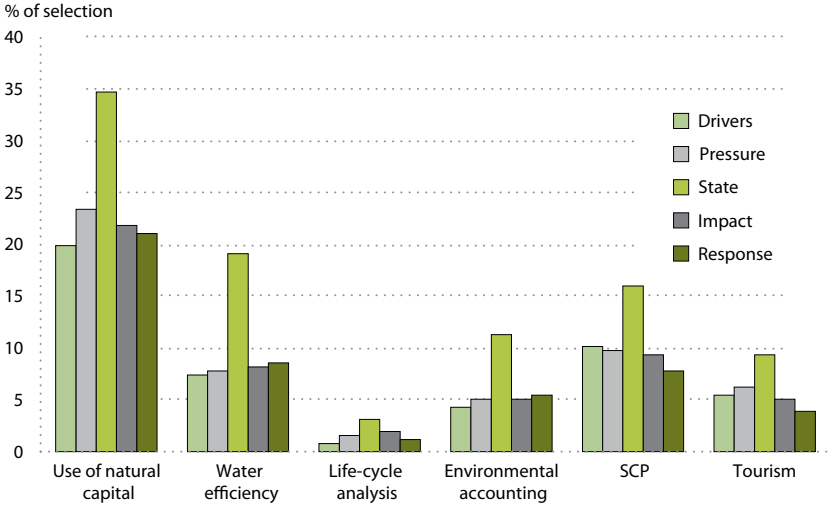


Figure 3.8 DPSIR analysis of priority areas (resource efficiency), 257 review templates (Source: EEA, EE-AoA portal, as of 31 May 2011).

- as with water assessments (Chapter 2), green economy assessments are overwhelmingly focused on the state of different priorities, and this is particularly true for the more well-established or traditional areas;

- drivers, pressures, impacts and responses are analysed and discussed much less frequently.

3.2.2 National assessments and indicator sets

Despite considerable momentum in the areas of the green economy and resource efficiency over recent years, no national level assessment or indicator set focused specifically and comprehensively on the priority areas exist as yet. However, a number of countries have produced strategic assessments and plans for greening their economies. These tend to vary in their emphasis and interpretation, as illustrated by the examples in Box 3.4.

Box 3.4 shows that the emphasis of national green economy assessments varies considerably, ranging from the agriculture to the business sector, and from innovation and green jobs to energy efficiency.

In general, those countries that have been badly affected by the global recession, for example, Greece, Ireland and Iceland, place a greater emphasis on green jobs and growth as a spur to a green economy. Countries that are highly dependent on primary and extractive sectors such as Ukraine and France tend to emphasise natural resource efficiency, whilst those that have not had the benefit of extensive fossil fuel reserves including Moldova and Austria tend to focus on the energy sector.

A wide range of specific targets related to elements of the green economy are set out by countries and progress reported against indicators. These cover everything from greenhouse gas emissions and water quality to energy efficiency in new housing and spatial distribution of natural ecosystems. For example, Ukraine has a target to stabilise greenhouse gas emissions at 20 per cent below 1990 levels by 2020, whilst Moldova aims to increase forested areas from 12.1 per cent in 2010 to 13.2 per cent in 2015.

National resource-efficiency assessments in EEA member countries will be summarised in the forthcoming survey of resource efficiency policies (EEA, 2011). These provide information on resource use per person, by category for fossil fuels and biomass etc., productivity and so on.

Instead of dedicated strategic policy assessments, six broad economy-wide types of strategies or assessments commonly include references to resource efficiency: national sustainable development strategies; national environmental strategies/action plans; SCP action plans; raw materials plans and strategies; strategies and plans related to climate change; and economic reform programmes.

Box 3.4

Shades of green: differences in emphasis on green growth

Green growth in Denmark ([40])
The purpose of the green growth agreement is to ensure that environmental, nature and climate protection go hand-in-hand with modern and competitive agriculture and food industries.

DKK 13.5bn will be invested in green growth until 2015 to ensure that Denmark fully meets its environmental obligations and strengthens growth and employment.

The Agreement on Green Growth incorporates:
- the Environment and Nature Plan Denmark up to 2020;
- a strategy for a green agriculture and food industry undergoing growth.

Building Ireland's smart economy ([41])
In 2009, the government's recovery strategy sets out a framework for economic renewal, based on sustainable development principles. The strategy addresses green-collar job creation and identifies 'enhancing the environment and securing energy supplies' as a priority action area.

Opportunities for the environmental goods and services sector include:
- efficiency in resource and energy use;
- development of new business sectors;
- importance of indigenous (environment-dependent) sectors such as food and tourism
- environmental technologies that decrease material input, reduce energy consumption and emissions, recover valuable by-products, or minimise waste disposal problems.

However, this situation is gradually changing and a number of countries are now developing more specific strategies and assessments for resource efficiency. Examples are presented in Box 3.5.

Some transition is taking place from sector-based policies — energy efficiency, water, waste, etc. — to integrated resource-efficiency policies, in Finland, for example. Only in a few cases is the complete life-cycle considered or environmental impacts abroad taken into account. For example, Sweden has strategic objectives related to reducing the global environmental impacts of national consumption, while the Netherlands is taking the environmental impacts embedded in trade into account.

([40]) Green Growth (2009) can be found in country fiche and at http://www.mim.dk/Nyheder/Temaer/Groen_vaekst.
([41]) Developing the Green Economy in Ireland can be found in the country fiche and at http://www.deti.ie/publications/trade/2009/developing_the_green_economy_in_ireland_01.12.09.pdf.

Box 3.4 (cont.)

Shades of green: differences in emphasis on green growth

State of environmental policy at the turn of the century in Russia ([42])
This review analyses preconditions for green growth in Russia and the relationship between economic growth, social well-being and environmental issues. It sets out past problems that have not been solved and new urgent environmental challenges facing Russian society, which run counter to the public interest. Recommendations are focused on increasing the effectiveness and efficiency of environmental policymaking. They include changing investment priorities and greening the economy through changes to environmental and economic policies at the highest level.

Energy efficiency and transition to a green economy in Turkey ([43])
A key part of Turkey's vision for a green economy brings together all aspects of energy efficiency, from production of energy to distribution and consumption.

One of the key aims is to reduce the country's carbon dioxide emissions. It considers pricing, competition, behaviour change and technology in all sectors of the economy. Other policy options considered are electrification of transport and changes to the building stock and to energy-using products.

Four priority resources — energy; waste, water and minerals — are commonly assessed by countries, but beyond these, other priorities are less often assessed with consideration given to land and soil, timber/forests, biodiversity, biomass, fish, metals, and the sea and coast, depending on national conditions.

Information on strategic objectives, targets and indicators in resource-efficiency assessments shows a large variety of approaches, directions and level of detail. Strategic objectives for resource efficiency tend to be fairly general in nature, most often referring to:

- ensuring sustainable use of natural resources;
- improving energy efficiency;
- increasing recycling of waste; and
- waste prevention/decoupling waste and growth.

([42]) http://rusrec.ru/ru/docs/1690.
([43]) Energy efficiency and transition to green economy (2010, supported by the Ministry of Energy and prepared by the Energy Efficiency Association), can be found in the country fiche and at http://www.enver.org.tr/modules/mastop_publish/files/files_4caeccbad1161.pdf.

Box 3.5

Resource efficiency assessment in the pan-European region ([44])

Austria's Resource Efficiency Action Plan (REAP) will be adopted in 2011 and is required by the National Strategy on Sustainable Development.

REAP will provide a framework and impetus for resource efficiency addressing security of supply for critical resources, specific resource groups such as renewable materials and selected economic sectors, construction.

REAP will provide a framework and impetus for resource efficiency defining several core strategies. The focus is on materials such as metals, minerals, biomass and fossil based materials. Links to energy efficiency and the efficient use of other natural resources such as water and area are covered and also addressed by the National Energy Strategy.

The upcoming REAP will be accompanied by other strategies aimed at improving resource efficiency, example e.g.: The 2010 Raw Materials Plan, the Austrian Strategy on Research, Technology and Innovation, the Energy Strategy, the existing master plans on Green Jobs and on environmental technologies, the 2010 Action Plan on Public Procurement and the upcoming Waste Prevention programme 2011.

Germany's Ministry for the Environment leads on the **National Resource Efficiency Programme**, to be published in 2011. The main focus is the minimisation of impacts on the environment through raw material production and processing.

Until now, resource efficiency has been addressed in different overall strategies:

- the 2002 Federal Development Strategy, focused on the improvement of raw materials efficiency, with quantitative targets for resource and energy efficiency;
- the 2010 National Raw Material Strategy, focused on securing the availability of mineral raw materials;
- the 2008 National Energy Efficiency Plan, aimed at reducing energy consumption and improving energy efficiency;
- the 2010 High-Tech Strategy 2020, focused on innovation processes and future technologies;
- the Framework Research Programme for Sustainable Development, with several thematic focal points addressing resource efficiency;
- the 2010 National Research Strategy for Bio Economy 2030, with an overarching aim to promote the sustainable use of biological resources by bio-innovations and their application in various industrial sectors.

([44]) See for detailed overview: 'Resource efficiency in Europe. Policies and approaches in 31 EEA member and cooperating countries' (forthcoming) (EEA, 2011).

Box 3.5 (cont.)

Resource efficiency assessment in the pan-European region

European Union: resource-efficient Europe — the flagship initiative under the Europe 2020 Strategy

A resource-efficient Europe is one of seven flagship initiatives as part of the Europe 2020 strategy aiming to deliver smart, sustainable and inclusive growth. This is now Europe's main strategy for generating growth and jobs, backed by the European Parliament and the European Council. Member States and the EU institutions are working together to coordinate action to deliver the necessary structural reforms.

This flagship initiative aims to create a framework for policies to support the shift towards a resource-efficient, low-carbon economy which will help to:

- boost economic performance while reducing resource use;
- identify and create new opportunities for economic growth and greater innovation, and boost the EU's competitiveness;
- ensure security of supply of essential resources;
- fight climate change and limit the environmental impacts of resource use.

Source: EC, 2011, p. 3: http://ec.europa.eu/resource-efficient-europe/pdf/resource_efficient_europe_en.pdf.

Other fairly common objectives include:

- sustainable management of minerals;
- improving resource efficiency;
- reducing energy use;
- increasing the share of renewable energy;
- improving water quality;
- reducing the use of water; and
- protecting biodiversity.

Several countries have set objectives and/or targets in assessments related to housing, for example energy-efficiency in buildings, appliances and electricity use (Belgium and Lithuania); mobility including increased use of biofuels in transport (Estonia, Slovakia) or fuel-efficiency standards for cars (Hungary); and food such as increasing the area of organic farming (Spain, Denmark). However, in most cases objectives and targets are aimed at efficiency improvements in technology rather than addressing consumption through managing demand, and very few countries include strategic objectives in their assessments to reduce absolute quantities of resources used.

3.2.3 Thematic assessments

Many countries complement wide-ranging 'state of the environment' reports with more focused, thematic assessments — both stand-alone reports or as chapters in broader reports — relating to sectors such as energy or topics such as green jobs. Indeed, while the concept of green economy may not be explicitly part of national policies, the underlying ideas of a green economy are an implicit component. The most obvious examples of this are renewable-energy and energy-efficiency measures, which are promoted by all countries to some extent and are part of all definitions of a green economy. For example, UNECE (2010) is a wide-ranging regional assessment, providing an overview of the energy sector and policy framework for Belarus, Ukraine and the Republic of Moldova, whilst UNDP (2007) considers the prospects for renewable energy in Uzbekistan, and UNFCCC (2010) relates many aspects of the green economy to climate change in Armenia. Other examples are provided in Annex 3.1.

Examples of specific thematic reports are presented in Box 3.6.

Key trends in thematic assessments include:

- well over half relate to energy and most of these are focused on the status of, and potential for, renewable energy. This is the case in all parts of the pan-European region;
- assessments related to energy also contain significantly more statistical detail (for example, breakdowns of energy by type — heat, transport, electricity, etc.) and technologies (including wind, wave and biomass) than is available for other sectors and priority areas;
- thematic assessments range from strategic documents to inform political priorities to influencing documents from sector and trade associations, and from economy-wide to focused, sector-based reports;
- thematic assessments are produced nationally, regionally and internationally by a wide variety of public institutions (for example, European Commission 2011 progress report on renewable energy ([45]) and the private sector (for example, the European Renewable Energy Council ([46]), which reports renewable energy generation and other statistics for EU-27 Member States);
- regional or global bodies tend to link assessments to political priorities (for example, preparations for the Rio 2012 conference) or to changes in awareness (for example, increased interest in water footprint); national and private bodies tend to focus more on specific topics or sectors;

([45]) http://ec.europa.eu/energy/renewables/reports/reports_en.htm.
([46]) http://www.erec.org/statistics.html.

Box 3.6

Examples of thematic reports across the pan-European region

Renewable energy in Croatia ([47])
The EBRD is assisting with Croatia's Renewable Energy Development Initiative, a regular assessment (latest version 2009) of the state of and potential for all types of renewable energy, including wind, biomass, solar, geothermal and hydroelectric. This follows the opening up of Croatia's electricity markets in 2007. A number of incentives, including feed-in tariffs, are in place.

Energy efficiency in Luxembourg ([48])
The National Action Plan on Energy Efficiency describes the current state of the energy sector and focuses on current and future measures to improve energy efficiency (and renewable energy generation) in the economy as a whole and sector by sector.

Waste management in the former Yugoslav Republic of Macedonia ([49])
The 2008–2020 Waste Management Strategy considers the generation, treatment and use of all types of non-hazardous and hazardous waste, including from mining and emissions from incineration plants. Policy options considered include waste as a source of renewable energy, obligations and responsibilities for manufacturing, business and domestic sectors, education and research.

Transport in Slovakia ([50])
A 2009 assessment of transport and its impact on the environment in the Slovak Republic uses the DPSIR approach and reports a suite of indicators to describe various issues relating to transport, including policy measures, emissions and renewable fuels.

- some thematic assessments relate to more general themes or to sectors outside the standard definitions of green economy. These include agriculture, tourism, manufacturing, construction, mining and health.

([47]) http://ws2-23.myloadspring.com/sites/renew/countries/Croatia/default.aspx.
([48]) http://www.eco.public.lu/documentation/rapports/Erster_Nationaler_Energieeffizienzaktionsplan_Luxembourg_-_Final.pdf.
([49]) http://www.moepp.gov.mk/WBStorage/Files/Waste %20Management %20Strategy %20of %20the %20RM %202008-2020.pdf.
([50]) http://enviroportal.sk/pdf/sektor/Doprava_sektor_09.pdf.

3.2.4 Assessments with country profiles

A variety of organisations produce a range of green economy related reports and assessments that contain information on specific countries. These are generally based on secondary, evidence-based information from international or national institutions and cover a number of topics of relevance to green economy (for example, CIA World Factbook) ([51]).

Country profiles vary in type and coverage. Some countries are more comprehensively covered by green economy related assessments than others. This is partly because of the number of assessments undertaken by regional bodies to which these countries belong (as in EEA, 2010). But it also reflects socio-political priorities, with countries from Eastern Europe, the Caucasus and Central Asia for example attracting greater attention from organisations with an interest in development or reconstruction and investment.

The basis of, and approach to, assessment also varies, bringing in organisational thought, strategic visions, detailed action plans and data-reliant assessments (e.g. benchmarking studies).

Global organisations leading on country profiles include the UN system, the World Bank and the World Resources Institute, a global environmental think tank. However, even across UN organisations, green economy concepts have not yet had a full impact on regular country assessments. For example, the FAO produces regular assessments of agricultural production, with accompanying data and indices, but these are not discussed in terms of resource efficiency or contributions to broader objectives.

Some country assessments by global organisations are driven by the strategic priorities of the organisation and are designed to feed into or influence significant global events. For example, the UN has prepared country assessments to feed into summits held as part of various conventions. These typically include assessments of natural-resource management (for example, water, forests and agriculture), energy use, social justice and poverty eradication.

Others are aimed at increasing awareness and knowledge. Examples include the Environmental Performance Index ([52]) and the World Resources Institute's *Earthtrends* series ([53]). The latter includes a comprehensive set of maps and a searchable database covering all countries, including the pan-European region. Information comes from a range of sources and is updated on an *ad-hoc* basis as new priorities are identified or as new information becomes available.

([51]) https://www.cia.gov/library/publications/the-world-factbook.
([52]) Yale Centre for Environment Law and Policy, http://epi.yale.edu/.
([53]) www.earthtrends.wri.org.

Other country level assessments by international organisations are focused on specific themes or topics. For example, the International Energy Agency (IEA) maintains a database of regularly updated energy statistics, covering electricity, heat, oil, renewable and so on.

At a regional level, environmental performance reviews (EPRs) are undertaken by OECD and UNECE ([54]). These reviews are particularly relevant to green economy and resource efficiency and have three main objectives:

- helping countries in transition to improve their management of the environment by establishing baseline conditions and recommending better policy implementation and performance;
- promoting continuous dialogue between UNECE member countries by sharing information about policies and experiences;
- stimulating greater involvement of the public in environmental discussions and decision-making.

The third cycle of UNECE environmental performance reviews from 2011 is currently being prepared and it is proposed to include aspects of green economy, specifically including a section on 'Environmental governance and financing in a green economy context' ([55]).

The OECD review programme has similar green economy related aims but it also includes targeted recommendations designed to reinforce national environmental policy initiatives. The third cycle of OECD performance reviews, launched in 2009, will sharpen the focus on performance and on selected issues that are of high priority in the reviewed countries.

The EEA, with support from its European Topic Centres, also produces a number of comparable datasets with information on SCP, resource and waste management in Europe. These are aimed at both decision-makers and the public (see for example ETC/SCP, 2011).

