

Technical report No 15

A checklist for state of the environment reporting

Prepared by:
Peter Kristensen, National Environmental Research Institute
Lloyd Anderson, Institute of Terrestrial Ecology, and
Nickolai Denisov, UNEP/GRID Arendal, with support
of the EEA Expert Group on Guidelines and Reporting)

Project manager:
Peter Bosch
European Environment Agency

Cover design: Rolf Kuchling, EEA

Legal notice

The contents of this report do not necessarily reflect the official opinion of the European Communities or other European Communities institutions. Neither the European Environment Agency nor any person or company acting on the behalf of the Agency is responsible for the use that may be made of the information contained in this report.

A great deal of additional information on the European Union is available on the Internet. It can be accessed through the Europa server (<http://europa.eu.int>)

©EEA, Copenhagen, 1999

Reproduction is authorised provided the source is acknowledged

Printed in Copenhagen

Printed on recycled and chlorine-free bleached paper

European Environment Agency
Kongens Nytorv 6
DK-1050 Copenhagen K
Denmark
Tel: +45 33 36 71 00
Fax: +45 33 36 71 99
E-mail: eea@eea.eu.int

Table of content

1. Introduction	4
2. Checklist for soe reporting	5
2.1. Determine the target groups and objectives	5
2.2. Organise the compilation	5
2.3. Define the structure	5
2.4. Chose the content	5
2.4.1. Design the organisation for data delivery and verification.....	6
2.4.2. Choose the datasets and indicators (diagrams, tables and maps) for each chapter	6
2.4.3. Outlooks	6
2.5. Design the publication.....	6
2.6. Presentation of the report	7
2.7. Evaluation of the soe report and the reporting process.....	7
3. The need for a checklist	8
3.1. Determine the target groups and objectives	9
3.2. Organise the compilation	10
3.3. Define the structure	12
3.4. Choose the contents.....	14
3.4.1. Design the organisation for data delivery and verification.....	16
3.4.2. Choose the datasets and indicators (diagrams, tables and maps) for each chapter	17
3.4.3. Outlooks	18
3.5. Design the publication.....	19
3.6. Presentation of the report	20
3.7. Evaluation of the soe report and the reporting process.....	21
4. References	23

1. Introduction

The European Environment Agency (EEA) is, among others, responsible for preparing regular State of the Environment (SOE) reports at European level, targeted at the European Commission, the European Parliament and the Member States. To execute this task most efficiently, the EEA is dependent on various information flows and is continuously looking for ways to streamline the European reporting process. Much data and information are provided to the EEA through the Environmental Information and Observation NETwork (EIONET). However, the EEA is also dependent on information from other sources.

National SOE reports generally aggregate and summarise data and information on development of the society and its pressures on the environment, on environmental issues and on responses to reduce environmental problems such as legislation and national environmental strategies. Information in national SOE reports can be a valuable input into the EEA reporting process, and streamlining and harmonisation of the type of information presented in those reports is equally useful for both the national and the European reporting process.

The aim of the European Environment Agency to arrive at the required harmonisation of state of the environment reporting is not to issue strict guidelines, but to work together with the member countries to develop common frameworks. An important instrument in this process is a group of national experts in SOE reporting established by the EEA. This group, called the 'EEA Expert Group on Guidelines and Reporting' (SOE Expert Group), helps the Agency to identify common requirements to develop products. Overviews of current practices and meetings to discuss the issues concerned are stepping stones to common frameworks and 'guidelines'. The group consists of experts from the 18 EEA member countries and from the 13 countries participating in the PHARE programme.

The intention of this checklist is thus to support a greater harmonisation of environmental information through the development and encouragement of common approaches, practices and terminology. The report first lists the condensed checklist, and thereafter an annotated version of the checklist.

2. Checklist for SOE reporting

The checklist aims at describing the key factors in the process of preparing a successful SOE report:

- ✓ Before embarking on a new SOE report, look back on the previous reports and find out what could be learnt from these.

2.1. Determine the target groups and objectives

- ✓ Describe precisely the target group(s) of the report, their expectations of it, and the use they are expected to make of it.
- ✓ Write down as precisely as possible the aim of the report.

2.2. Organise the compilation

- ✓ Find the best organisational structure for your situation.
- ✓ Produce a detailed list of activities and responsibilities for the SOE secretariat.
- ✓ Based on the above list, ensure that the SOE secretariat has the necessary tools (legal) and qualifications to perform its tasks.
- ✓ Establish procedures for handling conflicts between partners involved in the SOE reporting process.
- ✓ Write down a detailed SOE project plan. For each task specify the activities foreseen. Based on the project plan estimate for each task the resources needed and prepare a detailed timetable.

