# Module 7 – Assessing the State of the Environment

**Overview**
This module is designed to introduce you to assessing the state of the environment as a first step in IEA and reporting.

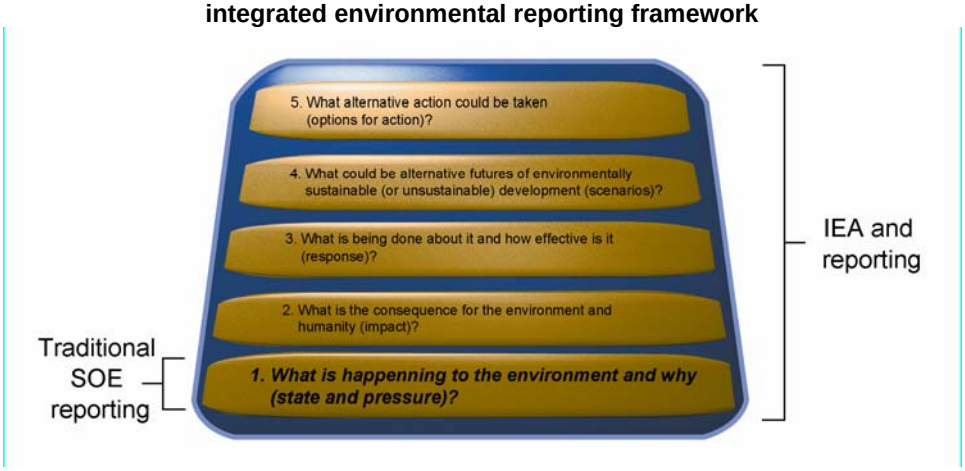
By the end of the module you will:

- Know the importance of reporting on environmental trends and conditions within an integrated system of environmental analysis.
- Learn a strategy for selecting the most important points in assessing the state of the environment.
- Learn about data and indicators and their importance in assessing the state of the environment and linking this assessment to environmental policy formulation.
- Learn about the value of unconventional sources of data such as remote sensing and the internet, and unconventional techniques of spatial data organization such as geographic information systems (GIS), in SOE analysis.

## 7.1 Introduction:

Reporting on the state of the environment is the first step in integrated environmental assessment. Traditional SOE reporting only answered the question "What is happening to the environment" (see Figure 7.1). While the reports were useful in informing about the state of the environment, they were not sufficient to ask questions required for influencing policy to do something about its state.

**Figure 7.1: The place of SOE analysis in the integrated environmental reporting framework**




*Source: Pinter and others 1999*

## 7.2 Important points in assessing "What is happening to the environment?"

In answering the first of the five questions in Figure 7.1, we get the basic environmental conditions and the pressures that are responsible for these conditions. An accurate understanding of the answer to the question lays a good foundation for IEA and reporting. Strategy for compiling information for the assessment may differ but the following points will be important:

- *What is the extent of the area to be covered by the assessment?*
  The area to be covered must be determined as the starting point. Data requirements vary with scale; what may be perfectly acceptable for decision making at one scale may be insufficient at another. Global data is good enough to compare regions of the world. On the other hand, there may not be sufficient capacity for data analysis if very detailed data is collected at the global level. At some level, too much detail blurs environmental trends and makes it difficult to link policy to the environment in the later stages of the analysis. At the other extreme, policy formulation may be difficult where data lacks sufficient detail. It is therefore important to determine the extent of the area to be covered before any plans for environmental assessment are made.

  How the area is demarcated may be important as well. The boundaries may be:

  - an ecosystem: a more natural division of an area to be assessed with more meaningful ecosystem averages. The functioning of the ecosystem are much more easily understood. The Zambezi Basin State of environment report (Chenje 2000) is a good example of this area demarcation for assessment.

- political boundaries: more common at all levels of assessment (global to sub-national) because they already exist in all countries and have been used for data collection. Many policies are also based on political jurisdictions with administrative structures that can be used for environmental assessment.