Organisations with a smaller geographical focus also produce country assessments covering specific areas. For example, the Nordic Council assesses annual trends in land use and natural resources, emissions, global warming and energy use.

([54]) UNECE carries out EPRs in South-East European, Caucasus and Central Asian countries, examining their environmental conditions and also strategies, policies and tools that they are using to manage the environment (see http://www.unece.org/env/epr/welcome.htm).
([55]) See http://www.unece.org/env/documents/2011/ece/cep/ece.cep.s.2011.3.e.pdf for more detail.

Box 3.7

The European environment — state and outlook 2010

SOER 2010 provides a set of assessments of the current state of Europe's environment, its likely future state, what is being done and what could be done to improve it, and how global developments might affect future trends.

The European environment — state and outlook 2010 is aimed primarily at policymakers, in Europe and beyond, involved with framing and implementing policies that could support environmental improvements in Europe. The information also helps European citizens to better understand, care for and improve Europe's environment.

The SOER 2010 'package' includes four sets of assessments:

1. thirteen Europe-wide thematic assessments of key environmental themes;
2. an exploratory assessment of global megatrends relevant for the European environment;
3. country assessments of the environment in individual EEA member and cooperating countries;
4. a synthesis — an integrated assessment based on the above assessments and other EEA activities.

Source: http://www.eea.europa.eu/soer.

Finally, in the EEA's most recent five-year 'state and outlook' report (see Box 3.7), the country assessments include several areas which are related to the green economy and resource efficiency, including renewable energy, energy productivity, material productivity and recycling quotas for different waste streams.

3.3 Highlights of green economy related assessments

This section considers how assessments might develop and be used in future, including the types of analysis that could be included, key concerns and emerging issues; and the main gaps in current assessments.

3.3.1 Types of analysis

A number of main threads can be identified from the analysis presented in this chapter so far that should help to guide future assessments on the green economy.

As has been seen, green economy is defined in many ways. Depending on the organisation(s) involved, the region and the context, it can refer to sectors (for example, land, water), topics (for example, SCP, pollution), principles (for example, fairness, polluter pays) or policies (for example, economic instruments, environmental impact assessment). It can also be used to describe an underpinning strategy, such as the mainstreaming of environmental policies or a supportive economic structure. This is why national assessments generally talk about green growth or greening the economy — indicating a dynamic rather than static process.

Only global assessments currently tackle such definitional issues. This assessment of assessments did not identify any national assessments that integrate all the specified elements of the green economy. This perhaps reflects the lack of an agreed definition and the fact that it is still an emerging concept. National assessments generally cover traditional elements of green economy but, driven by global policies and frameworks, new areas are emerging that need to be considered.

Given the nature of the subject, green economy and resource efficiency offer ideal opportunities for integrated assessments that assess key issues across sectors and themes. This is starting to emerge as with LCA in the Netherlands and Sweden. In Ukraine, Belarus and Moldova, recent assessments supported by the World Bank aim to raise awareness among policymakers of the need to accelerate and enhance implementation of environmentally sustainable practices across the agricultural and forestry sectors ([56]).

Integrated assessments also require clear institutional structures and mandates. A number of organisations are currently involved in assessments and in future these will need to work together and coordinate more effectively. This includes private organisations, which have much to offer in terms of data, knowledge and influence on decision-making. One example of this is the recently formed Global Green Growth Institute (see Box 3.8).

The expansion of areas to which green economy concepts have been applied has also contributed to an increasing size and detail of assessments. This in turn leads to a general impression that there is too much information to be assimilated.

Whilst future assessments should be more focused, they should also take account not just of the environmental state of the main priority areas, but also the drivers, pressures, impacts and responses. Related to this, assessments need to clearly address or link to policy questions and objectives if they are to be most useful to decision-making.

([56]) See for example World Bank (2007) Integrating Environment into Agriculture and Forestry Progress and Prospects in Eastern Europe and Central Asia, http://www.worldbank.org/eca/pubs/envint/Volume %20 II/English/Review %20UKR-final.pdf.

Box 3.8

Global Green Growth Institute

Founded in June 2010 and based in Korea, the Global Green Growth Institute (GGGI) is a globally represented, non-profit institute dedicated to the promotion of economic growth and development while reducing carbon emissions, increasing sustainability, and strengthening climate resilience. GGGI is founded on the belief that economic growth and environmental sustainability are not merely compatible objectives, but are mutually necessary for the future of humankind.

GGGI currently supports several projects in partner countries through programme development, implementation, capacity building, best practice sharing, and the provision of grants to local institutions. Through its work, GGGI seeks to position the green growth model as one that is both practical and effective in the pursuit of economic growth and sustainable development.

From 2012, GGGI will be fully converted into an international organisation operational on a global scale. Its aim is to establish itself as the institute of choice for tools, methodology, and data related to green growth. It will have a live database of policies and institutions and their performance in different countries, enabling the Institute to be on the leading edge on advising on implementation of plans.

In May 2011, the GGGI opened its first regional office in Copenhagen.

Indeed, currently, there is often no clear link between an assessment and the relevant decision-making body or bodies, and many assessments do not clearly articulate the objectives and scope or the key questions to be answered. The impression given by many assessments suggests that they follow rather than inform policymakers or where they do try to inform policy they are ignored or only partly addressed in the policymaking process. This may be because many assessments are produced only once, or very occasionally, so there is no regular cycle linking monitoring and assessment to measures previously proposed or adopted in order to evaluate progress and the need for further action.

Success here requires a green economy strategy to be at the very heart of the national or regional decision-making process. Currently, assessments address policy questions in specific but generally narrow areas, for example, related to increased proportion of renewable energy, to green public procurement or to green jobs. It is less clear how assessments, even those of the more strategic variety, are being used to drive economic policy in general. If the green economy is about transforming the way a nation

produces and consumes, trades and is governed, then assessments should be at the very heart of economic and political strategies, rather than at the fringes.

A clear framework is also required to guide assessments, including targets, ways of measuring progress and evaluating policy effectiveness. This should include adoption of green national accounting alongside current measures such as GDP. Green accounting seeks to factor the use of natural resources into mainstream national accounting. This requires an understanding of the value of such resources, including the benefits they deliver and the impacts of any depreciation or loss. Green accounting provides a fuller picture of a nation's economy for decision-makers. To date, it has not been widely adopted, although there are moves in a number of countries to improve understanding and to run natural resource accounting alongside conventional national accounts.

An example is the *Development of natural resources value accounting in the Russian Federation*, commissioned by the Ministry of Natural Resources and the Environment and the Federal State Statistical Service. The aim of this assessment is to study possibilities for harmonising national and international approaches to valuing natural capital, and providing government authorities with complete, accurate and scientifically substantiated data on the current state of environmental and economic valuation of natural capital in the Russian Federation. The assessment identified a number of priority needs and actions in order to improve the system of valuation of natural resources in the Russian Federation. These include establishing an integrated and regularly updated information system of environmental and economic valuation of natural capital, strengthening and improving inter-agency coordination, cooperation and training for Federal State Statistical Service specialists on natural resources accounting.

Finally, assessments should be publicly available and include web-based portals and databases, where relevant information and data can be provided in a common format, shared and quickly accessed.

3.3.2 Key concerns and emerging needs

In all regions, a large proportion of the assessments in the EE-AoA review template identified concerns (82 per cent) and emerging needs (77 per cent). These generally relate to the specific nature of the assessment, but some general observations can be drawn.

One key concern is that the assortment of topics and sectors related to green economy concepts enables organisations to select the aspects that are most relevant to or suitable for them. This flexibility is a double-edged sword. Whilst it helps to bring issues of environmental protection to a broader audience, it may 'water down' the green economy concept to the point that it becomes ineffective or meaningless.

This is similar to the problem that has afflicted sustainable development, which has been widely adopted and, as a result, used to describe and justify a plethora of policies, plans and strategies. There is an additional risk for the green economy in that the new discourse could be used to justify unilateral trade protection measures, as nations introduce domestic production quotas or targets, and offer subsidies or other economic incentives to 'home grown' industries and jobs. This could strengthen inequalities between rich and poor nations and hinder their development (UNCSD, 2011).

There is therefore a need to clearly define and agree what we mean by a green economy, and to adopt measures that take account of international, as well as domestic, impacts on natural resources and welfare.

A major concern identified in most assessments is the institutional complexity involved in the responsibility for, and production of, green economy assessments. Issues cited typically include poor coordination, weak environmental legislation/regulation, unenforceable multilateral agreements where transboundary issues are involved and the inability of environmental ministries and institutions to bring about effective change at the national level. An example is implementation of the polluter pays principle, which is an aspiration in many countries (including all EU Member States), but difficult to implement because of, for example, difficulties in identifying the polluter.

Lack of effective change can also come about through insufficient funding or technical expertise, a lack of available economic instruments, corruption (which can reduce the attractiveness for investors in green economy) or political emphasis on other issues. It remains the case that green growth and resource efficiency initiatives are often perceived as costly and irrelevant in the current economic climate. Indeed, a number of assessments in Eastern Europe, the Caucasus and Central Asia state that environmental protection is simply not a government priority.

This institutional complexity and inertia also make it harder for green economy assessments to get purchase at a national level, as they are overtaken by narrower short-term priorities. There is clearly a need to establish mechanisms for a central coordination of work to ensure the transition to a green economy, as is starting to emerge in some countries including Sweden and Germany. Other countries, such as Finland, have set up specialised agencies to support policy development.

The increasing tendency and need to involve institutions with different perspectives often leads to overlapping competencies, unclear responsibilities and tensions or conflicts between different groups and difficult trade-offs. For example, better understanding of LCA may lead to calls for less dependence on imported food, but this generally increases demand for water and pesticides domestically, with subsequent local impacts on pollution and resource use.

Here, countries need encouragement to integrate assessments and to be provided with a more clearly defined framework and methods for such assessments (e.g. ecosystem services approach, integrated natural resource accounting).

A further, widely cited concern is the number and extent of information gaps at both a spatial and temporal level. Partly, this is due to complex interactions of natural ecosystems, but it is also the result of poor or insufficient monitoring systems, which restrict the abilities of countries to produce robust assessments. This becomes more acute as the need to monitor more frequently for more and more issues increases, whilst budgets remain stable or are cut.

The information that is available highlights another major concern around the legacy of environmental degradation, especially in Eastern Europe, the Caucasus and Central Asia, where pollution and toxic waste are still real public health, as well as environmental, concerns. Partly, this is driven by continued poverty and income inequality. For example, the 2009 Ecological Bulletin of Belarus states that all major towns and cities regularly report a variety of pollutants (e.g. formaldehyde, carbon oxide, nitrogen dioxide, phenol, ammonia, dust) at levels exceeding maximum allowable concentrations by a factor of at least two or three, and often as high as ten.

There is clearly a need to develop assessments that rely on good quality, comprehensive and consistent data and information, produced in a common format. Whilst data quality and availability is generally improving, there is still considerable scope to streamline this through the concepts and development of a shared environmental information system.

Many assessments express concern regarding the difficulty in tackling political, economic and cultural inertia, for example where traditional dependence on fossil fuels has resulted in a legacy of particular skills, capital, expertise, and culture perspectives.

In many ways, this mirrors the move away from traditional manufacturing industries that occurred in much of Europe in the 1980s and 1990s. The need here is for assessments and policies to take into account some of the cross-cutting themes associated with a green economy, such as innovation, and to consider future drivers and needs. This is happening in many countries, such as Ireland, which has identified the win-win opportunities associated with a green economy and the sectors (such as renewable energy and green ICT applications) with business and employment growth potential ([57]).

([57]) See reports in the EE-AoA portal, Irish country fiche: *Innovation for a Green Economy — Environment and Technology: A win-win story* (2009), and *Future Skills Needs of Enterprise within the Green Economy* (2010).

Relatively few assessments analyse or identify the impact of emerging and future challenges as a concern. Most frequently cited issues are climate change and demographic changes (population growth and migration). In addition, some resource efficiency related assessments note the increasing demand for natural resources in areas such as domestic water consumption as lifestyles change and income rises.

The linkage between problem and solution in a long-term perspective is especially informative for decision-makers, yet few assessments include an outlook component that develops and analyses future scenarios as an aid to decision-making. Clearly, assessments need to be forward looking to ensure that they take adequate account of emerging challenges and their impact on the green economy and the environment.

3.3.3 Gap analysis

There are clearly unresolved issues around the definition and understanding of key terms. Figure 3.9 shows how some of these definitional issues overlap from the perspective of the UNECE, the United Nations and other institutions.

Figure 3.9 illustrates some gaps in understanding, with some key organisations involved in assessing and promoting a green economy not involved in or not aware of what others are doing. However, whilst different countries and organisations define

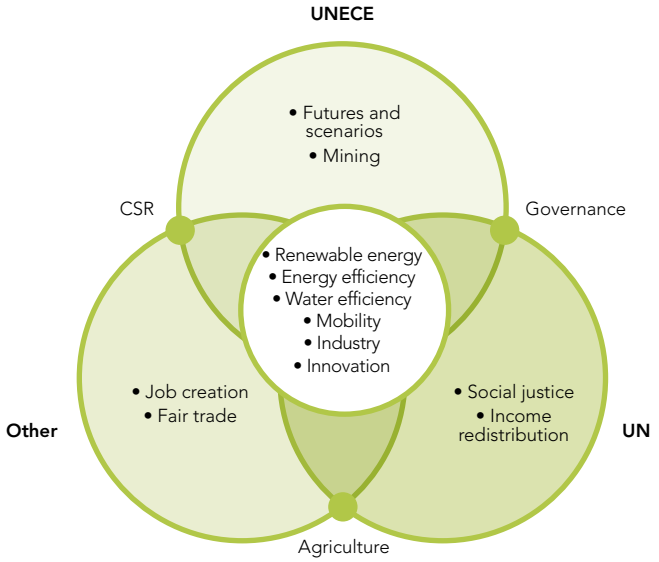


Figure 3.9 Defining green economy: Gaps in understanding? (Source: EEA, 2011).

the green economy and resource efficiency differently, this should not be a reason for inaction but could be the basis for further dialogue.

For example, it is currently unclear whether green-job creation is part of the UNECE aims for developing a green economy as it is not listed as one of the priority areas (see Box 3.1) and, if so, how this should be manifested in policies and assessments.

There is also significant overlap between green economy assessments and water assessments. Indeed, about 40 per cent of green economy assessments in the EE-AoA review template also discuss water resources and water management issues, highlighting the significant overlap and close relationship between these areas.

This has implications for countries and others involved in preparing assessments. Without clear direction and agreement on the concept of green economy, it is difficult to know where and how assessments should be focused, and there is more incentive for countries to use the cover of the broad green economy concept to continue to pursue and justify fragmented policymaking on issues of immediate national interest.

Nevertheless, whilst there are clear differences in definition and interpretation, there are many areas of agreement and consensus. To some extent, terms like green economy come and go, pass in and out of fashion. Whilst this can be the basis for some interesting, but largely intellectual debate, what is surely more important is to ensure all organisations at all levels are working towards common and agreed goals in relation to the shared concerns.

A clear gap that we have identified in this chapter is the paucity of dedicated national assessments on the subjects of green economy and resource efficiency. This may be addressed naturally as more integrated policy frameworks shape up (for example, the EU's Marine Strategy Framework Directive and the Water Framework Directive), but it is likely to need some stimulus in the form of institutional changes, shared information systems and better links to policymaking.

Data flow between countries and up to the European level remains inadequate. The development of SEIS is helping to ensure data relevant to national and other assessments are up to date and based on a consistent framework, organised according to green economy priority areas. Further development of the SEIS would facilitate better sharing of information, knowledge, skills, research and good practice, which is often lacking as a result of poor coordination and transfer between countries and regions.

A further gap identified in many assessments is the limited use of price-based instruments, such as environmental taxes, as a means of supporting progress towards a green economy. Price-based instruments can provide incentives for the efficient use of natural resources thereby improving resource efficiency and making pollution more expensive (EEA, 2010; and OECD, 2011a). There are several examples of effective instruments at the national level (for example, feed-in tariffs for renewable electricity

in Germany and the United Kingdom, and the carbon dioxide taxation scheme in Sweden) and European level (for example, the EU Emissions Trading System). The latter is a cornerstone of the EU policy to combat climate change and its key tool for reducing industrial greenhouse gas emissions cost-effectively. It is the first and biggest international scheme for the trading of greenhouse gas emission allowances, covering some 11 000 power stations and industrial plants in 30 countries.

However, in many other areas (e.g. tariffs to promote water efficiency), there are very few examples of effective economic instruments, particularly at the national level, and this is reflected in the relative scarcity of assessments on this subject.

A further gap can be identified by examining the patterns amongst current assessments, as identified in Annex 3.2. Assessments are generally better in some regions such as Northern Europe and for some sectors of economy including electricity. Other gaps identified in current assessments tend to revolve around data and information availability. In general, there is a lack of consistency in data, particularly over time to provide trend analysis. In some countries, particularly those in Eastern Europe, the Caucasus and Central Asia, there are data availability issues, with limited monitoring and restricted access to environmental information.

There is also a poor understanding of the relationships between economic activity and environmental impacts, particularly with respect to ecosystems, biodiversity and the impacts of climate change. This causes an absence of comprehensive systematic information on ecological and economic valuation of natural capital. Partly at least, this is the result of inadequate funding and monitoring systems, capacity building and awareness raising.

Finally, there is a clear gap in terms of comparable national and regional indicators, especially for the green economy. This stems partly from the definitional problems we have discussed. It is difficult to assess progress if the measuring tools are inadequate, inconsistent or incomplete.