2.3. Define the structure

- ✓ Write down for each potential issue to be included in the report the answers to the four basic questions:
 - a) What is happening?
 - b) Why is it happening?
 - c) Are the changes significant?
 - d) What is, or could be, the response?
- ✓ Select an analytical framework to structure the report.
- ✓ Select a consistent approach to organise the report.
- ✓ Identify the priority environmental issues and problems.

2.4. Chose the content

Select the list of contents of each chapter

- ✓ Based on the framework chosen write down for each chapter a list of contents and ask for each chapter the question: does the chapter contain enough information for decision-making?
- ✓ Identify clearly dependencies between chapters and use this for ensuring consistency between chapters with overlapping issues.

- ✓ To ensure consistency through the report select the reference year to present current state information and periods for presenting information on past trends and outlooks.

2.4.1. Design the organisation for data delivery and verification

- ✓ Consider the opportunity to establish overviews of existing data sources in the form of inventories and a meta-database, as a side product of making the report.
- ✓ Early in the reporting process identify data gaps and target these, ensure the access to data and information from other institutions.
- ✓ An inventory of policy measures and targets could also be relevant before starting writing a SOE report.
- ✓ Prepare guidelines on data handling, technical documentation of the data and analytical methods used.

2.4.2. Choose the datasets and indicators (diagrams, tables and maps) for each chapter

- ✓ Prepare guidelines to evaluate the datasets and indicators (diagrams, tables and maps) chosen for the report. The datasets should be checked for their a) relevance, b) validity c) reliability and d) comparability (see also OECD criteria for selecting indicators). For example a good indicator a) is relevant to an issue, b) can be expressed as 'below' or 'above' a target, c) is comparable internationally, d) is based on available or cost-efficient data, and is easy to communicate and understand.
- ✓ For each dataset and indicator (diagrams, tables and maps), maintain a paper or electronic fact-sheet with description of data source, data quality, methods for data compilation, other relevant information and its graphical draft.

2.4.3. Outlooks

- ✓ If the report should contain outlooks one general set of socio-economic scenarios may be produced centrally and delivered as input to the various environmental models. This would ensure consistency in relation to the socio-economic outlooks throughout the report.

2.5. Design the publication

- ✓ Prepare guidelines for the graphical presentation. Create templates for the graphical production.
- ✓ For each diagram ask the questions: a) does the diagram give a clear message and can it be understood without the caption or the text, b) does the diagram show what I want to show, c) are there not too many details on the diagrams (2-3 items per diagram).
- ✓ Set up procedures for review and quality check all the produced graphical items (e.g. spelling, conformity between raw data and final figure, consistency between legend and image).

2.6. Presentation of the report

- ✓ Early in the compilation process think of ways for presenting the report. How do we target the presentation to the primary user group, and find the right moment for publication of the report.
- ✓ Identify the main messages to go out to the media and target groups and ensure that an executive summary are prepared (politicians and other busy persons will only read the summary).
- ✓ Analyse if additional SOE products, such as educational material, posters, statistical compendium type reports, separate summaries in leaflets are necessary, and consider if resources are available for producing these.
- ✓ If you are considering an Internet version of the SOE report, read *Cookbook for State of the Environment Reporting on the Internet*, Denisov et al. 1998) see <http://www.grida.no/soe/cookbook/>.

2.7. Evaluation of the SOE report and the reporting process

- ✓ Establish procedures to monitor and evaluate the SOE reporting process.
- ✓ Think of a system and procedures to measure the effectiveness of the report. The evaluation process should also focus on the research agenda for the coming years.

3. The need for a checklist

1. SOE reporting in Europe is in a formative and dynamic phase. New approaches to reporting are developing, partly in response to the emergence of concepts such as sustainable development, public participation and indicators (EEA, 1999a). New forms of reporting are also appearing as a result of advances in computer technology.
2. However, differences in information content, data definitions, reporting form and reporting frequency make it difficult for users to compile information from the various reports or to make comparisons between different reports. Currently it is difficult to:
 - a) identify clear base years for European environmental data,
 - b) undertake environmental comparisons between countries,
 - c) aggregate data across countries,
 - d) quantify common trends in environmental conditions across countries,
 - e) identify common data gaps and needs, and
 - f) define opportunities for collaborative action.

(EEA, 1999a)

3. The intention of this checklist is thus to help move towards a greater harmonisation of environmental information through the development and encouragement of common approaches, practices and terminology (cf. Rump, 1996). It is also intended to help SOE reporters become acquainted with the best European practices, and to facilitate a discussion on ways to achieve further progress.
4. The checklist aims at describing the key factors in the process of preparing a successful SOE report. The checklist is based on the authors' experience as well as information in the report by Paul Rump (1996) *State of the Environment Reporting: Source book of Methods and Approaches*. In addition, information found in previous studies by the EEA and other international organisations (OECD, CSD, UNEP) on SOE reporting has been used for the checklist.