- *What are the most important environmental trends and conditions?*
  Identifying the most important environmental trends and conditions at this stage helps us to see what the direction of deterioration or improvement of the environment is. If these are identified properly at the stage of assessing the state of the environment, linking environment to human activity will be easier in later analysis. The number of issues of general concern on which the report might be based is likely to be high. The most important of these for a specific interest must be put together as a set for further analysis. Each set of issues is unique and depends on the theme of interest and the area where the assessment of the state of environment is carried out.

- *What are the forces for environmental change?*
  Pressures that influence environmental trends and conditions (e.g. demographics, production and consumption, etc.) must be identified to understand the state of the environment. Some of these may be indirect (e.g. trade) but powerful in influencing environmental change. Identifying the wrong pressures may be very damaging to further analysis and linking policy and the environment because they would tend to misdirect policy formulation.

There may be many other important points to note depending on either the area of analysis, the themes of interest, or data organization.

### 7.3 Data and indicators

All environmental assessments need to be supported with appropriate, good quality data and indicators. Data for SOE reporting comes from many sources and in various forms, and some of it (e.g. satellite data) may require special techniques and skills to process. Each type of appropriate data, however, may add a new aspect to the SOE analysis. An environmental indicator is a sign or symptom that may be used to assist in identifying environmental change. For example, agricultural data showing tins of sorghum obtained from a given acreage may be processed to detect deterioration in agricultural yields over time by calculating the number of tins of sorghum per hectare, an indicator of land productivity. A comparison of this indicator over time will show (i.e. indicate) whether there is an increase or decrease in land productivity. Processing data to obtain indicators is useful to improving environmental assessment and communication among scientists, the public and decision-makers.

The emphasis of indicators may, in general, be influenced by the framework used in environmental assessment. When using the Opportunities Framework, indicators may be designed to reveal what opportunities are available in the environment and how they can be used to achieve sustainable development. For example, a deteriorating ecological system will need a given level of effort to reach a stage where it will become self-sustaining. Instead of focusing on an indicator that will assess how much deterioration of the ecosystem is occurring over time we can be more positive and look for a threshold beyond which it will start “healing” itself. We should then be able to use it as a basis for deciding the appropriate action to take to prevent or reduce unwanted environmental change. Alternatively, it should be useful as an early warning sign to

reduce the impact of the change on activities or livelihoods that might be affected. When using the DPSIR framework, indicators may be more focused on assessing changes in pressure, state, or response on any environmental issue. For all frameworks, however, indicators are useful in formulating policy and monitoring progress towards sustainable development.

Data and indicators also (Pinter and others 1999):

- provide feedback on system behaviour and policy performance;
- improve chances of successful adaptation;
- ensure movement toward common goals;
- improve implementation; and
- increase accountability.

### 7.4 Data quality

Data quality and data availability are two of the most important problems for SOE reporting in Africa. Inconclusive debates based on poor quality data complicate the decision making process. However, using poor quality data may probably be more dangerous than having no data at all since it can build false confidence in environmental analysts and decision-makers that they are making appropriate responses when in fact they are not. While poor data collection techniques are responsible for much of the poor data, the worst problems in data quality relate to underestimates of the magnitude of various problems with political undertones, real or imagined, commonly as a result of ignorance of the potential dangers of intentional under-reporting (e.g. the rate at which HIV/AIDS is spreading) the problem. Table 7.1 gives some examples of the potential damage poor quality data may bring to decision making.