3.4 Conclusions and recommendations

This chapter began by stating that there are no completely integrated green economy assessments in the pan-European region. As a result, it is difficult to draw conclusions from assessments that do not, as yet, exist. This section is therefore presented in two stages:

- what conclusions can be drawn from assessments related to the green economy that do exist;

- where is focus needed in future to address the current deficiency of fully integrated assessments (recommendations).

3.4.1 Conclusions

A number of conclusions can be drawn from the assessment of current assessments.

A clear framework to promote a green economy is lacking

Currently, assessments are largely driven from the bottom-up, developed to address a specific need or policy question related to a specific aspect of green economy. This is largely as a result of the many and diverse aspects covered by the concept, but as a consequence assessments do not generally form part of a clear 'top-down' integrated framework.

Green economy is not yet defined clearly and consistently

UNEP's definition of a green economy is the most widely used and authenticated one. However, green economy is still a novel concept and refers to a mix of existing and emerging sectors, topics, principles and concepts. Most assessments focus on one or a few of these topics, with a particularly large number of assessments focused on energy (renewable and efficiency), mobility, industry and the use of natural capital. However, very few assessments take a more integrated approach, encompassing a range of concepts or the whole of the DPSIR assessment framework. This explains why there are currently no comprehensive green economy assessments at the national level, and only a few in the area of resource efficiency.

Institutional arrangements are unclear

Current assessments are published by a wide range of international, regional and national institutions, both from the public and private sectors. There is limited coordination either between or within regions and countries, or between the public and private sectors. This situation inevitably leads to some overlap in assessments and reduces effectiveness in policymaking, since it is not clear which assessments are being used to inform which decisions or decision-making processes, or how they are being used.

The objectives of green economy assessments are not always clearly defined

At present, the purpose of these assessments is not always clear. It may be to improve understanding, to inform or influence policy or to meet legal or voluntary targets. But the lack of clear objectives contributes directly to a lack of focus in too many assessments. There are also relatively few *ex-post* assessments that evaluate policy implementation or consider how assessments have led to adoption of policies.

Assessments are numerous, but often large and unfocused

There is a wealth of information available on many aspects of the green economy and resource efficiency. The assessment universe is constantly expanding, but in an uncontrolled way and there is currently a lack of consistency in the basis, format and frequency of data being collected and used to inform assessments and in the assessments themselves.

There are clear regional differences in assessments

Some assessment themes (e.g. SCP, innovation) are concentrated in EEA member countries. Others (e.g. mining) are most prevalent in Eastern Europe, Central Asia, the Russian Federation and the Caucasus. These patterns typically reflect countries' sectoral backgrounds and the presence of traditional industries but there are also indications that some of the 'newer' aspects of the green economy have not yet permeated to all areas.

There are specific knowledge gaps that have not been addressed

Specific information and knowledge gaps exist in a range of areas related to the green economy, for example concerning the relationship between ecosystems and economic systems.

3.4.2 Recommendations

A clear strategic framework to promote green economy is needed

Assessments need to be clearly part of an agreed, comprehensive and consistent framework aimed at transforming the economies of those involved from a classical to a green model. This requires leadership and agreement at the highest level. If the aim truly is the mainstreaming of the environment into economic development, then all policies and priorities at the pan-European level should be assessed against agreed green economy principles. For consistency with emerging international approaches, the framework should follow UNEP (2011a).

There is an urgent need to develop a clear and common understanding of green economy

The green economy is not sector specific and both green economy and resource efficiency apply to the whole economy. By artificially constraining interpretation of these concepts to specific sectors or topics, we risk overlooking some cross-sector synergies and efficiencies. To encourage more integrated assessments and to enhance understanding and effectiveness in decision-making, an agreement should be made on a number of

critical elements which will help define the green economy concept. This could form the basis of developing a tool-kit and guidelines to support capacity building and implementation, as well as a suite of indicators for use in regularly reporting progress towards a green economy. It should involve, at a minimum, the UNECE and other UN organisations, the OECD, the European Commission and the EEA.

Institutional arrangements need to be clarified

For assessments to clearly link to and inform policymaking in a consistent way, national and other institutions charged with their production need to have a clear remit and appropriate levers at their disposal to ensure that green economy is at the centre of national and regional economic strategies. Maximising the value from assessments also requires strong coordination, good cooperation, sharing of information, and the development of new partnerships.

Assessments should be clearly focused

In the future, assessments need to be streamlined, with fewer and shorter (more focused) reports, regularly updated. This will improve targeting, communication, consultation and policy relevance. In addition, assessments should include an explicit statement of objectives. More emphasis should also be placed on *ex-post* evaluation and how assessments have led to policy adoption, as well as help to implement policy.

Provide specific support where needed

Some parts of the pan-European region, notably countries of Eastern Europe, the Caucasus and Central Asia need help to monitor trends, produce assessments and make progress towards a green economy. They face a specific set of circumstances as a result of the relatively recent transition towards market-based economies, including institutional barriers and the need to focus on more pressing social and economic issues. Awareness of the needs of these countries is steadily improving (e.g. OECD, 2011d) but the relevant measures need to be implemented.

A system of information exchange is needed

A clear and agreed shared environmental information system would improve consistency and credibility of subsequent assessments, as well as showcasing good practice in assessments and aiding capacity building and knowledge transfer. Such a system would also help to ensure knowledge gaps are recognised and addressed in a coordinated way. Gathering and disseminating such case studies, including good and bad examples and practices, should be seen as an integral part of the information system.

Europe's environment
An Assessment of Assessments

4 Cross-thematic analysis

Key findings

A cross-cutting overview of the EE-AoA results around the two key themes of the Astana Ministerial Conference leads to a number of key observations including commonalities and differences in a number of areas.

Clearly, there is a margin of uncertainty arising from the methodology's application given the impossibility of identifying and capturing in the process everything available at all scales and for all related themes and of reviewing all of these consistently. With these limitations recognised, the assessment and conclusions presented here are believed to be robust and pertinent for the objectives of this exercise.

Assessment of assessments relevance for other themes

The characteristics of the problems faced by water and green economy assessments are not topic specific; rather, they depend on the underlying institutional make-up and approaches in countries and organisations across the MDIAK reporting chain ([58]). Similarly, common challenges are shared by different geographical regions.

The EE-AoA has confirmed the validity of the AoA approach to very diverse themes, beyond the marine environment, underscoring its potential for being applied more broadly to address other environmental priorities. Additionally, the results are relevant to the international environmental governance debate globally, such as discussed at the 2011 UNEP Governing Council on the world environment situation and UNEP-Live ([59]).

Looking across scales offers interesting insights

Water assessments are found at all geographical and institutional levels, while the Green Economy, as a theme still under conceptual debate, is mostly on the agenda of international organisations (UNEP, OECD, the EU, UNECE, the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), with international players at the forefront of publishing reports on the topic.

([58]) See Chapter 1, Box 1.3.
([59]) See e.g. 'Draft decision approved by the drafting group: World environment situation', UNEP/GC.26/CW/L.4/Add.2, 24 February 2011.

Water reporting is primarily a national obligation and is mostly carried out by environment ministries, the water department in these ministries, or environment (protection) agencies.

In contrast and due to the breadth of interpretation of the green economy, a wide range of actors and institutions are involved in green economy processes, often with a different role, from implementation to the actual production and/or coordination of assessments.

Accessibility of information improving

Improved accessibility is driven by more information and reports being available on line. Nevertheless, the production of hard copies is still significant. With regard to water, several of the environment ministries and their collaborating institutions have websites providing information on water resources, water pollution and the state of water, usually in the form of downloadable publications and increasingly in the form of access to (aggregated) data and near real-time monitoring. On the other hand, the cross-cutting institutional nature of the green economy implies that there are very few, if any, points of convergence (websites or portals) where all related information can be reached and integrated.

Multitude of assessments but limited relevance

There is evidence of a multitude of assessment documents available for the two priority themes, yet policy relevance and use remains limited with many reports commissioned and produced without a clear policy demand or target focus.

As the number of issues related to water management, state, trends, pressure and policies grows, so does the amount and type of information that needs to be compiled and aggregated, with some 50 to 100 assessment reports being produced annually across Europe at different levels. Despite this number, the assessment of water-related ecosystems is still weak in many countries and vulnerability, ecosystem services and restoration is not much discussed. For the green economy, a multitude of documents exist which address the various individual priority areas, broadly grouped under the two categories of resource efficiency and aspects of environmental sectoral integration. With only a few exceptions at the international level, there appears to be no national assessment which brings together in an integrated and coherent fashion all the elements of the green economy, by any definition of that term.

Differing demands hamper integrated use of information and policy influence

Among the multitude of assessments available for water, redundant collection of information and incomparable results are sometimes noted; further, integrated assessments, though increasing, are not the norm and the focus tends to be largely on description rather than on analysis. Many assessments appear to be of limited use in relation to policymaking due to their focus on the 'state' of the environment rather than on drivers and responses.

Assessments related to the green economy often do not clearly articulate the objectives and scope, or the key questions to be answered, and seem to follow rather than inform

policymaking; although this theme would offer ideal opportunities for integrated assessment, this is only starting to emerge. Also, for the green economy descriptions focus on the 'state' of the different priority sub-topics, in particular for the more well-established or traditional areas.

Several information contrasts are apparent

In some 90 per cent of cases, water assessments are based on the use of indicators, commonly produced according to standard/agreed methodologies, also at the international level; nevertheless, the data is not always updated and data gaps are frequently acknowledged in the assessments. An information system was available in only about a fifth of the assessments to support data management, data sharing, and/or data exchange. Water assessments often fit within existing legal frameworks, dedicated polices, strategies and targets.

Green economy experiences a more fragmented situation is terms of data consistency, frequency and comprehensiveness, as well as with regard to existing frameworks and corresponding targets. Information and knowledge gaps also exist in a range of areas such as, for example, the understanding of the relationship between ecosystems and economic systems. However, green economy assessments have a relatively higher reliance on forward-looking modelling than water, probably reflecting its conceptual stage of development.

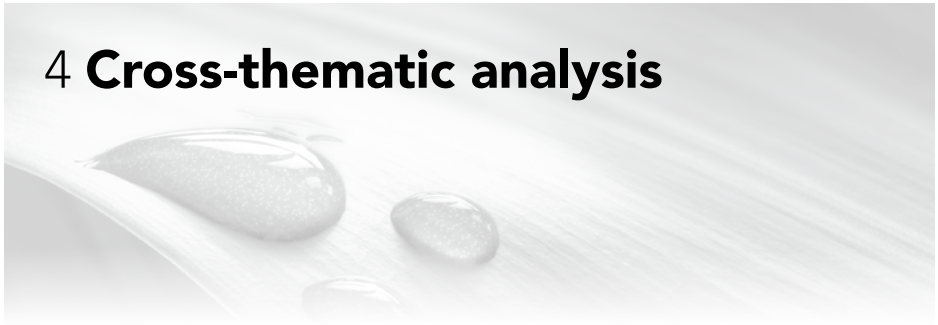
Integrated assessment is not a sum of the parts

Over time, water assessments have widened their scope as scientific understanding, data availability and policy interest have interacted; an integrated assessment process, though still limited generally, has allowed the underlying complexity of water issues to be more fully evaluated helping to frame, and not follow, the policy debate. In contrast, green economy is early in the policy cycle, but is already broad conceptually; integration, in this case, could thus mean simplifying the concept and breaking it down into its component parts to allow the policy process to tackle it practically and for the concept to be more easily assessed.

Making the Shared Environmental Information System work for assessments

There is evidence that SEIS would support the improved efficiency and effectiveness of environmental assessments, in particular, with regard to the following dimensions: (i) the generation of compatible content across themes and geographical scales; (ii) the diffusion of comparable methods for measuring progress towards a green economy and its many natural resource components; (iii) the deployment of various technologies as the information infrastructure to underpin information gathering, use and assessment processes; (iv) the organisation of and easy access to relevant knowledge, including assessments, between institutions and the public (implementation of the Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Aarhus Convention)); and (v) the improved coherence in and use of assessment findings by giving better access to existing results and assessment approaches and by strengthening the web of relationships among stakeholders.

4 Cross-thematic analysis



This chapter presents a cross-cutting overview of the EE-AoA results around the two key themes of the Astana Ministerial Conference: Water and related ecosystems and the green economy. The chapter highlights a number of key observations about environmental assessments across the region covering commonalities, differences and limitations, institutional responsibilities, processes and content, scope for improved environmental governance, as well as applicability and transferability of the results to other themes and areas regionally and globally.

These conclusions have been drawn from the analyses presented in the Water and Green economy chapters underpinned by the reviews performed on the individual assessments. While this knowledge base (available on the EE-AoA portal) represents a significant sample of the recent literature in the two areas over the past five years, the entries are not exhaustive. Consequently, there is a margin of uncertainty in the results arising from the methodology's application given the impossibility to identify and capture in the process everything available at all scales and for all related themes and to review all of these consistently. With these limitations recognised, the assessment and conclusions presented here are believed to be robust and pertinent for the objectives of this exercise.

AoA relevance for other themes

While the water and green economy priorities covered by the EE-AoA do not cover comprehensively all environmental issues, the breadth of their scope leads to the inference that the often crowded and uneven landscape of disconnected environmental assessments observed for these issues and topics, and of related underpinning data, is a common problem across issues. Furthermore, the characteristics of the problems faced are not specific to the topics themselves but to the underlying institutional make-up and approaches in countries and organisations across the MDIAK reporting chain. The common underlying syndromes observed here present a significant opportunity for improving the knowledge support to the policy process across the environmental domain since improvements in one area, such as water, have the potential to spill over and affect others.

The current diagnosis also has clear resonance with environmental assessment challenges in other geographical regions. Also globally, the results have strong relevance to the international environmental governance debate, such as discussed at the 2011 UNEP Governing Council on the World environment situation and UNEP Live ([60]).

First and foremost, therefore, the EE-AoA has confirmed the validity of the AoA approach to themes beyond the marine environment. The strong contrasts between the water and green economy themes also underscore the potential for the AoA methodology to be applied more broadly to address environmental priorities such as biodiversity, air pollution, climate change mitigation, sustainable consumption and production and waste.

Looking across scales offers interesting insights

Notwithstanding their strong national ties, water assessments are found at all geographical and institutional levels. In contrast, the green economy, as a theme still under conceptual debate, is mostly on the agenda of international organisations (UNEP, OECD, EU, UNECE, UNESCAP), with international players at the forefront of publishing reports on the topic.

As underlined by the Aarhus Convention, 'state of environment' reports play a key role in the policy process, not only in assessing overall environmental status at national level and communicating this to multiple actors, but also as valuable sources of regular assessments on the status of water and many aspects of the green economy.

Water reporting is carried out by environment ministries, the water department in these ministries, or environment (protection) agencies. In contrast, for the green economy, a wide range of actors are involved, and with it a diversity of institutions. This reflects the breadth of interpretation of the green economy at the national level, and the fact that the concept encompasses multiple sectors. This means that many different and possibly clashing priorities are involved. The multiple actors have different roles: some may be responsible for implementation within the individual sectors and others for the actual production and/or coordination of assessments. Other relevant players are international organisations and the civil society, including NGOs, the private sector, and trade-related stakeholders, as well as research and think-tanks, and multinational organisations.

([60]) See e.g. 'Draft decision approved by the drafting group: World environment situation', UNEP/GC.26/CW/L.4/Add.2, 24 February 2011.

Accessibility of information improving

By making reports available online, accessibility by the general public to assessments is satisfactory, although the production of hardcopies is still significant. With regard to water, several of the environment ministries and their collaborating institutions have websites covering water that provide information on water resources, water pollution and the state of water, usually in the form of downloadable publications and increasingly in the form of access to (aggregated) data and near real-time monitoring. For the green economy, even if the information is available online there are very few, if any, points of convergence (websites or portals) from where all related information can be reached and integrated. A strong contributory factor is the cross-cutting institutional nature of the topic where many bodies, ministries or agencies are responsible for parts of the related knowledge base, something which is reflected in the paucity of integrated green economy assessments.

Multitude of assessments but limited relevance

The EE-AoA has also shown that there is a multitude of assessment documents available for the two priority themes, yet policy relevance and use remains limited with many reports commissioned and produced without a clear policy demand or target focus.

For water-related topics, about 50 to 100 assessment reports are produced annually across Europe at different levels. Despite this number, the assessment of water-related ecosystems is still weak in many countries and vulnerability, ecosystem services and restoration is not much discussed. As the number of issues related to water management, state, trends, pressure and policies grows, so does the amount and type of information that needs to be compiled and aggregated. Additionally, relevant information is being produced at multiple governance levels: sub-national, national, regional and international. This geographical/governance scale level is itself becoming a significant multiplying factor.

For the green economy, this multiplicity of assessment documents is of a very different nature. The information collected for the EE-AoA shows that a multitude of documents exist which address the various individual priority areas under the green economy. These broadly cover the two categories of resource efficiency and aspects of environmental sectoral integration. The many documents available for all these sub-topics under the green economy umbrella, and registered individually by the EE-AoA portal, give the impression that hundreds of reports are actually existing and available on the green economy as such. In fact, all these reports relate to elements or sub-topics of the green economy only. Indeed, with only a few exceptions at the international level, there appears to be no national assessment which brings together in an integrated and coherent fashion all the elements of the green economy, by any definition of that term.

Differing demands hamper integrated use of information and policy influence

For water, many different assessments are produced, often with different purposes and not always using the available information systematically. This can sometimes lead to redundant and wasteful collection exercises and to results which are not easily comparable. Assessments related to the green economy often do not clearly articulate the objectives and scope, or the key questions to be answered and seem to follow rather than inform policymaking.

While for water, there are an increasing number of integrated assessments, this is not the norm. Reporting is mostly done on the separate topics with some cross-references if there are influences, and in many cases the assessments are largely descriptive rather than analytical. Green economy and resource efficiency would offer ideal opportunities for integrated assessment, but this is only starting to emerge.