Checklist

- ✓ Before embarking on a new SOE report, look back on the previous reports and find out what could be learnt from these.

3.1. Determine the target groups and objectives

5. A large array of publications exist that analyse the structure and detail of SOE reports and recommend essential ingredients¹. It is perhaps useful to first briefly review certain fundamental questions:
 - a) What is the definition of an SOE report?
 - b) Who is the audience of an SOE report?
 - c) What is its purpose (immediate objective)?
 - d) What is its goal (wider objective)?

6. Most of the available literature does not define an SOE report, but instead sets out what the objectives should be². Thus Rump (1996) provides a '*purpose*' ('to support sustainable development decision-making through the provision of credible environmental information') and a method ('this is accomplished by the development of objective, comprehensive and science-based information on environmental conditions and trends, including their significance, employing an integrated, holistic approach'). He also notes three key 'objectives':
 - a) to increase awareness and understanding of environmental trends and conditions, and their causes and consequences among all stakeholders;
 - b) to provide a foundation for improved decision-making at all levels, from the individual to national governments and international organisations; and
 - c) to facilitate the measurement of progress towards sustainability'.

7. *We will define an SOE report simply as a document that describes the current and future condition of the environment and the causes of it. The immediate objective of producing such a document is to describe, for policy-makers³, the trends in environmental condition and the potential problem areas. The wider objective is to review the position with regard to sustainable development (as noted⁴ in Chapter 40 of Agenda 21), again for policy-makers. In other words, SOE reporting is an activity in which disparate data are synthesised into meaningful and relevant environmental information, and communicated to decision-makers.*

¹ Eg. Avérous, 1989; EEA, 1999a; Campbell & Maclaren, 1995; Carl Bro Associates, 1997; Denisov, 1997; Denisov et al., 1997; Fedra, 1994; Hamilton, 1991; Kerr, 1988; Parker & Hope, 1992; Rump, 1996.

² An exception is that given by WRC (1996): 'reports on the state of the environment present information on the conditions and trends of the environment; identify and analyse causes, linkages and constraints; and indicate emerging issues and problems and their relevance to policies'.

³ 'Policy-makers' in a broad sense, which includes public opinion (perhaps leading to pressure on government), NGOs, and 'green' lobbies.

⁴ 'Countries and international organisations should review and strengthen information systems and services in sectors related to sustainable development, at the local, provincial, national and international levels. Special emphasis should be placed on the transformation of existing information into forms more useful for decision-making and on targeting information at different user groups. Mechanisms should be strengthened or established for transforming scientific and socio-economic assessments into information suitable for both planning and public information.' (UNCED, 1992).

8. Define a clear audience for the SOE report.
The wide objectives and target groups given in the previous paragraph are relevant when defining the group of SOE products. However, when making a specific SOE report, it is important to have a clear view of the primary target group, this will also enable a precise description of the objectives of the report.

Five major uses of SOE reports have been identified:

- a) public awareness
- b) education
- c) policy development
- d) performance assessments, and
- e) scientific bench marking.

Checklist

- ✓ Describe precisely the target group (s) of the report, their expectations of it, and the use they are expected to make of it.
- ✓ Write down the aim of the report as precisely as possible.

3.2. Organise the compilation

9. Producing a SOE report will generally require the establishment of a secretariat/group/team with responsibility for:
- a) planning tasks and allocating resources;
 - b) the everyday management;
 - c) compiling the overall structure and the outline of the report and ensuring that the chosen framework is used through the report;
 - d) developing in detail the red lines in the report and the main questions the report has to answer;
 - e) checking consistency in the use of similar data in various chapters, ensuring consistency in graphical layout, etc. ;
 - f) editing and reviewing the report;
 - g) final compilation and graphical layout of the report;
 - h) co-ordinating consultation with external partners.

Depending on the national situation, several ways of structuring the compilation can be chosen. During the SOE Expert Group meeting in March 1998, the following approaches were described:

- a) *A small team with a limited number of nearly full-time persons dedicated to the task of preparing the SOE report.* The team was responsible for the majority of activities in the process of preparing the report, including writing the individual chapters, collecting data and information from experts, co-ordinating the review process and the overall editing of the report.

- b) *A large network with many authors (generally experts from the different departments of the Ministry of the Environment) co-ordinated by a small editorial/steering group.* The expert authors each prepare a draft chapter or a draft section which will be assembled in the final report. The authors generally base their chapters on the data and information available from their department. The editorial/steering group sets out some general guidelines to the authors and, if required, cross-edit the draft chapters. Afterwards, the draft report is sent out for review in the Ministry of the Environment and among other relevant parties. The editorial group incorporates comments into the draft.
- c) *An approach between the two above types.* An editorial group (5-10 persons) is responsible for preparing an outline of the report and the different chapters. In some cases, the outline is discussed with the contributors to the report or the potential users. Then, experts or networks of experts are asked to prepare a chapter, or to provide input to chapters. This process is co-ordinated by persons from the editorial group. The editorial group edits the experts' input to the draft chapters and the draft of the final report, and runs the review process, preparation of final graphics, layout etc.
10. It is important that the terms of reference and the responsibilities of all involved partners/participants (e.g. SOE secretariat, steering and advisory groups, authors and data handlers) in the SOE reporting are clearly defined. In addition, procedures for handling conflicts may also be established.