**Table 7.1: Examples of potential damage to decision making by poor quality data**

| Variable | Potential error with poor quality data |
|---|---|
| Underestimate of the rate of land degradation | Insufficient attention to potential reductions in land productivity and desertification with a wide range of consequences for the economy and (on a large scale) climate. Reduction of biodiversity. |
| Underestimates of population growth | Errors in estimates of natural resources consumption. Poor planning for sustainable development. |
| Overestimates of crop yields | Insufficient attention to food security problems. |
| Mapping at inappropriate scales | (Scale too large) Excess and unsustainable expenditure on mapping at the expense of other problems deserving attention. (Scale too small) Insufficient information for all spatial planning. |

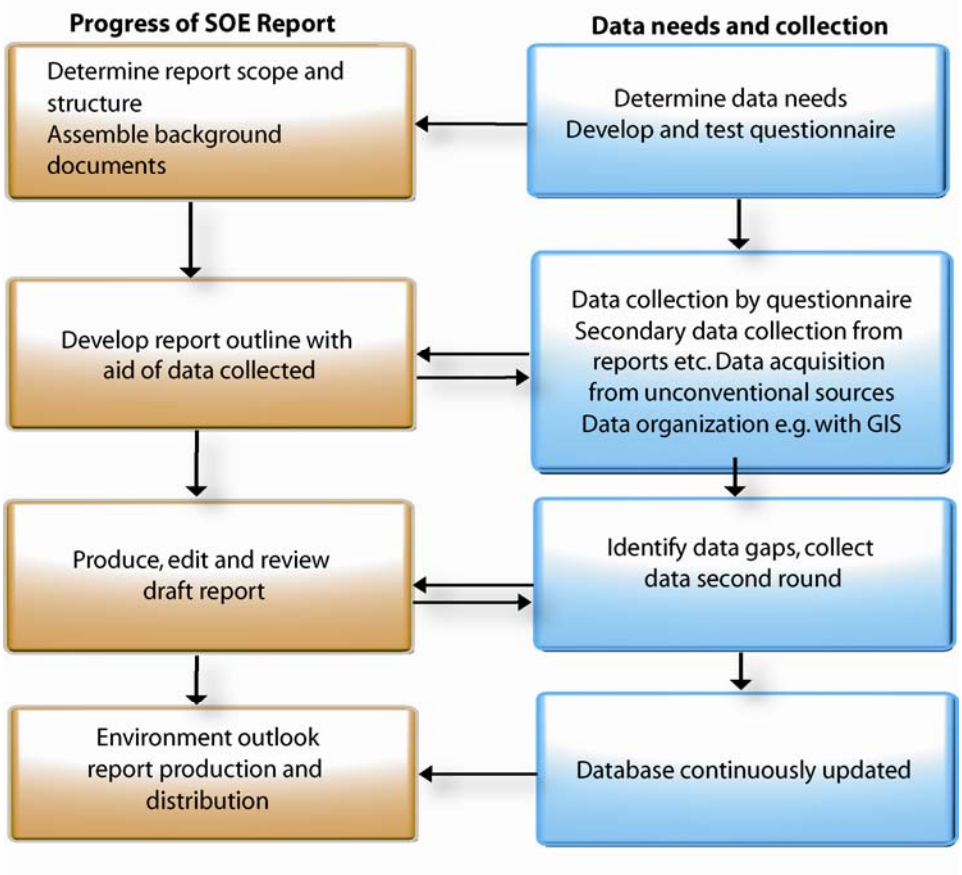
For example, data on rates of land degradation may show erroneously that degradation is progressing at a slower rate than is actually the case. Quality control should therefore be in-built in the data collection process.

### 7.5 Collection of data for an SOE Report

The range of data and the variables on which data is collected will be determined by the issues in the SOE report reflecting priorities of the area for the report (e.g. regional, sub-regional, national, etc.). SOE reporting may use data that might be discarded in scientific research, but even with this relaxation, availability of data may limit the issues on which analysis may be. A listing of the priorities may reveal gaps where new data has to be collected. It is advisable to first list the issues of interest regardless of whether data is available on some of them or not. The effort for data collection may then be directed at variables where gaps exist and various bodies may be identified to collect data to fill the gaps identified. For IEA and reporting, the range of issues will necessarily be wide requiring getting data from many government departments, NGOs and the private sector. Not all of these will have a keen interest in SOE reporting and maintaining data updates from their sources may be difficult.