For the green economy, descriptions focus on the 'state' of the different priority sub-topics, in particular for the more well-established or traditional areas. Drivers, pressures, impacts and responses are discussed less frequently reducing policy influence. State analyses also dominate assessments in the area of water and related ecosystems.

More generally the links between assessments and relevant decision-making are not evident for the green economy; there are also relatively few *ex-post* assessments that evaluate policy or consider how assessments have led to adoption of policies. Water-related assessments are often generally rich in statistical data but, with notable exceptions, many are of limited use in relation to policymaking since policy performance is often not provided, information is not presented in an integrated manner or indicators are not responding to policy questions and are not sensitive enough to drivers and responses.

Several information contrasts are apparent

Approximately 90 per cent of the countries use indicators to describe the environmental status of water. Despite an improved timeliness of relevant water information, with data and information in the water assessments often being only a few years old, some countries have many water indicators based on old data (in some cases over 10 years old). Water-related country profiles compiled at the international level provide often rather outdated information.

Further, information gaps were identified in almost halfof the assessments and in only 20 per cent of the assessments was an information system to support data management, data sharing, and/or data exchange identified. More positively, 70 per cent of the indicators used in the water-related assessments are wholly or partially produced on the basis of standard/agreed methodologies, most of which are agreed at the international level.

For the green economy, a lack of consistency in the basis, format and frequency of data being collected and used to inform assessments is observed; there is an evident gap around indicators for green economy and to some extent also for resource efficiency; additionally, specific information and knowledge gaps exist in a range of areas such as, for example, the understanding of the relationship between ecosystems and economic systems.

There is also a limited use of modelling and scenario tools in the assessments, thereby restricting the forward-looking component of reporting as an important aid to decision-making especially in the face of global systemic challenges, greater uncertainties and increasing risks. That being said, green economy assessments have a relatively higher reliance on forward-looking modelling, probably reflecting its conceptual stage of development.

Water has dedicated legislative frameworks and regulations that do not exist as such for the green economy. Thus, while targets related to water do exist as a consequence of legal obligations, polices and strategies, the green economy has a range of specific targets related to its sub-topics and ranging, for example, from greenhouse gas emissions to energy efficiency in new housing.

Integrated assessment is not a sum of the parts

Taking the long view in the development of assessments, lessons can be learnt from the clear trend observable in water assessments. Early in the policy cycle, water assessments started narrow, addressing a cluster of specific issues of interest to the policymaker. Over time, water assessments have widened their scope as scientific understanding, data availability and policy interest have interacted. This more integrated approach to water assessments, though still limited generally, has allowed the underlying complexity of water issues to be more fully evaluated helping to frame, and not follow, the policy debate. Furthermore, this has supported strengthened policy insights into the interconnectedness between policy areas (water, industry, energy, agriculture, health, ecosystems, etc.) and helped contribute to the exploration and evaluation of policy trade-offs and win-win approaches.

In contrast, green economy is early in the policy cycle, but is already broad conceptually. The difficulty in assessing the green economy is precisely due to its breadth and complexity, encouraged by the multiple definitions of the concept which exist. This situation could lead to an opposite trajectory of development to that of water, where the concept could be simplified and broken down into its component parts to allow the policy process to tackle it practically and for the concept to be more easily assessed. However, as assessment of the green economy is not the same as a sum of the assessments of its component parts, such a development path for assessments needs to be guarded against.

Making SEIS work for assessments

Overall, the EE-AoA demonstrates the need for a system of assessments which is closely interlinked with and served by a system of shared environmental information for the whole of Europe (SEIS). There are five dimensions of SEIS development that would support the improved efficiency and effectiveness of environmental assessments: the generation of compatible content across themes and geographical scales; the diffusion of comparable methods for measuring progress towards a green economy and its many natural resource components; the deployment of various technologies as the information infrastructure to underpin information gathering, use and assessment processes; the organisation of and easy access to relevant knowledge, including assessments, between institutions and the public (implementation of the Aarhus Convention); and an improved coherence in the communication of assessment findings and related knowledge.

1. Develop compatible content across scales and themes. Assessments should not exist in isolation but rather be connected as appropriate and feasible through common approaches using appropriate types of information, agreed analytical approaches and indicators as needed. This landscape of interconnected assessments is described schematically in Figure 4.1. This captures the way that information from assessments at different levels should interact to maximise coherency, transparency and traceability of outcomes. This raises many questions, among them: Should we develop common norms and standards for data collection and transfer as well as analytical methods and indicators to facilitate improved compatibility? Some data flows (e.g. emission inventories) and indicators already exist globally, some are coming on stream soon (e.g. environmental accounting methods), while some need to be developed from scratch (e.g. methods for measuring the effectiveness of responses in making progress towards green economy objectives).

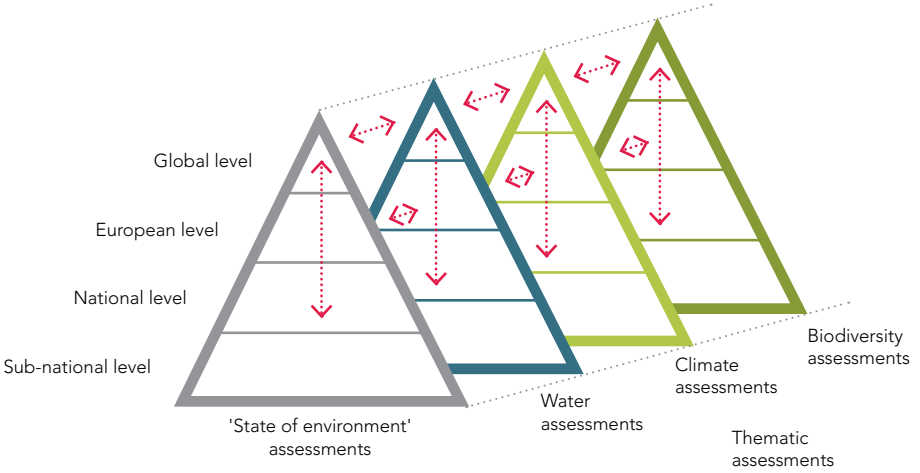


Figure 4.1 The assessments landscape (Source: EEA).

2. Use accounting methods and indicators to support water and green economy objectives. GDP is the aggregate measure of progress with the current economic model and is derived from the System of National Accounts established by the UN in 1952. Sixty years on in 2012 the UN Statistical Commission (UNSC) will be invited to consider adopting global approaches for environmental accounting that address key aspects of resource efficiency. The results of UNSC deliberations in February 2012 will be considered as part of the Rio+20 Conference in June 2012. The guidelines will address physical and monetary accounting methods including links back to the System of National Accounts, thereby opening up the possibilities to go beyond GDP by internalising the environmental externalities that result from impacts on ecosystems' and people's health. This will in turn provide the opportunity for all countries to develop credible metrics for measuring progress towards a green economy for the next 60 years in the same way that the SNA have enabled for the current economy over the past 60 years.

3. Deploy an information infrastructure that is fit for purpose. The transition to a green economy is complex with many information strands, including huge data demands, accounts, indicators, lay and local knowledge, uncertainties etc. There are therefore many dimensions to a supporting information infrastructure ranging from sensor technologies, to enable real-time data collection and transfer, cloud computing, to enable large information sets to be managed efficiently, web platforms, that facilitate information provision from a wide range of actors, web services, that enable information to be accessible continuously to a wide range of users, web tools, that enable analytical methods such as accounts to be made available and used consistently by many actors, and knowledge clearing houses, that ensure information is collated and organised efficiently (Examples abound of established practices which could be applied in this context).

4. Facilitate networks and organisation for sharing knowledge: People networks are the backbone of a successful shared environmental information system. The pan-European region has several examples of established practice (e.g. the UNECE Working Group on environmental Monitoring and Assessment, WGEMA ([61]), and the Pan-European Biological and Landscape Diversity Strategy, PEBLDS ([62]) alongside the mandated Eionet in EEA member countries ([63]). For the most part, these networks support specific challenges with (to EEA's knowledge) no examples across pan-Europe of international networks established to deal with systemic challenges. Seeds exist in many areas (e.g. UNEP's International Resource Panel ([64]), while formal inter-governmental recognition has been confirmed for IPBES (International Platform of Biodiversity and Ecosystem Services ([65]). Assessments on such systemic challenges are a basic requirement for the policy process and need to be developed.

5. Improved coherence and use of environmental assessments. Implementing consistent assessment frameworks such as DPSIR across environmental assessments, strengthening the science-policy interface in the design, preparation and communication of assessments, reinforcing the forward-looking component of reporting and policy support, and clearer communication of assessment findings are among the main elements in play. By improving use of existing assessment results, frameworks and approaches, SEIS can help develop coherence between assessments and support how they can build upon each other. Furthermore, SEIS can improve the use and uptake of assessment results in the policy process by strengthening the web of relationships among stakeholders so that the results of the assessments are more salient, credible and legitimate.

([61]) WGEMA: Working Group on Environmental Monitoring and Assessment under the United Nations Economic Commission for Europe, http://www.unece.org/env/europe/monitoring.
([62]) PEBLDS: the Pan-European Biological and Landscape Diversity Strategy, http://www.peblds.org.
([63]) Eionet: The European Environment Information and Observation Network, http://www.eionet.europa.eu.
([64]) International Resource Panel: http://www.unep.org/resourcepanel.
([65]) IPBES: http://ipbes.net.

Europe's environment
An Assessment of Assessments

5 Recommendations

5 Recommendations

Based on a cross-cutting overview of the results of EE-AoA, EEA in consultation with the UNECE Committee on Environmental Policy has identified 14 key recommendations for improving how environmental assessments at the country, sub-regional, pan-European and global levels are organised.

The recommendations provide framework within which the pan-European environment can be kept under review in a more efficient and effective manner in support of relevant policy processes.

The recommendations are grouped into three blocks covering: I) Enhancing the knowledge base; II) Improving assessment tools and processes to underpin the knowledge base; and III) Europe's participation in global environmental knowledge and assessments.

I. Enhancing the knowledge base

Recommendation 1:
Improve the linkage and use of assessments in the policy process

Future assessments should be explicitly commissioned by policymakers, specifying the policy needs at different stages of the policy cycle. By translating these policy needs into relevant policy objectives, and relevant indicators, assessments can then be targeted to provide more pertinent input to the policy debate. For water and the green economy, more investment in policy performance and effectiveness indicators and analysis is needed. The exchange of established practice examples to demonstrate the cost-efficient use and benefits of different approaches for tackling key issues should be promoted.

Recommendation 2:
Develop a regular process of environmental assessment and a shared environmental information system across the pan-European region

Overall, the EE-AoA demonstrates the need for a system of assessments designed to address multiple needs and policy processes from national to pan-European levels,

as well as globally, and one which is closely interlinked with and served by a shared environmental information system for the whole of Europe.

Consequently, a Regular Process of environmental assessments should be established with countries, organisations and other stakeholders, to keep the pan-European environment under review, and promote the development of a shared environmental information system across the pan-European region. This should be supported by the necessary capacity-building and by further assessment of assessments as required in different fields.

Recommendation 3:
Commission new assessments as part of a new 'Regular Process'

In future, the commissioning of new environmental assessments should address multiple policy needs, in order to improve the balance between their efficiency of production and the effectiveness of their use. Thus, the Ministerial Conference in Astana is invited to consider putting in place a process of ongoing assessments that serve multiple purposes, underpinned by SEIS principles and practices, rather than to call for a new pan-European assessment report for the next 'Environment for Europe' conference.

Such a 'Regular Process' should be based on the development of a suite of coordinated products from sub-regional to pan-European levels, with a synchronicity and timing suitable to maximising their use in multiple policy processes. At country level a basic requirement of the Regular Process will be national 'state of the environment' reports in accordance with the Aarhus Convention.

Recommendation 4:
Promote national 'state of the environment' reports

SoE reports were shown by the EE-AoA to promote an integrated and comprehensive overview of environmental issues and sectors. As such, SoEs play a vital role in the policy process, by delivering a regular assessment of the overall environmental status at the national level as underlined by the Aarhus Convention, including the status of water and many aspects of the green economy.

To these ends, the further development by countries of regular with SoE reports with components covering the sub-topics of the green economy and of water and related ecosystems should be promoted. This should become a basic requirement for any Regular Process for keeping Europe's environment under continuous review, supported with relevant capacity building.

Recommendation 5:
Promote national/regional level green economy assessments

Water assessments are found at many geographical and institutional levels, reflecting the relatively well-balanced attention to policy implementation and developments in this area. In contrast, the green economy as a theme is still under conceptual debate and is mostly on the agenda of international organisations (the EU, OECD, UNECE, UNESCAP, UNEP, etc.), with international players at the forefront of publishing reports on the topic.

Consequently, to even this imbalance and support green economy decision-making down to the country level, there is a need to promote national-level integrated green economy assessments. These should combine international approaches to indicators for consistency and comparability, while at the same time recognising diversity in the focus of sectoral interests within and between countries. Such assessments should accommodate policy demands that focus on managing shared natural resources (international seas, rivers, mountain ranges, etc.).

II. Improving assessment tools and processes to underpin the knowledge base

Recommendation 6:
Strengthen integrated assessment

To support the policy process across the policy cycle, assessments of broad systemic issues, such as water and ecosystems and the green economy, require integrated assessments which cover the whole DPSIR framework and are more analytical in nature. To complement the many descriptive reports available, and in line with the tendency of water assessments over the past years to become more integrated, the development of integrated green economy assessments should be promoted as opposed to assessments of component parts of the green economy. A common conceptual understanding of the green economy is needed to support this (see Recommendation 8). Priority should be given to capacity building in the field of integrated assessment itself, with the aim of mainstreaming these practices into regular assessments and SoE reporting.

Recommendation 7:
Promote and strengthen forward-looking activities

There is inadequate use of scenario and modelling tools in the assessments, limiting the forward-looking component of reporting and policy support. This needs to be improved since forward-looking information is vital for dealing with the challenges of

global developments, multiple systemic challenges, crisis prevention, and robust and flexible environmental management responses to uncertainties and risks. A spectrum of possible tools and outputs is available ranging from the use of driving forces and megatrends and quantitative modelling to qualitative scenario building.

Work is required in all the following areas: capacity building, exchange of information and practices, training in the development and use of forward-looking techniques and understanding of their added-value for policymakers. The development of forward-looking components of SEIS should be a part of this to maximise the benefits and use of forward-looking components in environmental assessments, including regular 'state of environment' reports.

Recommendation 8:
Improve understanding of the underlying concepts

For consistent assessments across scales to function effectively, a clear understanding is needed of the policy objectives as well as and their translation into common indicators that allow assessment practitioners to operate coherently though not in a straitjacket.

For the green economy such agreed objectives and common indicators do not yet exist. There is a need to develop a common operational understanding of the concept of green economy and its critical elements. Based on this, key policy objectives should be identified from the different stakeholders and then translated into indicators to underpin the development of more consistent and relevant green economy assessments. A tool-kit and guidelines for capacity building and implementation should be developed.

Compared with green economy, water is a 'traditional' sector of environmental concern and management whose components are rather clearly defined and mostly agreed upon, often within well-established regulatory frameworks. For 'water' and 'water-related ecosystems', a clear categorisation of the scope of issues to be dealt with in the assessment process is needed because of the relatively new and complex ecosystem perspective. Future assessments could also usefully include assessing the contribution of water and related ecosystems to the green economy and vice-versa.

Recommendation 9:
Clarify roles of different organisations in green economy assessments

For the main part, water reporting is carried out by a relatively limited number of institutions including hydrological services, water, agriculture and environment ministries and statistical agencies. In contrast, a wide range of actors are involved in

reporting on the green economy and with it a diversity of institutions. For example, environment, economic, finance, energy, industry and trade ministries all have a legitimate interest in such assessments.

This reflects the breadth of interpretation of the green economy at the national and international levels, and the fact that the concept encompasses multiple sectors. Many different and possibly clashing priorities are involved. The multiple actors have different roles: some may be responsible for implementation within the individual sectors and others for the actual production and/or coordination of assessments. Other relevant players are international organisations and civil society, including non-governmental organisations (NGOs), the private sector, and trade-related stakeholders, as well as research and think-tanks, and international organisations.

Consequently, the leadership roles and responsibilities at national and international levels for carrying out green economy assessments should be clarified with inter-institutional agreements to support their implementation.

Recommendation 10:
Close gaps in knowledge, reduce duplication of effort and increase the use of the rich diversity of environmental assessments in Europe

While there is a quantitative richness of reports, there remain gaps and duplications. Given the number of assessments being produced in the fields of water and related ecosystems and resource efficiency and the green economy, and being mindful of the resources being invested by organisations, countries, scientists and experts, it is important that requests for new assessments take into consideration existing and other relevant assessments. Consequently, those involved in these assessments should actively seek to coordinate, share and link their information and results with others.

The interconnectedness of assessments at different geographical levels as well as between themes needs to be improved, and the responsibilities of data and information providers better defined. Common indicators offer appropriate 'scaffolding' for achieving these goals.

The overarching objective of this recommendation is to improve the quality and consistency of results, to close gaps in knowledge, and to increase the multiple uses of assessments and of the underpinning information. To achieve this, there is a need to identify and map the demand for new assessments in the fields of water and the green economy in order to streamline the policy process and agree common indicators to support strategic planning.

Recommendation 11:
Address information shortcomings

There are some significant gaps in information concerning water and related ecosystems and the green economy such as defining and measuring natural capital and ecosystem services, resource efficiency, the economics of resources, including water pricing, the relationship between ecosystems, economic systems and social cohesion and, policy performance. Since the green economy is viewed differently by countries depending on specific political priorities, there are variations in information, needs and shortcomings, on for example economic sectors and themes e.g. mobility/access and social well-being.