Checklist

- ✓ Find the best organisational structure for your situation.
 - ✓ Produce a detailed list of activities and responsibilities for the SOE secretariat.
 - ✓ Based on the above list ensure that the SOE secretariat has the necessary tools (legal) and qualifications to perform its tasks.
 - ✓ Establish procedures for handling conflicts between partners involved in the SOE reporting process.
11. Resources and Planning. From the beginning, think about SOE preparation in project-management terms. Proper planning of tasks and allocation of resources are critical to the success of the report.

Checklist

- ✓ Write down a detailed SOE project plan. For each task, specify the activities foreseen. Based on the project plan, estimate the resources needed for each task, and prepare a detailed timetable.

3.3. Define the structure

12. The layout and contents of an 'ideal' SOE report are open to much debate. At least several hundred SOE reports have been produced since the late 1970s, when the concept first appeared (Rump, 1996). These cover all areas of the world, on various geographical scales, from municipal to national and regional. In general, the conceptual framework used falls into one of four categories:
 - a) Pressure-State-Response models (and their variants) [systems approach]
 - b) Ecosystem approach [spatial framework]
 - c) Information hierarchy [spatial and thematic aggregation]
 - d) Policy cycle [stages of decision-making]
 - e) Combinations of the above
13. These frameworks have been fully described¹, and will not be elaborated here. The EEA, in both its *Dobris Assessment* and SOE reports on the EU, has successfully used the DPSIR-type model as a framework, where a systems approach is taken that recognises the linkages between the environment and the socioeconomic domains⁵. In *Dobris*, 'human activities' (*Driving forces*) were seen as leading to 'Pressures' on the environment, which in turn led to changes in 'environmental conditions' (*State*) and thence 'environmental problems' (*Impacts* on human beings, natural resources and materials). These problems closed the loop back to human activities and also led to policy actions (*Responses*) (Stanners & Bourdeau, 1995).
14. Whichever framework is used, there are four basic questions to be answered by an SOE report (Rump, 1996):
 - a) What is happening? [the environmental conditions and trends]
 - b) Why is it happening? [the human and natural causes of changes]
 - c) Are the changes significant?
[the health, economic, social and ecological implications]
 - d) What is, or could be, the response?
[the environmental implications of societal response]
15. The PSR model provides a logical way of organising and classifying environmental information for reporting purposes (Rump, 1996), and the recommendation from the OECD (1993, 1994 & 1996) to use such an approach is followed by most European countries. However, there are great differences in the way the approach has been used (Carl Bro Assoc., 1997). The enlargement of this model into Driving Forces-Pressures-States-Impacts-Responses⁶ is seen as

⁵ Conversely, a variant of PSR, UNCSO's Driving Force-State-Response framework, is not based on the assumption of causal linkage between indicators, either horizontally or vertically (Mortensen, 1996).

⁶ DPSIR is a framework for linking related environmental issues and hence enabling integrated environmental assessment (RIVM, 1995; NERI, 1996). Integrated

providing consistency to the analysis of environmental information, and avoiding repetition (Carl Bro Assoc., 1997). That said, DPSIR should not be taken as an exhaustive model of the environment, as this can lead to over-simplification of the problems.

16. An example of the structure under a DPSIR framework is as follows (taken from the proposal for the EU98 SOE report):
 - a) Driving Forces
 - General: Population, Economy, Land Use, Societal Development
 - Sector specific: Manufacturing & Industry, Energy, Agriculture, Fisheries & Aquaculture, Transport, Households & Consumers, Tourism & Recreation
 - b) Pressures
 - Soil Emissions, Water Emissions, Air Emissions, Waste, Use of Resources
 - c) State
 - Water (ground-, surface-, marine-), Soil, Air
 - d) Impact
 - Ecosystems, Human Health and other functions of the environment
 - e) Response
 - Target Setting, Environmental Policies and Measures
17. Consideration of the decision-making, or policy cycle has to be woven into this framework. If the SOE report is a part of the national strategic environmental planning, such as a background document for national policy plan or for evaluation of policy measures (e.g. emissions targets or action plans), the chosen framework has to reflect this.