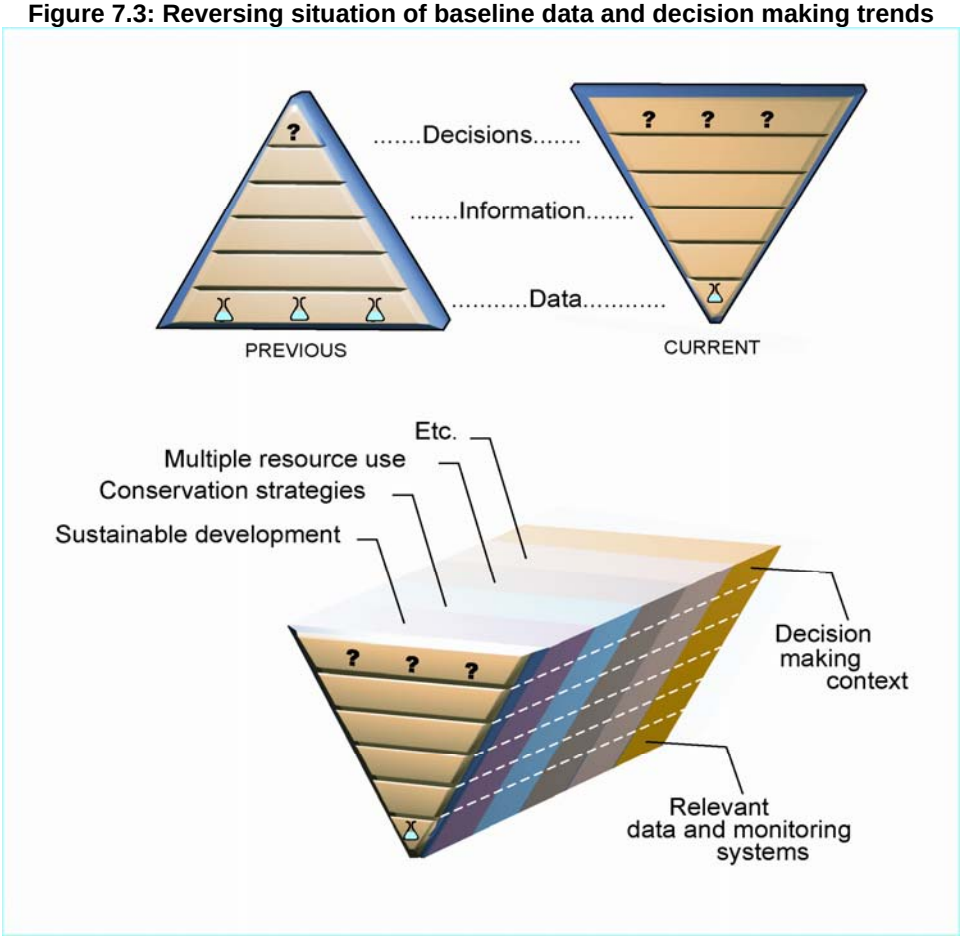
Managing the data for the SOE report is carried out in step with report development throughout the process. The arrangement of the stages may differ depending on what data relevant to the issues is already available. One illustrative development is given in Figure 7.2. Data should be collected and processed with a clear decision making process in mind rather than as an end in itself (see Figure 7.3).

**Figure 7.2: An illustrative continuous data collection and acquisition effort as the development of the SOE report progresses**




*Source: modified from Rump 1996*

**Figure 7.3: Reversing situation of baseline data and decision making trends**



### 7.6 Study/Discussion questions

Q1: Think of one example where an inappropriate indicator may be erroneously used and creates problems in assessing the state of the environment.

A1: _____
_____
_____
_____

Q2: How can you justify collecting and acquiring data being in step with the development of the SOE report? Why not decide on all the data you need and collect it all at the beginning of the process?

A2: _____
_____
_____
_____