The development of common indicators which are harmonised at a minimum across the pan-European region and which address the key policy objectives in the relevant fields, can help address gaps as well as prioritise the underpinning priority statistical information and data flows to support these indicators and the related institutional responsibilities. Moreover, there is a need to promote regular updating to improve timeliness of data flows and automate this where possible, identify common needs between geographical levels, and devise ways to interconnect assessment needs at different levels through common indicators.

Recommendation 12:
Improve the accessibility of environmental assessments and related data and information

By making reports available online, accessibility by the general public to assessments is currently satisfactory, although the production of paper only reports is still significant. With regard to water, environment ministries and other public authorities have websites that provide information on water resources, water pollution and the state of water, usually in the form of downloadable publications and increasingly in the form of access to (aggregated) data and near real-time monitoring information. For the green economy, even if the information is available online, there are very few, if any, points of convergence (websites or portals) where all related information can be reached and integrated.

Consequently, online publication of assessments and their underlying information and data should be promoted. Inter-institutional agreements should also be developed to share and connect relevant data, information and assessments to facilitate the development of integrated green economy assessments and to allow more timely access. Where available, the link with relevant near real-time information should be developed.

Recommendation 13:
Apply the Europe's environment — Assessment of Assessments findings to other environmental themes and issues

The water and green economy priorities covered by the EE-AoA do not cover all environmental issues. However the breadth of their scope and preliminary analysis of the virtual library lead to the conclusion that the often crowded and uneven landscape of disconnected environmental assessments observed is a common problem across all issues. Furthermore, the characteristics of the problems faced are not specific to the topics themselves but to the underlying institutional arrangements and approaches in countries and organisations across the reporting chain. There is therefore a significant opportunity for improving knowledge support to the policy process across the environmental domain, since improvements in one area, such as water, have the potential to spill over and affect others.

III. Europe's participation in global environmental knowledge and assessments

Recommendation 14:
Transfer findings to other areas, regions and globally through outreach and communication

The current diagnosis resonates with environmental assessment challenges in other geographical regions. Also globally, the results have a strong relevance to the international environmental governance debate coming up at Rio 2012 and as already discussed at the 2011 UNEP Governing Council on the world environment situation and on UNEP Live.

Consequently, there is a need to promote the translation and interpretation of these results into other geographical regions, and also globally. Targeting UNEP and Rio 2012 discussions on this diagnosis appear to be the most promising short-term opportunities.

Source: © European Space Agency

Glossary

ADB	Asian Development Bank
AHSG	Ad hoc steering group
AoA	Assessment of Assessments
AR4	Assessment Report 4
CAREC	Regional Environmental Centre for Central Asia
CBD	Convention on Biological Diversity
CEP	Committee on Environmental Policy
CIA	Central Intelligence Agency
CSR	Corporate Social Responsibility
DEWA	Division of Early Warning and Assessment
DG	Directorate General
DPSIR	Driving forces-Pressures-State-Impacts-Responses
EBRD	European Bank for Reconstruction and Development
EC	European Commission
ECLAC	Economic Commission for Latin America and the Caribbean
EEA	European Environment Agency
EE-AoA	Europe's environment: An Assessment of Assessments
EEB	European Environmental Bureau
EECCA	Eastern Europe, the Caucasus and Central Asia
EfE process	Environment for Europe process
EFTA	European Free Trade Association
EIA	Environmental impact assessment
Eionet	European Information and Observation Network
ENPI	European Neighbourhood Partnership Instrument of the EU
EPR	Environment performance review
ETC	European Topic Centre
EU	European Union

EUREAU	European Federation of National Associations of Water and Wastewater Services
Eurostat	Statistical Office of the European Communities
EUWI	European Water Initiative
FAO	Food and Agriculture Organization of the United Nations
FAO-Aquastat	FAO's global information system on water and agriculture
GDP	Gross domestic product
GEA	Greening the Economy with Agriculture
GEF	Global Environment Facility
GEI	Green Economy Initiative
GEO	Global Environment Outlook
GGGI	Global Green Growth Institute
GHG	Greenhouse gas
GIS	Geographic information system
GLAAS	Global Annual Assessment of Sanitation and Drinking-Water
GMES	Global Monitoring for Environment and Security
GRAMED	Global and Regional Assessments of the Marine Environment Database
GRDC	Global Runoff Data Centre
GRID	Global Resource Information Database
GWP	Global Water Partnership
HELCOM	Helsinki Commission — Baltic Marine Environment Protection Commission
HiTs	Health system profiles
IBNET	International Benchmarking Network for Water and Sanitation Utilities
ICSD	Interstate Commission for Sustainable Development of Central Asia
ICT	Information and Communication Technologies
ICWC	Interstate Commission for Water Coordination of Central Asia
ICZM	Integrated Coastal Zone Management
IHP	International Hydrological Programme
IISD	International Institute for Sustainable Development
ILO	International Labour Organisation
IMF	International Monetary Fund
INSPIRE	Infrastructure for Spatial Information in Europe
IOC-UNESCO	Intergovernmental Oceanographic Commission of UNESCO

IPBES	International Platform of Biodiversity and Ecosystem Services
IPCC	Intergovernmental Panel on Climate Change
IRWS	International Recommendation for Water Statistics
IT	Information technology
IWRM	Integrated water resource management
JMP	WHO/UNICEF Joint Monitoring Programme
JRC	Joint Research Centre
KEO	Carpathians Environment Outlook
LCA	Life-cycle analysis
MDG	Millennium Development Goal
MDIAK	Reporting chain: Monitoring — Data — Indicators — Assessments — Knowledge
NESDCA	Network of Experts for Sustainable Development of Central Asia
NFP	National focal point
NGO	Non-governmental organisation
OAS	Organisation of American States
OECD	Organisation for Economic Co-operation and Development
OSCE	Organisation for Security and Co-operation in Europe
PEBLDS	Pan-European Biological and Landscape Diversity Strategy
PPP	public private partnership
RBO	River Basin Organisation
REC	Regional Environmental Centre
Reportnet	Eionet's infrastructure for supporting and improving data and information flows
Rio 2012	Earth Summit 2012
SCL	Saliency — Credibility — Legitimacy
SCP	Sustainable consumption and production
SEBI	Streamlining European 2010 Biodiversity Indicators
SEEAW	System of Environmental-Economic Accounting for Water
SEIS	Shared Environmental Information System
SENSE	Shared European National State of the Environment — the EEA/Eionet project for SOER 2010
SIA	Strategic impact assessment
SIWI	Stockholm International Water Institute
SNA	System of national accounts

SoE	State of the environment
SOER	Environment state and outlook report
SOER 2010	*European environment — state and outlook 2010* report
TEEB	The Economics of Ecosystems and Biodiversity
UK	United Kingdom
UN	United Nations
UNCSD	United Nation Commission on Sustainable Development
UNDP	United Nations Development Programme
UNECE	United Nations Economic Commission for Europe
UNECE/WGEMA	UNECE's Working Group on Environmental Monitoring and Assessment
UNEP	United Nations Environment Programme
UNEP-GEMS	United Nations Environment Programme Global Environmental Monitoring System
UNEP-WCMC	UNEP World Conversation Monitoring Centre
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nation Framework Convention on Climate Change
UNGA	United Nations General Assembly
UNICEF	United Nations Children's Fund
UNSC	United Nation Statistical Commission
UNSD	United Nations Statistical Division
USA	United States of America
USAID	United States Agency for International Development
WBCSD	World Business Council for Sustainable Development
WFD	Water Framework Directive
WHO	World Health Organisation
WISE	Water Information System for Europe
WMO	World Meteorological Organisation
WRI	World Resources Institute
WWAP	World Water Assessment Programme
WWC	World Water Council
WWDR	World Water Development Report
WWF	World Wide Fund for Nature

Annexes

Chapter 1

Annex 1.1 Comparing the main elements of the EE-AoA with the Marine AoA

Building element	Building element	EE-AoA
Policy driven process	UNGA's decisions in Resolution 60/30	Following the 2007 Belgrade environment ministers' conference agreed by the UNECE Committee on Environmental Policy (Oct 2010) and endorsed by the UNECE Executive Committee in Feb 2010 (see Chapter 1, Section 1.1).
Reference frameworks	Start-up phase towards a Regular Process for global reporting and assessment of the state of the marine environment	Part of the development of a sustainable Regular Assessment Process of Europe's environment following the reform of the UNECE Environment for Europe (EfE) process and coherently with the establishment of the EU/EEA Shared Environmental Information System (SEIS) and ENPI-SEIS project.
Ownership	Expert-based process. A Group of Expert was established by the Ad Hoc Steering Group (AHSG) to undertake the actual work of the AoA with the support of UNEP and the Intergovernmental Oceanographic Commission (IOC) of UNESCO. The Group of Expert included 17 scientists; their work was complemented by other contributing experts as needed.	Participatory process overseen by the UNECE Steering Group on Environmental Assessments specifically set up for the EE-AoA and co-chaired by the EEA and the Kazakh government. Within the guidelines and criteria laid down, the countries had the freedom to decide which information to be input to the process and on the critical appraisal of such information. The writing of the sub-regional modules contributing to the EE-AoA was placed with the relevant Regional Environmental Centers.
Scale	Global, with 21 AoA 'regions' (seas or oceans) outlined.	Pan-European, with the following sub-regions (EEA member countries, Central Asia, Caucasus, Eastern Europe, Russian Federation, and Western Balkans).

Building element	Building element	EE-AoA
Content	Mono-thematic (marine environment, including socio-economic aspects).	Multi-thematic (water resources and water resource management for 'water and related ecosystems'; green economy and resource efficiency for 'green economy') and multiple topics within each theme.
Structure	One module	One pan-European module and four sub-regional modules (Central Asia, Caucasus, Eastern Europe, and Russian Federation) for each of the themes, for a total of ten modules, two at pan-European level (one for water and one for green economy) and eight at regional level (four for water and four for green economy).
Guidance	The mandate of the AoA was elaborated by the AHSG at its first meeting in 2006. In brief, the mandate encompasses: (i) assembling information about relevant marine assessments; (ii) undertaking a critical appraisal of such assessments; (iii) identifying a framework and options to build the Regular Process.	The process was developed along guidelines elaborated by the EEA and under the guidance of the Steering Group defining: (i) the conceptual framework of the EE-AoA, including guiding principles; (ii) the main tools for implementation (glossary, guidelines for assessments' selection and prioritisation, templates for assessments' screening, and reporting formats). Tools were adjusted and enriched during implementation.
Monitoring and coordination	The AHSG was established to oversee the implementation of the AoA. Coordination was provided by UNEP and IOC-UNESCO.	The process was guided by the UNECE Steering Group on Environmental Assessment.
IT infrastructure	The GRAMED (Global and Regional Assessments of the Marine Environment Database), an online fully searchable tool, was developed by UNEP-WCMC as a resource to support the work of the Group of Experts.	The EE-AoA knowledge base portal was established. The portal collates information from existing assessments across the pan-European region, allows online direct contribution from individual countries to the process, and provides all necessary tools for implementation, including analytical instruments.
Networking	Through the several UN agencies involved.	Through existing networks (National Focal Points from EEA member and cooperating countries and UNECE/WGEMA Contact Points from Eastern Europe, Caucasus, Russian Federation and Central Asia).
Tools for implementation	Use of terms, individual assessment template, regional summary template.	Glossary, virtual library and assessment atlas, country fiches, prioritisation criteria, review template

Chapter 2

Annex 2.1 Overview of the different organisations responsible for environmental assessments ([66])

Country	Organisations producing SoE assessments	Statistical yearbook	Water reporting
Albania	Ministry of Environment, Forests and Water Administration	Statistical Service	Ministry of Environment, Forests and Water Administration
Armenia	Ministry of Nature Protection	National Statistical Service	Ministry of Nature Protection
Austria	Federal Environment Agency	Ministry of Agriculture, Forestry, Environment and Water Management, Statistics Austria	Ministry of Agriculture, Forestry, Environment and Water Management, Federal Environment Agency
Azerbaijan	Ministry of Ecology and Natural Resources	State Committee of Statistics	Ministry of Ecology and Natural Resources
Belarus	Ministry of Natural Resources and Environmental Protection	National Statistical Committee	Ministry of Natural Resources and Environmental Protection
Belgium	Flanders: Flemish Environment Agency (VMM); Walloon: Directorate General for Agriculture, Natural Resources and Environment (DGARNE)	Statistics Belgium, Walloon Institute for Evaluation of Foresight and Statistics (IWEPS)	Flemish Environment Agency, Directorate General for Agriculture, Natural Resources and Environment
Bosnia and Herzegovina	Federal Ministry of Environment and Tourism	Federal Office of Statistics	Federal Hydrometeoro-logical Institute
Bulgaria	Executive Environment Agency	National Statistical Institute	Ministry of Environment and Water
Croatia	Croatian Environment Agency	Croatian Bureau of Statistics	Hrvatske vode
Cyprus	Ministry of Agriculture, Natural Resources and Environment	Statistical Service	Water Development Department
Czech Republic	Czech Environmental Information Agency	Czech Statistical Office	Ministry of the Environment — Department of Water Protection
Denmark	National Environmental Research Institute	Statistics Denmark	Ministry of the Environment, National Environmental Research Institute, Geological survey of Denmark and Greenland
Estonia	Estonian Environment Information Centre	Statistics Estonia	Ministry of the Environment
Finland	Finnish Environment Institute	Environmental Administration	Environmental Administration
The former Yugoslav Republic of Macedonia	Ministry of Environment and Physical Planning	State Statistical Office	Ministry of Environment and Physical Planning
France	Ministry for Ecology, Sustainable Development, Transportation and Housing	Service of Observation and Statistics (SOeS)	EauFrance
Georgia	Ministry of Environment Protection and Natural Resources	National Statistics Office	Ministry of Environment Protection and Natural Resources
Germany	Federal Environment Agency (with important input from the Federal states)	Federal Statistical Office (with important input from the Federal states)	Federal Environment Agency, Federal Environment Ministry (with important input from the Federal states)
Greece	Ministry of Environment, Physical Planning and Public Works	National Statistical Service of Greece	National Technical University of Athens
Hungary	Ministry of Rural Development	Hungarian Central Statistical Office	Ministry of Rural Development, Hungarian Central Directorate for Environment and Water, VITUKI
Iceland	Ministry for the Environment	Statistics Iceland	Environment Agency
Ireland	Environmental Protection Agency	Central Statistics Office	Environmental Protection Agency

([66]) In many countries, in addition to the organisations mentioned in this annex, the responsible ministries involve their statistical office, environment agency, water resources institute and/or hydrological service in developing the assessments.

Country	Organisations producing SoE assessments	Statistical yearbook	Water reporting
Italy	Ministry for the Environment	Italian National Institute of Statistics	Italian National Institute of Statistics
Kazakhstan	Ministry of Environmental Protection	Agency for Statistics	Ministry of Environmental Protection
Kosovo under UNSCR 1244/1999	Environmental Protection Agency		Water and waste regulatory office
Kyrgyzstan	State Agency for Environmental Protection and Forestry	National Statistical Committee	State Committee on Water Resources and Melioration
Latvia	Latvian Environment, Geology and Meteorology Centre	Central Statistical Bureau of Latvia	Latvian Environment, Geology and Meteorology Centre
Liechtenstein	Liechtenstein National Administration	Office of Statistics	Environmental Protection Agency
Lithuania	Environmental Protection Agency	Statistics Lithuania	Environmental Protection Agency
Luxembourg	Ministry for the Environment	National Institute of Statistics and Economic Studies of the Grand Duchy of Luxembourg	Administration of water management
Malta	Malta Environment and Planning Authority	National Statistics Office	Malta Environment and Planning Authority
Moldova	Ministry for the Environment	National Bureau of Statistics	Ministry for the Environment
Montenegro	Environmental Protection Agency	Statistical Office	Environmental Protection Agency
Netherlands	Netherlands Environmental Assessment Agency	Statistics Netherlands	Netherlands Environmental Assessment Agency
Norway	State of the Environment Norway	Statistics Norway	Ministry of Environment
Poland	Chief Inspectorate for Environmental Protection	Central Statistical Office	Ministry of the Environment, National Water Management Authority, Chief Inspectorate for Environmental Protection
Portugal	Ministry of Environment and Spatial Planning	Statistics Portugal	Water Institute

Country	Organisations producing SoE assessments	Statistical yearbook	Water reporting
Romania	Ministry of Environment and Forests	National Statistical Institute	Ministry of environment/water department
Russian Federation	Ministry of Natural Resources and Environment	Federal State Statistics Service	Ministry of Natural Resources and Environment
Serbia	Ministry for the Protection of the Natural Resources and Environment	Statistical Office	Ministry of Agriculture, Forestry and Water Management
Slovak Republic	Ministry of the Environment, Slovak Environmental Agency	Statistical Office of the Slovak Republic	Ministry of the Environment, Water Research Institute, Slovak Hydrometeorological Institute, Slovak Environmental Agency, Public Health Authority of the Slovak Republic
Slovenia	Ministry of the Environment and Spatial Planning	Statistical Office of the Republic of Slovenia	Slovenian Environment Agency
Spain	Ministry of Environment and Rural and Marine Affairs	National Statistics Institute	Ministry of Environment and Rural and Marine Affairs
Sweden	Swedish Environmental Protection Agency	Statistics Sweden	Geological Survey of Sweden
Switzerland	Federal Office for the Environment	Federal Statistical Office	Federal Office for the Environment
Tajikistan	Committee for Environmental protection	Statistical Agency	State Hydrometeorology Agency
Turkey	Ministry of Environment and Urbanisation	Turkish Statistical Institute	Ministry of Forestry and Water Works
Turkmenistan	Ministry for the Protection of Nature	State Committee of Turkmenistan on Statistics	Ministry for the Protection of Nature
Ukraine	Ministry of Environment and Natural Resources of Ukraine	State Statistics Committee	Ministry of Environment and Natural Resources of Ukraine
United Kingdom	Department for Environment, Food and Rural Affairs	Office for National Statistics	Department for Environment, Food and Rural Affairs
Uzbekistan	State Committee for Nature Protection	State Statistics Committee	State Committee for Nature Protection