The description of environmental problems will change over time as the understanding of the problem evolves and as responses are implemented. Winsemius (1986) in Bakkes et al. (1994) described the shifting of focus as the response to an environmental problem. He used the concept of a four-phase “policy life cycle”, starting with problem identification, followed by the formulation of a policy response, its implementation, and, eventually, arriving at a stable control situation – or a fresh start, identifying new aspects of the problem. In the problem-identification phase, descriptive single-parameter indicators are normally used (e.g. chemical risk). In the policy development phase, more detailed assessments are presented, using relationships between driving forces and pressures or between

environmental assessment is defined as the interdisciplinary process of identification, analysis and appraisal of all relevant natural and human processes and their interactions, which determine both the current and future state of environmental quality, and resources, on appropriate spatial and temporal scales, thus facilitating the framing and implementation of policies and strategies (Stanners and Bourdeau, 1995).

pressures and states. To monitor the performance of environmental policies once they are established, a different focus and indicators from those used for policy development may be selected, such as focus on emission reductions or abatement measures.

18. It is possible to organise the report according to media (air, water, soil) or according to environmental problems or issues (e.g. climate change, acidification). In addition, it may be necessary to include chapters describing societal sectors and their pressures as well as chapters on environmental management (e.g. environmental awareness, monitoring, environmental cost and expenditures).

A consistent organising approach has to be chosen. Ordering of chapters also has to be evaluated. The chapters may be ordered according to *geographical scale* of the problems, which goes from global, via continental to regional and local problems, or according to *position in policy cycle*: problem identification (e.g. chemical risks), policy setting (climate change) and policy implementation (stratospheric ozone implementation)

19. There is a considerable amount of information available about the environment, and similarly there is a wealth of information about the development of society and its pressure on the environment. But it is easy to become overloaded with data and to miss the key messages. In addition, the length of the SOE report and the resources available for producing the report generally are limited.

Therefore it is important to focus the report on priority issues for which the available information is synthesised. The checklist below should make it possible to identify priority environmental issues or problems.

Checklist

- ✓ Write down for each potential issue to be included in the report the answers to the four basic questions:
 - a) What is happening?
 - b) Why is it happening?
 - c) Are the changes significant?
 - d) What is, or could be, the response?
- ✓ Select an analytical framework to structure the report.
- ✓ Select a consistent approach to organise the report.
- ✓ Identification of priority environmental issues and problems.

3.4. Choose the contents

Select the content of each chapter

20. Recently, the focus in SOE reports has been shifting away from describing the *State of the Environment*, and instead is moving towards analysing the relationship in the DPSIR framework, the analysis and interpretation of trends, focusing on the areas that can be influenced by policies (Driving forces and Pressures), and analysing the amount of Responses taken.
Based on the desired structure of the report, the analytical framework chosen, and priority issues identified, the content of the chapters has to be determined. When the content of the chapter has been chosen, it has to be ensured that the report contains information relevant for and enabling decision-making.
21. Reliable information must be presented in a clear, concise manner in order to make it relevant and meaningful. It must tell us what we want to know.

There should be consistency between the information presented under different sections (e.g. comparable temporal trends for connected pressure and state indicators; trends and current state should be on the same time and geographical scales), and between the different issues within the chosen framework. Effects indicators proposed by USEPA (1995) help to 'hard wire' linkages that are suggested by the use of conceptual frameworks⁷.

It is relevant to have general guidelines for presenting information throughout the report. For example, choose a specific reference year to present all current state information (e.g. 1995), and choose specific periods to present past trends (e.g. 1980-95) and outlook information (e.g. 1995-2010).

⁷ The effects indicators proposed by USEPA (1995) help to clarify linkages between the elements within conceptual frameworks. These concern the relationships between two or more variables within a P, S or R category, and are based on models and analyses that provide good evidence of a linkage between a problem, potential cause and, or, a solution. The important types of effects are:

- a) effects of underlying pressures on human activities (e.g. effects of population growth on the energy sector)
- b) effects of human activities on levels of biophysical pressures (e.g. CFC emissions from the use and repair of automobile air conditioners)
- c) ecological effects (e.g. exotic species introductions on native biodiversity)
- d) human health impacts (e.g. lung cancer incidence associated with radon exposure)
- e) human welfare impacts (e.g. aesthetic value of wilderness areas)

Checklist

- ✓ Based on the framework chosen write down for each chapter a list of content and ask for each chapter the question: does the chapter contain enough information for decision-making?
- ✓ Identify clearly dependencies between chapters and use this for ensuring consistency between chapters with overlapping issues
- ✓ To ensure consistency through the report select reference year to present current state information and periods for presenting information on past trends and outlooks.

3.4.1. Design the organisation for data delivery and verification

22. Robust environmental and socio-economic data provide the foundation for analysis and interpretation of the state of the environment. In many cases, data limitations, both in terms of balance and quality, severely hinder the quantitative assessment and reporting of the state of the environment (Rump, 1996). Generally, SOE reports have to be based on data and information produced by other organisations. The various sources of environmental data include organisations responsible for environmental monitoring, environmental research institutes and statistical surveys. Geographical information in GIS files is becoming increasingly important, not only for the production of illustrations, but also as an extra tool in developing the analysis.