Annex 2.2 Overview of international organisations involved in environmental assessments

Country	FAO Water Management	FAO-Aquastat	UNCSD freshwater profile	Water Wiki	GEMS-Water
Albania	x			x	
Armenia	x	x		x	
Austria		x	x	x	2000
Azerbaijan	x	x		x	
Belarus	x	x		x	
Belgium		x	x	x	2004
Bosnia and Herzegovina	x			x	
Bulgaria	x	x	x	x	
Croatia	x			x	
Cyprus	x	x		x	
Czech Republic	x	x	x	x	
Denmark	x	x		x	2001
Estonia		x		x	
Finland		x	x	x	2002
The former Yugoslav Republic of Macedonia			x	x	
France	x	x		x	2002
Georgia	x	x		x	
Germany	x			x	2002
Greece		x	x	x	2000
Hungary		x	x	x	2000
Iceland	x			x	
Ireland	x	x		x	2001
Italy	x	x		x	2000
Kazakhstan	x	x		x	
Kosovo under UNSCR 1244/1999				x	
Kyrgyzstan	x	x		x	
Latvia				x	
Liechtenstein		x		x	
Lithuania		x	x	x	2002
Luxembourg				x	2000
Malta	x			x	
Moldova				x	
Montenegro	x		x	x	
Netherlands	x	x		x	1996
Norway	x		x	x	1996
Poland		x		x	2002
Portugal		x		x	2001
Romania	x	x	x	x	
Russian Federation	x	x	x		2004
Serbia	x		x	x	
Slovak Republic	x		x	x	2004
Slovenia	x		x	x	
Spain		x		x	2001
Sweden		x		x	2001
Switzerland	x			x	2003
Tajikistan	x	x		x	
Turkey		x	x	x	2003
Turkmenistan	x	x	x	x	
Ukraine	x	x	x	x	
United Kingdom		x	x	x	2003
Uzbekistan	x	x	x	x	

Note: FAO Water Management country profiles, see the individual countries. Available at http://www.fao.org/countryprofiles/index.asp?lang=en&iso3=ALB&paia=4.
FAO-Aquastat available at http://www.fao.org/nr/water/aquastat/main/index.stm.
UNCSD freshwater profile (freshwater and sanitation) available at http://www.un.org/esa/dsd/dsd_aofw_ni/ni_indecsdthemprof.shtml#water.
Water Wiki http://waterwiki.net/index.php/Countries#Europe_and_CIS.
GEMS/Water status of participating countries http://www.gemswater.org/global_network/statistical_summary.html.

Annex 2.3 Overview of years in which environmental performance reviews were conducted by OECD and UNECE

Country	OECD			UNECE	
	Latest EPR	Previous EPR	Earlier EPR	Latest EPR	Previous EPR
Albania					2002
Armenia					2000
Austria	2003	1995			
Azerbaijan				2010	2003
Belarus	1997			2005	
Belgium	2007	1998			
Bosnia and Herzegovina				2010	2004
Bulgaria	1996			2000	
Croatia					1999
Cyprus					
Czech Republic	2005	1999			
Denmark	2007	1999			
Estonia				2001	1996
Finland	2009	1997			
The former Yugoslav Republic of Macedonia				2011	2002
France	2005	1997			
Georgia				2010	2003
Germany	2001	1993			
Greece	2009	2000			
Hungary	2008	2000			
Iceland	2001	1993			
Ireland	2009	2000			
Italy	2002	1994			
Kazakhstan				2008	2000
Kosovo under UNSCR 1244/1999					
Kyrgyzstan				2009	2000
Latvia				1998	
Liechtenstein					
Lithuania				1998	
Luxembourg	2009	2000			
Malta					
Moldova				2005	1998
Montenegro				2007	
Netherlands	2003	1995			
Norway	2011	2001	1993		
Poland	2003	1995			
Portugal	2011	2001	1993		
Romania				2001	
Russian Federation	1999				
Serbia				2007	
Slovak Republic	2011	2002			
Slovenia	2011			1997	
Spain	2004	1997			
Sweden	2004	1996			
Switzerland	2007	1998			
Tajikistan				2011	2004
Turkey	2008	1999			
Turkmenistan				2011	
Ukraine				2007	1999
United Kingdom	2002	1994			
Uzbekistan				2009	2001

Chapter 3

Annex 3.1 Green economy — What does it mean?

Green economy (Priority area)	
Renewable energy	**Explanation** Energy which is naturally replenished and comes from natural resources such as sunlight, wind, freshwater, tides or geothermal heat. **Relevance to green economy** Different parts of the world have a competitive advantage in different renewable energy technologies, depending on geography, climate, etc. In addition, many governments offer subsidies or incentives for renewable energy generation, and there are national/regional renewable energy/greenhouse gas reduction targets that drive investment in this area. **Examples of assessments** • The European Renewable Energy Council reports renewable energy generation and other statistics for EU-27 countries (EREC, 2011). • In Germany, electricity from renewable sources is supported through a feed-in tariff and electricity from renewable sources is given priority connection to the grid. The Renewable Energy Sources Act aims to increase the proportion of renewable energy sources in total energy supply to at least 30 per cent by 2020 and to continuously increase this proportion thereafter (BMU, 2010). • The Czech government's most recent national report on electricity and gas industries covers progress in 2009 (The Czech Republic's National Report on the Electricity and Gas Industries for 2009, 2010). • The UK renewable energy strategy sets out how the sector's role in meeting ambitious greenhouse gas reduction targets (DECC, 2011).
Energy efficiency	**Explanation** Changes in behaviour and technology that lead to reductions in amount of energy required to provide products and services. **Relevance to green economy** As with other aspects of resource efficiency, doing 'more with less' reduces environmental impacts, enhances competitiveness and provides opportunities for growth. Initiatives are often driven by carbon reduction targets or concerns over energy security. **Examples of assessments** • The European Union has a target to reduce annual energy consumption by 20 per cent by 2020 (EC, 2011). • In Georgia, a review of energy efficiency potential and policy options has highlighted a range of drivers, including potential EU membership and positive impacts on economic and social development (USAID, Georgia, 2008). • Energy Efficiency in Russia: Untapped Reserve (World Bank/Russia, 2008). • Energy efficiency in Poland in years 1998-2008 (Central Statistical Office, Warsaw, 2010).

Mobility	**Explanation** The environmental impacts of transport, including air quality, emissions, noise. **Relevance to green economy** Essentially related to the reduction in pollution of different media, which has beneficial impacts on health, welfare and productivity. **Examples of assessments** • 51 out of the 56 UNECE member countries are Parties to the 1979 Convention on Long-range Transboundary Air Pollution. A 2010 Review presents progress to date in implementing the Convention across the UNECE region (CEIPT, 2010). • The Netherlands has assessed the Traffic emissions of carbon and organic carbon (PBL, 2009). • Annual Report of Air Pollution 2009 (Greece, Ministry of Environment, Energy and Climate Change). • Trends in Air Quality in Germany (Umweltbundesamt, For our Environment, 2009).
Industry	**Explanation** Emissions, waste and resource use from industrial production and processes. **Relevance to green economy** Relative reductions in emissions and waste are associated with efficiency improvements, innovation, improved environmental quality and public health benefits. **Examples of assessments** • Steady as she goes: Norway's strategy for environmentally friendly growth in maritime industry (Norwegian Ministry of Trade and Industry, 2007). • Study of municipal waste management in Hungary 2010 (KVVM, 2010).
Innovation	**Explanation** Any change that renews or improves a product or process. **Relevance to green economy** Environmental or eco-innovation is now widely used as a means of reducing the environmental impacts from economic activity. **Examples of assessments** • The OECD has developed a workstream on the links between eco-innovation in industry and green growth, with examples from a number of member countries (OECD, 2011a). • Innovation for a Green Economy — Environment and Technology: A win-win story (EPA, Ireland, 2009). • Environmental Technologies and Eco-Innovation in the Czech Republic (CENIA, 2009).

Environmental Impact Assessment / Strategic Impact Assessment (EIA/SIA)	**Explanation** Environmental or strategic impact assessment. **Relevance to green economy** These policymaking tools are widely used to measure the environmental impacts of a decision or policy change. **Examples of assessments** • UNEP manual on integrated environmental assessment and reporting (UNEP, 2008). • The 1991 Espoo Convention on EIA in a Transboundary Context applies to all UNECE members. It sets out obligations to assess the environmental impact of activities at an early planning stage and to consult each other on projects that have a significant adverse environmental impact across boundaries (UNECE, 2006).
Governance	**Explanation** Institutional arrangements, multilateral agreements, etc. **Relevance to green economy** The structures, institutions and governing bodies that are required to develop, implement and enforce the policies designed to move towards a green economy. **Examples of assessments** • The Changing Wealth of Nations (World Bank, 2011). • Beyond Rio+20: Governance for a Green Economy (International Institute for Sustainable Development, 2011). • Environmental Governance in the Context Of Green Growth In Eastern Europe, Caucasus and Central Asia: Main Policy Conclusions (OECD, 2011b).
Corporate social responsibility (CSR) and environmental reporting	**Explanation** All voluntary and self-regulating mechanisms in the private sector designed to ensure active compliance with spirit of the law, ethical standards, and international norms. **Relevance to green economy** The triple bottom line of people, planet and profit is the axiom most commonly identified with CSR and environmental reporting. It includes actions that encourage a positive impact through activities on the environment, consumers, employees, communities, stakeholders and other. **Examples of assessments** • In Greece, the Hellenic network for CSR seeks to promote the concept of CSR and visibility to both the business and the social environment, with a view to achieving balanced and sustainable earnings growth (Hellenic Network for Corporate Social Responsibility, 2011). • Reporting environmental information in annual reports: Analysis of legal requirements in the Nordic countries (Norden, 2008). • Carbon Disclosure Project, a forum for measuring and disclosing greenhouse gas emissions, water use and climate change strategies (Carbon Disclosure Project, 2011).

Futures and scenarios	**Explanation** Vulnerability, opportunities, competitiveness and migration. **Relevance to green economy** These are emerging or future issues that will impact, either positively or negatively, on the ability of a country or region to develop a green economy. **Examples of assessments** • The pan-European environment: glimpses into an uncertain future (EEA, 2007). • In Ireland, Future Skills Needs of Enterprise within the Green Economy identifies 6 sub-sectors as having business/employment growth potential, including renewables and green ICT applications (Expert Group on Future Skills Needs, 2010). • Baltic 21 Triennial report (Baltic 21, 2009). • EEA megatrends 2010 report, analysis of 11 global megatrends, with links to Europe's priority environmental challenges, and reflections on possible implications for policymaking (EEA, 2010).
Mining	**Explanation** Extraction of valuable minerals or other geological, non-renewable material from the earth. **Relevance to green economy** Virtually any material that cannot be grown or created artificially has to be mined, creating potential negative impacts on the environment. **Examples of assessments** • UNDP programme for pioneering a green economy is supporting the transformation of abandoned mines in Balkans as eco-tourism hubs (UNDP, 2011). • Mining and environment in the Western Balkans (Environment and Security Initiative, 2011).
Resource efficiency	
Use of natural capital	**Explanation** Forestry, agriculture, urbanisation and other human activities leading to use and degradation of land, soil, water and biodiversity. **Relevance to green economy** Natural capital can be used more efficiently (resource efficiency), but it can also be degraded, leading to reduced welfare and environmental legacy issues such as pollution. **Examples of assessments** • GLOBE international natural capital initiative (Globe International, 2011). • The Economics of Ecosystems and Biodiversity: Mainstreaming the Economics of Nature (2010) (TEEB, 2010). • UK National Ecosystem Assessment (UK NEA, 2011). • Resource consumption of Germany — indicators and definitions (Umweltbundesamt, 2008). • Natural resource consumption of Finnish households (Finland's environmental administration, 2008). • Forests and Climate Change in Eastern Europe and Central Asia (FAO, 2010).

Water efficiency	**Explanation** Per unit reductions in the amount of water used in industrial, rural and urban areas. **Relevance to green economy** Doing 'more with less' reduces environmental impacts, enhances competitiveness, gives opportunities for growth. Initiatives are often driven by carbon reduction targets or concerns over energy security. **Examples of assessments** • The efficient use of water in agriculture in Central Asia has been supported by the World Bank. The work recognises that water availability is a major challenge and that agriculture in the region is dependent on irrigation (World Bank, 2009). • The efficiency of the water supply in Croatia (Institute for Public Finance, 2008). • Food and drink sector Federation House 2020 commitment (FHC2020, 2009).
Life-cycle analysis (LCA)	**Explanation** Full account of environmental impacts of producing, supplying, consuming and disposing of a good or service, whether these are within national borders or elsewhere. **Relevance to green economy** Broadens the interpretation of resource to bring in consideration of environmental impacts prior to production (beginning with raw material extraction) and following consumption (to disposal). **Examples of assessments** • Guidelines for social life cycle assessment of products (UNEP, 2009) (The Dutch sustainable trade initiative seeks to mainstream the social and ecological sustainability of commodity supplies from emerging markets to the Netherlands and Western Europe. It includes analysis of the life cycle impacts of a range of goods, including timber, cocoa and tea (IDH, 2011). • Life cycle analysis applied to first generation biofuels consumed in France (Ministry of Agriculture, 2010).

Environmental accounting	**Explanation** Valuation of natural capital and financial instruments such as green taxes, trading schemes, charges and levies. **Relevance to green economy** Environmental accounting tools are used to bring non-market (environmental) goods and services into decision-making, providing incentives to producers and consumers. **Examples of assessments** • Use of economic instruments in environmental policy (UNEP, 2004). • Environmental statistics and accounts in Europe (Eurostat, 2010). • The EU Emissions Trading System is a cornerstone of the EU's policy to combat climate change and its key tool for reducing industrial greenhouse gas emissions cost-effectively. It is the first and biggest international scheme for the trading of greenhouse gas emission allowances, the EU ETS covers some 11 000 power stations and industrial plants in 30 countries (EC, 2010a).
Sustainable consumption and production (SCP)	**Explanation** Reducing environmental impacts while improving or maintaining economic outputs. **Relevance to green economy** Generally takes a broader life cycle approach than other interpretations of resource efficiency. **Examples of assessments** • The European Commission has a number of examples of green public procurement, including an energy self-sufficient primary school in Malta and green city administration vehicles in Slovenia (EC, 2010b). • Time for action: towards sustainable consumption and production in Europe (EEA, 2008). • Sustainable Consumption: Examples from Germany (Umweltbundesamt, 2006). • Getting more and better from less — Proposals for Finland's national programme to promote SCP (Committee on Sustainable Consumption and Production, 2005).
Tourism	**Explanation** The greening of the travel and tourism sector. **Relevance to green economy** Green tourism creates opportunities for new jobs, resource efficiency and poverty reduction. **Examples of assessments** • Turismo de Portugal Sustainability Report 2009 (MEID, 2009).

Note: The two priority areas 'innovation' and 'mining' were added by the EEA.

Annex 3.2 Key aspects of assessments in priority areas

Green economy	
(Priority area)	
Renewable energy	**Number and frequency of assessments** A large number of assessments produced at least annually (some more frequent) **Size and type of assessments** Range from high-level (e.g. per cent of total energy from renewables) to detailed breakdown of energy by type (heat, transport, electricity) and technology (e.g. wind, wave, biomass) **Main developments** Assessments in this area have been increasing rapidly in number, level of detail and frequency. Goals and targets are often defined. **Basis of assessments** Generally based on comprehensive and audited data provided by government and/or private sector **Geographical aspects** All countries covered but most comprehensive in Northern and Western Europe. Balkans and new EU Member States more patchy.
Energy efficiency	**Number and frequency of assessments** Most assessments look at the background to or scope for energy efficiency **Size and type of assessments** Range from short overview assessments and factsheets to detailed long-term strategies, with consideration of progress, barriers, opportunities, etc. **Main developments** Increasingly linked to wider resource efficiency, behaviour (sustainable consumption), green growth (economic growth without increasing GHG emissions or air pollution) and life-cycle analysis **Basis of assessments** Past consumption based on energy consumption time series data. Future consumption based on international comparisons, technological changes, GDP growth, etc. **Geographical aspects** Well established in most areas, with increasingly detailed assessments from Western Balkans and new EU Member States
Innovation	**Number and frequency of assessments** Very few and far between, often led by pan-regional organisations **Size and type of assessments** *Ad-hoc* **Main developments** Linked to economic recovery and growth (Lisbon agenda). Generally applied to 'traditional' areas, e.g. transport, energy **Basis of assessments** Identification of opportunities for GDP growth and job creation **Geographical aspects** Poor coverage in all areas
Mobility	**Number and frequency of assessments** Good number of annual and *ad-hoc* assessments **Size and type of assessments** Range of high-level strategies, annual progress reports and action plans **Main developments** Most focus on transport (modes, behaviour, road pricing, integrated transport systems, etc.) and air pollution (especially links to emissions and climate change) **Basis of assessments** Mostly air quality measurements (with comprehensive range of indicators) and transport patterns (e.g. freight demand, car use). Very little on noise **Geographical aspects** Focused on heavily developed countries
Industry	**Number and frequency of assessments** Good number of annual and *ad-hoc* assessments **Size and type of assessments** Breakdown of waste types (e.g. hazardous, non-hazardous) and pollution sources (Assessments on emissions are generally part of energy sector reports, where industry is one of many sectors). **Main developments** Increasingly considering solutions and policy responses, e.g. domestic waste charging, separation systems. Also life cycle, cradle to grave assessments and new opportunities, e.g. waste as renewable energy source **Basis of assessments** Robust and comprehensive data from industrial sectors **Geographical aspects** All areas well covered
EIA/SIA	**Number and frequency of assessments** Very few **Size and type of assessments** Undertaken by pan-regional bodies and often applied to transboundary issues **Main developments** Compliance with International conventions(especially re transboundary issues) and guidance from European Commission and others **Basis of assessments** Questionnaires completed by participating countries **Geographical aspects** All countries covered by legislation and using EIA, but very few specific assessments

Governance	**Number and frequency of assessments** Very few **Size and type of assessments** Strategic think pieces or proposals by pan-regional bodies **Main developments** Futures and scenarios (e.g. vulnerability of poorer regions to environmental degradation and loss of natural capital, opportunities arising from improved environmental protection and the socio-economic effects of migration due to climate change and other factors **Basis of assessments** Generally based on in-depth but *ad-hoc* reviews of national institutional arrangements **Geographical aspects** Focused on emerging or transitional economies
CSR and environmental reporting	**Number and frequency of assessments** Large number of regular and *ad-hoc* assessments **Size and type of assessments** Large variation from public and non-public organisations **Main developments** Often at cutting edge, with integrated assessments coming to the fore **Basis of assessments** Generally based on primary data from industry or trade associations **Geographical aspects** Most coverage in Northern and Western Europe
Futures and scenarios	**Number and frequency of assessments** Very few specific assessments, though most assessments consider future challenges **Size and type of assessments** A range, from high level to in-depth and from different regional, national and non-public bodies **Main developments** Climate change, migration Regional organisations often talk about developing new partnerships and extending geographical scope **Basis of assessments** Often trend-based, but increasingly focused on forecast and complex probabilistic scenarios (e.g. for climate change) **Geographical aspects** Good coverage in all regions

Mining	**Number and frequency of assessments** Reasonably comprehensive **Size and type of assessments** Range of organisations involved, including regional, national and non-public bodies **Main developments** Increasingly concerned with rehabilitation following mine closure (e.g. contaminated water, tailings management) **Basis of assessments** International good practice principles **Geographical aspects** Focused on countries with significant ongoing mining industries, or with legacy issues
Resource efficiency	
Use of natural capital	**Number and frequency of assessments** Comprehensive assessments are largely limited to occasional, high-level and international issues **Size and type of assessments** Mainly strategic documents and think pieces at global level, and sector focused (e.g. forestry) at national level **Main developments** Increasingly recognised as a means of bringing environmental assets into mainstream decision-making and improving protection of natural resources. Terminology still evolving, with some assessments including finite natural resources (e.g. oil) **Basis of assessments** Robust and comprehensive time series data on material stocks and flows in key sectors **Geographical aspects** Content of assessments largely reflects extent of primary industry in country (e.g. forestry, mining, fishing)
Water efficiency	**Number and frequency of assessments** Increasing in number but *ad-hoc* rather than planned or programmed **Size and type of assessments** Mainly sector based (most on industrial or domestic consumption, less in rural areas) and varying in level of detail **Main developments** Consider broader issues (availability, affordability, appropriate water pricing). Increasingly interested in water footprint (embedded water) and re-use **Basis of assessments** Lots of reports from environment agencies, private and third sectors covering water use, stress, abstraction, efficiency, etc. **Geographical aspects** Most common in water scarce and well-developed countries

LCA	**Number and frequency of assessments** Very few and far between. Often rather narrow and specific (e.g. recycling or minimising waste) **Size and type of assessments** Application of LCA to specific sectors, products or topics **Main developments** Still developing methodologies and guidelines for assessing LCA (e.g. carbon and water footprint of imported products) **Basis of assessments** Bottom-up approaches based on consumption and production patterns for products and services **Geographical aspects** Poor coverage in all areas
Environmental accounting	**Number and frequency of assessments** Very sparse, mainly focused on high-level concepts and principles **Size and type of assessments** Mainly regional national attempts to stimulate debate **Main developments** Some sectors (e.g. forests) better understood and covered than others (e.g. soil). Largely focused on developing metrics, e.g. through ecosystem services approach **Basis of assessments** Based on economic value of different sectors, plus flows of raw or processed material, also material imports and exports, domestic material consumption per GDP **Geographical aspects** Poor coverage in all areas
SCP	**Number and frequency of assessments** Gradually increasing in number and range **Size and type of assessments** Cover both regional and national **Main developments** Driven increasingly by national sustainable development strategies and programmes, and focused on specific themes or areas (e.g. public procurement). Also decoupling resource use (e.g. energy, material extraction) and environmental pressures (e.g. CO_2) from economic growth, ecological footprint **Basis of assessments** Generally case study based but including various indicators (e.g. production and consumption by sector, resource consumption, number of companies with ISO 14001 and ISO 9001 certification) **Geographical aspects** Least well developed in Western Balkans, Eastern Europe, Caucasus and Central Asia

Tourism	**Number and frequency of assessments** Relatively few and infrequent assessments **Size and type of assessments** Generally national, but some regional assessments (e.g. OSPAR Commission) **Main developments** Impacts of tourism on environment (e.g. landtake, demand for water, erosion) **Basis of assessments** Mix of regular, time-series data (e.g. number of establishments and bed spaces, arrivals by country) and project-based info **Geographical aspects** Focused on countries with established tourism sectors

References

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Belgium, Wallonia (SPW), 2010, *Environmental Scoreboard/Tableau de bord 2010*. http://etat.environnement.wallonie.be/index.php?page=le-tableau-de-bord-2010.

BiH, 2010, *State of the environment in the Federation of Bosnia and Herzegovina*. http://aoa.ew.eea.europa.eu/tools/virtual_library/bibliography-details-eachassessment/answer_5413818081/w_assessment-upload/index_html?as_attachment:int=1.

Croatia AZO, 2010, *The Environment in Your Pocket*. http://www.azo.hr/TheEnvironmentIn.

CEC, 2009, 5th Commission Summary on the Implementation of the urban waste water treatment directive. Commission Staff Working Document SEC(2009) 1114 final, 3.8.2009. http://ec.europa.eu/environment/water/waterurbanwaste/implementation/pdf/implementation_report_summary.pdf.

Dalcanale, F., D. Fontane, and J. Csapo, 2011, 'A General Framework for a Collaborative Water Quality Knowledge and Information Network'. *Environmental Management* 47(3): 443-455. doi:10.1007/s00267-011-9622-7.

DSI, 2009, *Turkey water report 2009*, http://www2.dsi.gov.tr/english/pdf_files/TurkeyWaterReport.pdf.

EC (European Commission), 2003, Monitoring under the Water Framework Directive. Working Group 2.7 — Monitoring. WFD_CIS Guidance document no. 7. Luxembourg: Office for Official Publications of the European Communities.

EEA (European Environment Agency), 1995, *Europe's environment — The Dobris assessment*. Copenhagen, Denmark.

EEA (European Environment Agency), 2003, *Europe's water: An indicator-based assessment*. Topic report No 1/2003. Copenhagen, Denmark.

EEA (European Environment Agency), 2008, *Impacts of Europe's changing climate — 2008 indicator-based assessment*. EEA Report No 4/2008. Copenhagen, Denmark.

EEA (European Environment Agency), 2009, *Water resources across Europe — confronting water scarcity and drought*. EEA Report No 2/2009. Copenhagen, Denmark.

EEA (European Environment Agency), 2010a, *The European environment — state and outlook 2010: synthesis*. Copenhagen, Denmark.

EEA (European Environment Agency), 2010b, *The European environment — state and outlook 2010: water resources: quantity and flows*, Thematic assessment, Copenhagen, Denmark.

EEA (European Environment Agency), 2010c, *The European environment — state and outlook 2010: water quality*, Thematic Assessment, Copenhagen, Denmark.

EEA (European Environment Agency), 2010d, *Quality of bathing water — 2009 bathing season*. EEA Report No 5/2010, Copenhagen, Denmark.

EEA (European Environment Agency), 2010e, *10 messages for 2010 — freshwater ecosystems*. Copenhagen, Denmark.

EEA (European Environment Agency), 2010f, *Europe's ecological backbone: recognising the true value of our mountains*, Chapter 6: The water towers of Europe. Copenhagen, Denmark.

EEA (European Environment Agency), SEBI16 — Freshwater quality. http://www.eea.europa.eu/data-and-maps/indicators/freshwater-quality/freshwater-quality assessment-published-may-2010.

EEA (European Environment Agency), 2011, *Mapping the impacts of natural hazards and technological accidents in Europe*. EEA Technical report No 13/2010. Copenhagen, Denmark.

EEA Waterbase, 2011, databases on the status and quality of Europe's rivers, lakes, groundwater bodies and transitional, coastal and marine waters, and on the quantity of Europe's water resources, European Environment Agency, http://www.eea.europa.eu/data-and-maps (accessed on 16 March 2011).

Environmental Indicators, Slovenia 2007, http://kazalci.arso.gov.si/?data=indicator&ind_id=282&lang_id=94.

Environmental Indicators, 2010, Flemish Region, Belgium. http://www.milieurapport.be/Upload/main/rapport_TW_def.pdf?bcsi_scan_2ba133642188d903=0&bcsi_scan_filename=rapport_TW_def.pdf.

EUREAU, 2009, *Eureau statistics overview of water and wastewater in Europe 2008*, http://www.stilis.be/clients/eureau/publications/EUREAU_Statistics_Overview_on_Water_and_Wastewater_in_Europe_2008.pdf.

European Parliament, 2008, Climate change-induced water stress and its impact on natural and managed ecosystems. Study report. http://ecologic.eu/2333.

Eurostat, 2010, Environmental statistics and accounts in Europe. http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-32-10-283/EN/KS-32-10-283EN.PDF.

The former Yugoslav Republic of Macedonia, State Statistical Office, 2009, *Environmental statistics 2009*. http://www.stat.gov.mk/Publikacii/ZivotnaSredina2009.pdf.

GIOS, Chief Inspectorate for Environmental Protection, 2008, *Report on the state of the environment in Poland*. http://www.gios.gov.pl/zalaczniki/artykuly/SOER_PL_2008_angielski.pdf.

Italian National Institute of Statistics, 2009, *Statistiche ambientali 2009*, http://www.istat.it/dati/catalogo/20091130_00.

Kundzewicz, Z. W.; Lugeri, N.; Dankers, R.; Hirabayashi, Y.; Döll, P.; Pinskwar, I.; Dysarz, T.; Hochrainer, S.; Matczak, P., 2010, 'Assessing river flood risk and adaptation in Europe — review of projections for the future'. *Mitigation and Adaptation Strategies for Global Change*, 15(7): 641–656 p.

Landsberg-Uczciwek, M. and T. Zan, 2004, 'Developing transboundary monitoring Strategy for the Bug River (achievements under the UNECE Bug pilot project)', pp. 241–252 in: Timmerman, J.G., H.W.A. Behrens, F. Bernardini, D. Daler, Ph. Ross, C.J.M. Ruiten, R.K. Turner, and R.C. Ward (eds.). Proceedings Monitoring Tailor-Made IV; *Information to support sustainable water management: from local to global levels*, 15–18 September 2003, St. Michielsgestel, the Netherlands. RIZA/IWAC/RIKZ, Lelystad, the Netherlands.

Lovett, G.M., D.A. Burns, C.T. Driscoll, J.C. Jenkins, M.J. Mitchell, L. Rustad, J.B. Shanley, G.E. Likens, and R. Haeuber, 2007, 'Who needs environmental monitoring?' *Frontiers in Ecology and the Environment* 5: 253–260. Millennium Ecosystem Assessment reports (2005). http://www.maweb.org/en/index.aspx.

Ministry of Health, France, 2008, *L'eau potable en France 2005–2006*. http://www.eaufrance.fr/IMG/pdf/bilanqualite_05_06.pdf.

Ministerie van Verkeer en Waterstaat, 2010, *Water in Beeld/Netherland's Water in Focus 2010*. http://www.waterinbeeld.nl.

Minpriroda, Natural Resources and Environmental Protection Ministry of the Republic of Belarus, 2010, *The state of environment of the Republic of Belarus*, http://minpriroda.by/en/nac_dokl/new_url_1244680181.

Nordemann Jensen, P., Boutrup, S., Bijl, L. van der, Svendsen, L.M., Grant, R., Wiberg Larsen, P., Bjerring, R., Ellermann, T., Petersen, D.L.J., Hjorth, M., Søgaard, B., Thorling, L. and Dahlgren. K., 2010, *Vandmiljø og Natur 2009. NOVANA. Tilstand og udvikling — faglig sammenfatning*. Danmarks Miljøundersøgelser, Aarhus Universitet. 108 s. — Faglig rapport fra DMU nr. 806. http://www.dmu.dk/Pub/FR806.pdf.

OECD (Organisation for Economic Co-operation and Development), 2008a, *OECD Environmental Outlook to 2030*, http://www.oecd.org/document/20/0,3746,en_2649_37465_39676628_1_1_1_37465,00.html.

OECD (Organisation for Economic Co-operation and Development), 2008b, *Environmental Data Compendium 2006–2008*, http://www.oecd.org/dataoecd/22/55/41878136.pdf.

OECD (Organisation for Economic Co-operation and Development), 2008c, *Environmental Performance of Agriculture in OECD Countries since 1990*, http://www.oecd.org/document/56/0,3746,en_2649_33793_40374392_1_1_1_1,00.html.

OECD (Organisation for Economic Co-operation and Development), 2009, *Managing water for all: An OECD Perspective on Pricing and Financing*, http://www.oecd.org/document/19/0,3746,en_2649_34285_42289488_1_1_1_1,00.html.

Permanent Secretariat of the Alpine Convention, 2009, *Water and water management issues — Report on the State of the Alps, Alpine Convention, Alpine Signals* — Special Edition 2, Alpine Convention, 2009. Report available at http://www.alpconv.org/documents/Permanent_Secretariat/web/RSAII/20090625_RSA_II_long.pdf.

Plan Bleu, 2009, *State of the Environment and Development in the Mediterranean — 2009*. http://www.planbleu.org/publications/SoED2009_EN.pdf.

Russian Federal Service on State Statistics, 2010, *Environmental Protection in Russia, 2010*. http://www.gks.ru/wps/wcm/connect/rosstat/rosstatsite/main/publishing/catalog/statisticCollections/doc_1139919459344.

Smeets, E. and R. Weterings, 1999, *Environmental indicators: Typology and overview*, EEA Technical report No 25, Copenhagen, Denmark.

Slovak Republic, EnviroPortal. http://enviroportal.sk/index.php.

SYKE (Finnish Environment Institute), 2008, *State of the environment*. http://www.ymparisto.fi/default.asp?contentid=373480&lan=en&clan=en.

Timmerman, J.G., E. Beinat, C.J.A.M. Termeer, and W.P. Cofino, 2010a, 'Analysing the data-rich-but-information-poor syndrome in Dutch water management in historical perspective'. *Environmental Management* 45(5): 1 231–1 242.

Timmerman, J.G., E. Beinat, C.J.A.M. Termeer, and W.P. Cofino, 2010b, 'A methodology to bridge the water information gap'. *Water Science and Technology* 62(10): 2 419–2 426.

Timmerman, J.G., J.J. Ottens, and R.C. Ward, 2000, 'The information cycle as a framework for defining information goals for water-quality monitoring'. *Environmental Management* 25(3): 229–239.

Timmerman, J.G., M.J. Gardner, and J.E. Ravenscroft, 1996, *Quality assurance*. Volume 4, 1994/1995 working programme of the ECE Task Force on Monitoring and Assessment, RIZA report no. 95.067. RIZA, Lelystad, the Netherlands.

UBA (Umweltbundesamt), 2009, Germany. Umweltdaten. http://www.umweltbundesamt-daten-zur-umwelt.de/umweltdaten/public/theme.do?nodeIdent=3653.

UBA (Umweltbundesamt), 2006, *The 2006 Water quality in Austria — Annual Report*. http://www.umweltbundesamt.at/umweltsituation/wasser/wgev.

UNECE, 2006, *Strategies for monitoring and assessment of transboundary rivers, lakes and groundwaters*. ECE/MP.WAT/20. United Nations Economic Commission for Europe, Geneva, Switzerland. http://www.unece.org/env/water/publications/documents/StrategiesM&A.pdf.

UNECE, 2007, *First Assessment of Transboundary Rivers, Lakes and Groundwaters in the UNECE region*. http://www.unece.org/env/water/publications/pub76.htm.

UNECE, 2008, *Environmental performance review of Kazakhstan*. http://www.unece.org/env/epr/epr_studies/kazakhstan %20II.pdf.

UNECE, 2010, *Environmental performance review of Uzbekistan*. http://www.unece.org/env/epr/epr_studies/uzbekistan %20II %20e.pdf.

UNEP and IOC-UNESCO, 2009, An Assessment of Assessments, Findings of the Group of Experts. *Start-up Phase of a Regular Process for Global Reporting and Assessment of the State of the Marine Environment including Socio-economic Aspects*. ISBN 978-92-807-2976-4. http://www.unga-regular-process.org.

UNEP/DEWA, 2005, *Freshwater in Europe — Facts, figures and maps*. http://www.grid.unep.ch/product/publication/freshwater_europe.php.

UNEP/DEWA, 2007, *Carpathians Environment Outlook 2007 (KEO)*. http://www.grid.unep.ch/activities/assessment/KEO/index.php.

UNESCO, *World Water Development Reports I, II, and III*. http://www.unesco.org/water/wwap/wwdr.