SOE reporting institutions should consider the opportunity to establish overviews of existing data sources in the form of inventories and meta-database. The SOE reporting institutions also have to ensure access to external data and information from other institutions. The overviews of data and information sources will be important when choosing the data for the report.

Checklist

- ✓ Consider the opportunity to establish overviews of existing data sources in form of inventories and a meta-database, as a side-product of making the report.
 - ✓ Early in the reporting process identify data gaps and target these, ensure the access to data and information from other institutions.
 - ✓ An inventory of policy measures and targets could also be relevant before starting a SOE report.
23. The organisation of the data collected for the SOE report has also to be evaluated. Generally, more than a hundred datasets have to be collected to produce the SOE report, including general background data and more detailed specialist data. The datasets used have to be documented, and an archive of the datasets used as well as technical documentation of the methods used are also relevant.

- a) One solution could be to leave all the data with the authors/participating institutions and prepare guidelines on how the datasets should be documented, or
- b) The background data to the report could be gathered in one place. This solution would require resources available for data handling and to establish databases/archives, but makes it easier to do consistency checks and to produce other SOE products, such as indicator-based reports and Internet versions.

Checklist

- ✓ Prepare guidelines on data handling, technical documentation of the data and analytical methods used.

3.4.2. Choose the datasets and indicators (diagrams, tables and maps) for each chapter

- 24. Based on the list of contents for each chapter, as well as knowledge of data sources, the datasets for the report have to be chosen. Each dataset has to be evaluated to ensure that it is relevant and reliable.

Rump (1996) identifies four criteria requiring particular attention:

- a) data relevance
- b) data validity
- c) data reliability
- d) data comparability.

The evaluation of the quality of the datasets should be done together with an evaluation of the indicators (diagrams, tables and maps) to go into the report. This is discussed below.

Indicators

- 25. Most SOE reports compile sets of physical, biological or chemical indicators to reflect trends in the state of the environment and to monitor progress made in realising environmental policy targets (EEA, 1999).

An indicator can be defined as a parameter or a value derived from parameters, which provides information about a phenomenon (OECD, 1993). Indicators are quantified information which help to explain how things are changing over time or vary spatially.

Indicators have three basic functions: simplification, quantification, and communication. Indicators generally simplify in order to make complex phenomena quantifiable, so that the information can be communicated (DoE, UK, 1996).

The OECD (1993) has defined three basic criteria for indicator selection: a) policy-relevance, b) analytical soundness and c)

measurability. Table 1 offers a more detailed presentation of these general criteria.

Table 1: Criteria for indicator selection (OECD, 1993). These criteria describe the “ideal” indicator and not all of them will be met in practice.

<p>Policy relevance and utility for users An environmental indicator should:</p> <ul style="list-style-type: none"> • provide a representative picture of environmental conditions, pressures on the environment or society’s responses; • be simple, easy to interpret and able to show trends over time; • be responsive to changes in the environment and related human activities; • provide a basis for international comparisons; • be either national in scope or applicable to regional environmental issues of national significance; • have a threshold or reference value against which to compare it so that users are able to assess the significance of the values associated with it.
<p>Analytical soundness An environmental indicator should:</p> <ul style="list-style-type: none"> • be theoretically well founded in technical and scientific terms; • be based on international standards and international consensus about its validity; • lend itself to being linked to economic models, forecasting and information systems.
<p>Measurability The data required to support the indicator should be:</p> <ul style="list-style-type: none"> • readily available or made available at a reasonable cost/benefit ratio; • adequately documented and of known quality; • updated at regular intervals in accordance with reliable procedures.

Checklist

- ✓ Prepare guidelines to evaluate the datasets and indicators (diagrams, tables and maps) chosen for the report. The datasets should be checked for their a) relevance, b) validity c) reliability and d) comparability (see also OECD criteria for selecting indicators). For example a good indicator a) is relevant to an issue, b) can be expressed as ‘below’ or ‘above’ a target, c) is comparable internationally, d) is based on available or cost-efficient data, and is easy to communicate and understand.
- ✓ For each dataset and indicator (diagrams, tables and maps), maintain a paper or electronic fact-sheet with description of data source, data quality, methods for data compilation, other relevant information and its graphical draft.

3.4.3. Outlooks

26. Producing outlooks for the future state of the environment is driven by scenarios of socio-economic development, and takes one of two forms:
- a) qualitative (expert opinion and judgement), and
 - b) quantitative (predictive models and data extrapolations).

Forecasting is inherently difficult because of the significant uncertainties involved (Rump, 1996), but economic forecast scenarios have been developed which can be used to feed environmental models to make environmental outlooks.

27. Outlooks can be framed by a number of key questions concerning the relationship between socio-economic developments and environmental change, and the current and future state of the environment. The initial step is to determine the significant socio-economic developments that impact on the functions of the environment and cause change, and then to discuss the changes over time of the different components of the environment, emphasising the linkages and interactions. This would include an assessment of the future state against reference values. The selected time frame for the diagnosis and prognosis is important; 10-20 years is common for determining the past and present conditions, while 25-40 years is more usual for forecasting purposes (Rump, 1996).

Checklist

- ✓ If the report should contain outlooks, one general set of socio-economic scenarios may be produced centrally and delivered as input to the various environmental models. This would ensure consistency in relation to the socio-economic outlooks throughout the report.

3.5. Design the publication

28. The spectrum of presentation styles used in European SOE reports ranges from massive technical documents, densely packed with data and statistical information, to short reports lavished with colour maps, pictures and graphs. This reflects differences in objective, where the report is:
- a) a data communication tool, targeted at scientists and government experts, or
 - b) a means of communicating interpreted information, targeted at non-experts.
29. When viewing a SOE product, a user's attention will immediately be drawn to any graphical elements present, rather than to text elements. For many years, editors and publishers have understood the power of graphical production and have devoted considerable resources to carefully crafting high quality, effective images which capture the attention of readers. Pleasant to the eye, and simply conceived, an image should significantly help users to rapidly absorb basic information. A well-designed graphic will not only convince the user of the quality of information being presented, but will also entice them to investigate the SOE product in more detail. The success of graphical production will depend on one's ability to follow some basic rules of graphical semiology, and to rely on a consistent presentation methodology.
30. Time series, whenever possible, should be extended to accommodate the most recent data, and can be supplemented with projections.

Local-level case studies can be used to draw attention to hot spots or local-scale solutions. Normalisation of indicators (e.g. per capita, per unit area, per monetary unit) can be used to improve the comparability of information.

31. In order to compare the past/present situation with the desired state of affairs, established target values (such as quality standards, local, national and international limits) should be presented together with actual data.

Checklist

- ✓ Prepare guidelines for the graphical presentation. Create templates for the graphical production.
- ✓ For each diagram, ask the questions: a) does the diagram give a clear message and can it be understood without the caption or the text; b) does the diagram show what I want to show? c) are there not too many details on the diagrams (2-3 items per diagram).
- ✓ Set up procedures for review and quality check for all the produced graphical items (e.g. spelling, conformity between raw data and final figure, consistency between legend and image).

3.6. Presentation of the report

32. It is important that the presentation of the final report and related products is planned. Traditionally, SOE reports are presented at press conferences with information being sent beforehand to the media. However, more targeted presentations of report, such as at a ministerial conference or together with the national budget, may be a solution.

Checklist

- ✓ Early in the compilation process, think of ways of presenting the report. How do we target the presentation to the primary user group, and find the right moment for publication of the report.
- ✓ Identify the main messages to go out to the media and target groups, and ensure that an executive summary is prepared (politicians and other busy persons will read only the summary).

Prepare an Internet version of the SOE report

33. Possibly the most important factor to affect the structure, layout and frequency of SOE reports is the recent development in computing technology, and particularly the ability to publish such reports on the Internet. This ability has considerable implications for both the dissemination and use of the report. Crucially, it is helping the SOE report to break away from the traditional concept of a single, comprehensive document, produced at regular intervals, and is

allowing it to become a more dynamic information source, which can be updated continuously and assessed according to need. In this way, it can also become more deeply integrated into the operation of the organisation. It is not necessarily a major project to compile and prepare the information, and once set up it can be maintained more or less on a day-to-day basis by a wide range of different contributors. Publishing on the Internet also helps to establish stronger cross-links between the various sections of the report. In addition, by use of links, it will be possible to provide access to more detailed information, such as per region information on a given indicator, or technical information on the method of producing the indicator.

Checklist

- ✓ If you are considering an Internet version of the SOE report, then read the ‘*Cookbook for State of the Environment Reporting on the Internet*’, Denisov et al. 1998) see <http://www.grida.no/SOE/cookbook/>

3.7. Evaluation of the SOE report and the reporting process

34. Evaluation of the SOE reporting process. When the SOE report is finalised, it is important to evaluate the whole process to find out where things have gone wrong and to capture suggestions for improvements for the process of preparing future SOE reports. As many partners are involved in the SOE reporting process, much valuable information on the process may be lost if it is not gathered during the compilation phase or just after the report is completed. Therefore it is recommended that every partner involved in the process makes a brief technical note on the process, and participates in the overall evaluation.
35. How do you measure achievement of the purpose and goal?
There is very little experience in determining if the information in SOE reports reaches the aims. Most measuring systems are based on gathering evidence on the use of the information in printed material, by keeping a file with clippings and photocopies from reports that refer to the SOE report. A classification can be applied of the level of decision-maker reached by the reports, such as:
 - a) general public (e.g. newspaper clippings, NGO information)
 - b) general policy-makers
 - c) environment minister, transport, agriculture minister
 - d) prime minister, minister of economic affairs.After users have become familiar with the report, a user evaluation can be undertaken.