UN-Water/WHO, *Global Annual Assessment of Sanitation and Drinking-Water (GLAAS)*. http://www.who.int/water_sanitation_health/glaas/en.

Ward, R.C., J.C. Loftis, and G.B. McBride, 1990, *Design of water quality monitoring systems*. Van Nostrand Reinhold, New York, USA. 231 pp.

WHO/UNICEF, 2010, Progress on Sanitation and Drinking-water: 2010 Update. *WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation*. http://whqlibdoc.who.int/publications/2010/9789241563956_eng_full_text.pdf.

WHO/Europe and EEA, 2003, *Water and health in Europe*. http://www.euro.who.int/en/what-we-publish/abstracts/water-and-health-in-europe.-a-joint-report-from-the-european-environment-agency-and-the-who-regional-office-for-europe.

WHO, 2010, *Progress and challenges on water and health: the role of the Protocol on Water and Health*. http://www.euro.who.int/en/what-we-do/conferences/fifth-ministerial-conference-on-environment-and-health/documentation/background-documents/progress-and-challenges-on-water-and-health-the-role-of-the-protocol-on-water-and-health.

WHO/UNICEF, *Joint Monitoring Programme (JMP) on Water Supply and Sanitation Reports*. http://www.wssinfo.org.

WWF and EEB, 2009, *What future for EU's waters*. http://wwf.panda.org/about_our_earth/all_publications/?165741/What-future-for-EUs-water.

Chapter 3

ECLAC (Economic Commission for Latin America and the Caribbean), 2010, *A Green Economy: Introduction to the debate and implications for Latin America and the Caribbean*. http://www.cepal.org/dmaah/noticias/noticias/4/41684/DraftDiscussionPaper.pdf.

Ecologic, 2011, *Final Report for the Assessment of the 6th Environment Action Programme*. DG ENV.1/SER/2009/004.

EC (European Commission), 2011, A resource-efficient Europe — Flagship initiative under the Europe 2020 Strategy. EC. http://ec.europa.eu/resource-efficient-europe/pdf/resource_efficient_europe_en.pdf.

EEA (European Environment Agency), 2010, *The European environment — state and outlook 2010*. Copenhagen, Denmark. http://www.eea.europa.eu/soer.

EEA (European Environment Agency), 2011, 'Resource efficiency in Europe. Policies and approaches in 31 EEA member and cooperating countries'. Copenhagen, Denmark (forthcoming).

ETC/SCP (European Topic Centre on Sustainable Consumption and Production), 2011, *Progress in Sustainable Consumption and Production in Europe: Indicator-based Report*. http://eea.eionet.europa.eu/Public/irc/eionet-circle/etc_waste/library?l=/scp_2010indicator/indicators_paperpdf/_EN_1.0_&a=d.

Eurostat, 2009, *Sustainable Development in the European Union: 2009 monitoring report of the EU sustainable development strategy*. http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-78-09-865/EN/KS-78-09-865-EN.PDF.

Globe Foundation, 2010, *British Columbia's Green Economy: Building a Strong, Low Carbon Future*. http://www.globe-net.com/media/118121/bcge_report_(feb_2010).pdf.

IISD (International Institute for Sustainable Development), 2011, *Beyond Rio+20: Governance for a Green Economy*. http://www.bu.edu/pardee/files/2011/03/Rio20TFC-Mar2011.pdf.

OAS (Organization of American States), 2010, *Payment for environmental service*. http://www.oas.org/dsd/PES/Programs.htm.

OECD (Organisation for Economic Co-operation and Development), 2008, *Environmental Outlook to 2030*. http://www.oecd.org/document/20/0,3746,en_2649_37465_39676628_1_1_1_37465,00.html.

OECD (Organisation for Economic Co-operation and Development), 2010, *Eco-Innovation in Industry: Enabling Green Growth*. http://www.oecd.org/document/34/0,3343,en_2649_34273_44416162_1_1_1_37417,00.html.

OECD (Organisation for Economic Co-operation and Development), 2011a, *Towards Green Growth*. http://www.oecd.org/document/10/0,3746,en_2649_37425_47983690_1_1_1_37425,00.html.

OECD (Organisation for Economic Co-operation and Development), 2011b, *Towards Green Growth: Monitoring Progress OECD Indicators*. http://www.oecd.org/document/49/0,3746,en_2649_37465_48033720_1_1_1_37465,00.html.

OECD (Organisation for Economic Co-operation and Development), 2011c, *Resource Productivity in the G8 and the OECD: A Report in the Framework of the Kobe 3R Action Plan*. Working Party on Resource Productivity and Waste Working Party on Environmental Information, http://www.oecd.org/document/14/0,3746,en_2649_37465_47926478_1_1_1_37465,00.html.

OECD (Organisation for Economic Co-operation and Development), 2011d, *Environmental Governance in the Context of Green Growth in Eastern Europe, Caucasus and Central Asia: Main Policy Conclusions*. http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=ENV/EPOC/EAP(2011)3&docLanguage=En.

Pearce, D., Markandya, A. and E. Barbier, E.,1989, *Blueprint for a green economy*. Earthscan, London, Great Britain.

Russo, R.O. and Candela G., 2006, 'Payment of environmental services in Costa Rica: evaluating impact and possibilities', *Tierra Tropical*, Vol. 2:1, 1–13.

Stockholm Environmental Institute, 2009, *A European Eco-Efficient Economy: Governing climate, energy and competitiveness*, Report for the 2009 Swedish Presidency of the Council of the European Union. http://sei-international.org/mediamanager/documents/Publications/Policy-institutions/europeanecoefficienteconomyfinal.pdf.

TEEB (The Economics of Ecosystems and Biodiversity), 2010, *The Economics of Ecosystems and Biodiversity*. http://www.teebweb.org/.

UNCSD (United Nations Conference on Sustainable Development), 2011, *Objective and Themes of the United Nations Conference on Sustainable Development*, Report of the Secretary-General, United Nations Conference on Sustainable Development. http://www.uncsd2012.org/files/prepcom/SG-report-on-objective-and-themes-of-the-UNCSD.pdf.

UNDP (United Nations Development Programme), 2007, *Outlook for Development of Renewable Energy in Uzbekistan*. http://europeandcis.undp.org/environment/show/B67E3D85-F203-1EE9-BCC4DBBD1EB12BC9.

UNDP (United Nations Development Programme), 2009, *National Human Development Report in the Russian Federation 2009. Energy Sector and Sustainable Development*, http://hdr.undp.org/en/reports/nationalreports/europethecis/russia/NHDR_2009_Russia_English.pdf.

UNDP (United Nations Development Programme), 2010, *The Opportunities for Georgia in the new Green Economy*. http://www.undp.org.ge/files/24_1182_476920_private-dev-eng.pdf.

UNECE (United Nations Economic Commission for Europe), 2010, *Regional Analysis for Policy Reforms to Promote Energy Efficiency and Renewable Energy Investments*. http://www.unece.org/se/pdfs/eneff/eneff_pub/EE21_FEEI_RegAnl_Final_Report.pdf.

UNECE (United Nations Economic Commission for Europe), 2011, *Proposal for a 'Green Bridge' Partnership Programme under the Astana 'Green Bridge' Initiative*. http://www.unece.org/env/documents/2011/ece/cep/ece.cep.s.2011.l.5.e.pdf.

UNEP (United Nations Environment Programme), 2005, *Global International Waters Assessment: Baltic Sea*, GIWA Regional Assessment 17. http://www.unep.org/dewa/giwa/areas/reports/r17/giwa_regional_assessment_17.pdf.

UNEP (United Nations Environment Programme), 2008, *Green Jobs: Towards decent work in a sustainable, low-carbon world*. http://www.unep.org/labour_environment/PDFs/Greenjobs/UNEP-Green-Jobs-Report.pdf.

UNEP (United Nations Environment Programme), 2009a, *Mining and Environment in the Western Balkans*. http://www.envsec.org/see/docs/MiningBalkans_screen.pdf.

UNEP (United Nations Environment Programme), 2009b, *The global state of sustainable insurance: Understanding and integrating environmental, social and governance factors in insurance*. http://www.unepfi.org/fileadmin/documents/global-state-of-sustainable-insurance.pdf.

UNEP (United Nations Environment Programme), 2010a, *UNEP and resource efficiency at a glance.* http://www.unep.org/pdf/brochures/ResourceEfficiency.pdf.

UNEP (United Nations Environment Programme), 2010b, *green economy: Developing Countries Success Stories*. http://www.unep.org/pdf/GreenEconomy_SuccessStories.pdf.

UNEP (United Nations Environment Programme), 2011a, *Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication*. http://www.unep.org/greeneconomy.

UNEP (United Nations Environment Programme), 2011b, Organic Agriculture — a step towards a green economy in the EECCA Region (forthcoming).

UNEP (United Nations Environment Programme), 2011c, Resource Efficiency: Economics and Outlook for Asia and the Pacific. CSIRO Publishing, Canberra, Australia (forthcoming).

UNESCAP (United Nations Economic and Social Commission for Asia and the Pacific), 2010, *Astana Green Bridge Initiative: Europe-Asia-Pacific partnership for the Implementation of Green Growth*, Ministerial Conference on Environment and Development in Asia and the Pacific.

UNESCAP (United Nations Economic and Social Commission for Asia and the Pacific), 2011, Green Growth, Resources and Resilience: Environmental sustainability in Asia and the Pacific (preview). http://www.unescap.org/esd/environment/flagpubs/GGRAP/documents/Green %20Growth-16Sept %20(Final).pdf.

UNFCCC (United Nations Framework Convention on Climate Change), 2010, *Second National Communication under the United Nations Framework Convention on Climate Change, Republic of Armenia Ministry of Nature Protection*. http://unfccc.int/resource/docs/natc/armnc2e.pdf.

USAID (United States Agency for International Development), 2007, *Belarus, FAA 119 Biodiversity Analysis.* http://ukraine.usaid.gov/lib/belarus_biodiversityanalysis_2007.pdf.

US Department of Commerce, 2010, *Measuring the Green Economy, Economics and Statistics Administration*. http://www.esa.doc.gov/sites/default/files/reports/documents/greeneconomyreport_0.pdf.

World Bank, 2011, *The Changing Wealth of Nations*. Washington DC. http://issuu.com/world.bank.publications/docs/9780821384886.

World Enterprise for Georgia, 2008, *Energy Efficient Potential in Georgia and Policy Options for Its Utilization. prepared for USAID/Caucasus*, http://root.ew.eea.europa.eu/aoa/tools/virtual_library/bibliography-details-each-assessment/answer_6427460979/w_assessment-upload/index_html?as_attachment:int=1.

World Steel Association, 2010, *Using Steel to Reduce Greenhouse Gas Emissions*. http://www.worldsteel.org/pictures/publicationfiles/LCA %20poster.pdf.

WWF, 2010. 2010 *Living Planet report*. http://wwf.panda.org/about_our_earth/all_publications/living_planet_report.

References to Annex 3.1

Baltic 21, 2009, http://www.baltic21.org/attachments/Baltic21_report2009_lowres_FINAL.pdf.

BMU, 2010, Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, http://www.erneuerbare-energien.de/inhalt/5996/42720.

Carbon Disclosure Project, 2011, https://www.cdproject.net/en-US/Pages/HomePage.aspx.

CEIPT, 2010, http://www.ceip.at.

CENIA, 2009, http://www.cenia.cz/web/www/web-pub2.nsf/$pid/CENMSFVKXSCW/$FILE/environmental_technologies_and_eco-innovation_in_the_cr.pdf.

Central Statistical Office, Warsaw, Poland, 2010, http://www.stat.gov.pl/cps/rde/xbcr/gus/PUBL_ee_energy_efficiency_in_Poland_1998-2008.pdf.

Committee on Sustainable Consumption and Production, 2005, http://www.environment.fi/download.asp?contentid=40471&lan=en.

DECC, 2011, http://www.decc.gov.uk/en/content/cms/what_we_do/uk_supply/energy_mix/renewable/res/res.aspx.

EC (European Commission), 2010a, http://ec.europa.eu/clima/policies/ets/index_en.htm.

EC (European Commission), 2010b, http://ec.europa.eu/environment/gpp/case_en.htm.

EC (European Commission), 2011, http://www.decc.gov.uk/en/content/cms/what_we_do/uk_supply/energy_mix/renewable/res/res.aspx.

EEA (European Environment Agency), 2007, http://www.eea.europa.eu/publications/eea_report_2007_4.

EEA (European Environment Agency), 2008, http://www.eea.europa.eu/publications/technical_report_2008_1.

EEA (European Environment Agency), 2010, http://www.eea.europa.eu/soer/europe-and-the-world.

Environment and Security Initiative, 2011, http://www.envsec.org/publications/MiningBalkans_screen.pdf.

EPA, Ireland, 2009, http://www.epa.ie/downloads/pubs/research/tech/name,26326,en.html.

EREC, 2011, http://www.erec.org/statistics.html.

Eurostat, 2010, http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-32-10-283/EN/KS-32-10-283-EN.PDF.

Expert Group on Future Skills Needs, 2010, http://www.skillsireland.ie/publications/2010/title,7063,en.php.

FAO, 2010, http://www.fao.org/forestry/climatechange/53622/en.

FHC2020, 2009, http://www.fhc2020.co.uk/fhc/cms.

Finland's environmental administration, 2008, http://www.environment.fi/default.asp?contentid=316115&lan=en&clan=en.

Globe International, 2011, http://www.globeinternational.info/policy/natural-capital.

Greece, Ministry of Environment, Energy & Climate Change, 2009, http://www.ypeka.gr/LinkClick.aspx?fileticket=NIpIqbQgp4U %3d&tabid=490.

Hellenic Network for Corporate Social Responsibility, 2011, http://www.csrhellas.org/portal/en.php?lang=EN.

IDH, 2011, http://www.dutchsustainabletrade.com/en/home.

Institute for Public Finance, Croatia, 2008, http://www.ijf.hr/eng/newsletter/37.pdf.

International Institute for Sustainable Development, 2011, http://www.iisd.org/publications/pub.aspx?pno=1417.

KVVM, 2010, http://www.kvvm.hu/data/kiadvanyok/kvvm_kiadvany_15.pdf.

MEID, 2009, http://www.turismodeportugal.pt/Português/ProTurismo/destinos/destinosturísticos/Documents/RelatSustTurismo %2002072010 %20FINAL.pdf.

Ministry of Agriculture, France, 2010, http://agriculture.gouv.fr/analyses-de-cycle-de-vie.

Norden, 2008, http://www.norden.org/en/publications/publications/2008-513.

Norwegian Ministry of Trade and Industry, 2007, http://www.regjeringen.no/upload/NHD/Vedlegg/strategier2007/steadyasshegoes_2007.pdf.

OECD, 2011a, www.oecd.org.

OECD, 2011b, http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=ENV/EPOC/EAP(2011)3&docLanguage=En).

PBL (Netherlands Environmental Assessment Agency), 2009, http://www.pbl.nl/en/publications/2009/Traffic-emissions-of-elemental-carbon-and-organic-carbon.

TEEB, 2010, http://www.teebweb.org.

The Czech Republic's National Report on the Electricity and Gas Industries for 2009, 2010, http://www.energy-regulators.eu/portal/page/portal/EER_HOME/EER_PUBLICATIONS/NATIONAL_REPORTS/National %20Reporting %202010/NR_En/E10_NR_CzechRep-EN.pdf.

UBA (Umweltbundesamt), 2006, http://www.umweltdaten.de/publikationen/fpdf-l/3096.pdf.

UBA (Umweltbundesamt), 2008, http://www.umweltdaten.de/publikationen/fpdf-l/3427.pdf.

UBA (Umweltbundesamt), 2009, For our Environment, http://www.cisherzog.de/cis_en/download/air-bmu.pdf.

UK NEA, 2011, http://uknea.unep-wcmc.org.

UNDP, 2011, http://content.undp.org/go/newsroom/2011/january/cleaning-up-toxic-past-montenegro-town-pioneers-a-green economy.en?categoryID=349434&lang=en.

UNECE, 2006, http://www.unece.org/env/eia/eia.htm.

UNEP, 2004, http://www.unep.ch/etb/publications/EconInst/econInstruOppChnaFin.pdf.

UNEP, 2008, http://www.unep.org/geo/GEO_assessment.asp.

UNEP, 2009, http://www.cdo.ugent.be/publicaties/280.guidelines-sLCA.pdf.

USAID, Georgia, 2008, http://aoa.ew.eea.europa.eu/tools/virtual_library/bibliography-details-each-assessment/answer_6427460979/w_assessment-upload/index_html?as_attachment:int=1.

World Bank/Russia, 2008, http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/ECAEXT/RUSSIANFEDERATIONEXTN/0,,contentMDK:22336584~pagePK:1497618~piPK:217854~theSitePK:305600,00.html.

World Bank, 2009, http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/ECAEXT/TURKMENISTANEXTN/0,,contentMDK:22230778~pagePK:1497618~piPK:217854~theSitePK:300736,00.html?cid=3001_171.

World Bank, 2011, http://issuu.com/world.bank.publications/docs/9780821384886.


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Sea of Okhotsk
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Svalbard
KOLYMSKIY RANGE
VERKHOYANSKIY RANGE
TAYMYR PENINSULA
SCANDINAVIAN PENINSULA
North Sea
Bay of Biscay
Baltic Sea
NORTH EUROPEAN PLAIN
CENTRAL RUSSIAN UPLAND
VOLGA UPLAND
URAL MOUNTAINS
WEST SIBERIAN PLAIN
CENTRAL SIBERIAN HIGHLAND
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Black Sea
Sea of Asov
CAUCASUS
ASIA MINOR
Caspian Sea
Aral Sea
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KARA KUM DESERT
TAKLA MAKAN
KUNLUN MOUNTAINS
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