Checklist

- ✓ Establish procedures to monitor and evaluate the SOE reporting process.

- ✓ Think of a system and procedures to measure the effectiveness of the report. The evaluation process should also focus on the research agenda for the coming years.

4. References

Avérous, C., 1989. *The International Scene: Reporting on the State of the Environment, a Review of the Experience of OECD Countries*. In: Proceedings of a National Workshop on State of the Environment Reporting. Environment Canada and BC Environment. Victoria, BC. October 24-26, 1989.

Bakkes, J.A., G.J. van den Born, J.C. Helder, R.J. Swart, C.W. Hope and J.D.E. Parker, 1994. *An Overview of Environmental Indicators: State of the art and perspectives*. A report from United Nations Environment Programme (UNEP) & RIVM.

Campbell, M. & V. Maclaren, 1995. *Municipal State of the Environment Reporting in Canada: Current Status and Future Needs*. Occasional Paper No. 6. State of the Environment Reporting Directorate, Environment Canada. Ottawa.

Carl Bro Associates, 1997. *Scoping study on the need for environmental reporting guidelines*. Report to the European Environment Agency.

Denisov, 1995. *Environmental Information Systems in the Russian Federation - Assessment Report*. Report from UNEP/GRID Arendal.

Denisov, 1997. *The Global Programme - Methodology Papers 1997*. Project report from UNEP/GRID Arendal.

Denisov, N.B., R.A. Mnatsakanian & A.V. Semichaevsky, 1997. *Environmental Reporting in Central and Eastern Europe: A review of Selected Publications and Frameworks*. A report from United Nations Environment Programme (UNEP) & Central European University.
http://www.grida.no/prog/cee/soe_cee/index.htm

Denisov, N.B., L. Hislop, P. Rekacewicz & O. Simonett, 1998. *Cookbook for State of the Environment Reporting on the Internet*. Report from UNEP/GRID Arendal. <http://www.grida.no/SOE/cookbook/>

DoE, UK, 1996. *Indicators for Sustainable Development for the UK*.
<http://www.environment.detr.gov.uk/epsim/indics/index.htm>

EEA, 1999. *Environmental Indicators: Typology and Overview*. Technical report by the European Environment Agency, Copenhagen.

EEA, 1999a. *Reporting Frequencies of State of the Environment Reports in Europe*. Technical report by the European Environment Agency, Copenhagen.

Fedra, K. 1994. *State of the Environment Reporting*. A study Commissioned by the UNEP/GRID Arendal and IAASA, Luxembourg.

Hamilton, K.E. 1991. *Organisational Principles for Environmental Statistics*. Paper presented to the 48th Session I.S.I. Cairo, September 9-17, 1991.

Kerr, A. 1988. *Framework for State of the Environment Reporting Operations*. Technical Report No. 1. Strategies and Scientific Methods. SOE Reporting Branch, Environment Canada.

OECD, 1993. *OECD Core Set of Indicators for Environmental Performance Reviews*. A Synthesis Report by the Group on the State of the Environment. Environment Monographs No 83. Organisation for Economic Co-operation and Development, Paris.

OECD, 1994. *Environmental Indicators. Indicateurs d'environnement*. OECD Core Set. Corps central de l'OCDE. Organisation for Economic Co-operation and Development, Paris.

OECD, 1996. *Environmental Indicators for Environmental Performance Reviews*. Discussion Paper. Group on the State of the Environment. Organisation for Economic Co-operation and Development, Paris.

Parker, J. & C. Hope, 1992. *The State of the Environment: A survey of reports from around the World*. Environment: 34(1) 19-20 and 39-44.

Rump, 1996. *State of the Environment Reporting: Source Book of Methods and Approaches*. Report from Division of Environment Information and Assessment. United Nations Environment Programme (UNEP/DEIA), Nairobi.

Stanners D. and Bourdeau P., 1995. *Europe's Environment: The Dobris Assessment*. European Environment Agency, Copenhagen.

UNCED, 1992. Agenda 21. United Nations Conference on Environment and Development Secretariat, Geneva.

UNCSD, 1996. *Indicators of Sustainable Development Framework and Methodologies*. Commission on Sustainable Development. United Nations, New York.

US EPA, 1995. *A conceptual framework to support development and use of environmental information in decision-making*. US EPA Environmental Indicator Home Page. [Http://www.epa.gov/indicator/](http://www.epa.gov/indicator/)

Winsemius, P. 1986. Referred in Bakkes et al. 1994; p.4-5.