ENVIRONMENTAL INDICATORS:

Methodological approaches[1]

Environmental indicators are a key tool for environmental reporting. Appropriately chosen indicators, based on sufficient time-series data, can show key trends, help describe causes and effects of environmental conditions, and track and evaluate policy implementation (see box). This section describes methodological aspects of indicator development, based on documents and discussions within the UNECE Working Group on Environmental Monitoring and Assessment.

Box. Defining environmental indicators

Environmental indicators describe environmental conditions and trends. They synthesize often complex numerical data, turning it into "information" that can be communicated to end-users such as policy makers and the public. Environmental indicators are commonly classified along three main lines:

- First, by *topic* – either an environmental *issue*, such as air pollution, climate change, or waste management, or an economic *sector*, such as energy, transport and agriculture;
- Second, indicators fit within a broad *assessment framework;*
- Third, different *types* of indicators have specific functions, related to the specific policy questions they answer.

Indicators are typically used as part of a coherent set: a *core set* that covers a broad array of topics, across all categories of the assessment framework, a *sectoral indicator set* for specific economic sectors, or a small set of *headline* indicators for audiences such as the general public and high-level decision makers.

An ***assessment framework*** provides a structure for indicator sets and helps identify the functions of individual indicators. For example, the sustainable development indicators of the United Nations Commission on Sustainable Development (UNCSD) follow a three-part framework, *driving forces-state-response*. The European Environment Agency (EEA) has developed an extended version: the *Driving forces - Pressures - State - Impact - Responses (DPSIR)* framework (see the fig. below), as follows:

- *Driving forces* are socio-economic factors and activities that increase or mitigate pressures on the environment. These can include, for example, the volume of industrial, transport or tourism activities (specific modes and technologies employed also play an important role). Specific indicators may refer to, for example, the production level of an industrial sector or total passenger car use (which can be measured in terms of vehicle-kilometres).
- *Pressures* include direct anthropogenic stress and impacts on the environment, such as pollution releases and natural resources use (for example, the emission of carbon dioxide by passenger cars or the volume of fishing in a water body).

[1] This section is adapted from the UN Publication *Environmental Monitoring and Reporting: Eastern Europe, the Caucasus and Central Asia*, New York and Geneva, 2003 (Sales No. E.03.II.E.33).

- *State* refers to the current conditions and trends of the environment, including: quality parameters (such as pollution levels) in air, water bodies and soil; diversity of species in a specific geographic region; and availability of natural resources such as timber or freshwater.
- *Impact* stands for the effects of a changed environment on the health of human beings and other organisms and on the effects on nature and biodiversity (for example, human health effects related to air pollution in a large city).
- To close the loop, *responses* are societal efforts to address environmental problems. These can include specific policies, such as government charges on natural resources use. Choices made by enterprises and individuals are also important – for example, enterprise investments in pollution control, or household purchase of recycled goods.

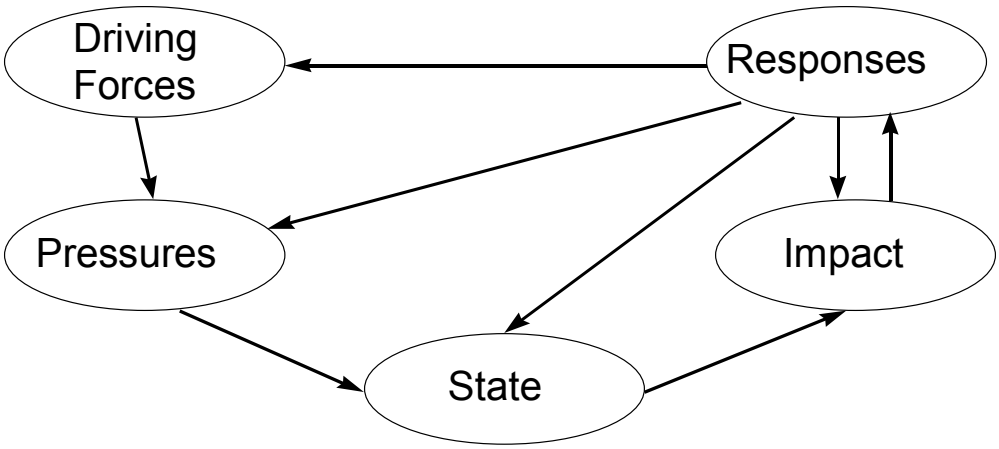

Figure. The EEA framework for indicator reporting on environmental issues

There are several ***types*** of indicators based on the policy questions they answer:

- *Descriptive indicators* answer the question: "How are pressures on the environment and how is the quality of the environment developing?" They are usually presented as a line diagram showing the development of a variable over time. Examples include: "emissions of CO_2" or "the number of indigenous species in biogeographical regions". Descriptive indicators cover all five areas of the EEA framework.
- *Performance indicators* answer the follow-up question: "and is that relevant for policy goals?" Generally these indicators use the same variables as descriptive indicators but are connected with target values. One example is: "The number of days in which ozone levels exceed ambient air standards". Performance indicators thus use policy targets.
- A third category is *eco-efficiency indicators*. These answer the question "have we become more efficient in our economic processes?" Eco-efficiency indicators link driving forces with state or pressure indicators. This refers to an overall goal for policy integration and sustainable development: "decoupling" economic growth from environmental pressures. Here, efficiency refers to pressures such as emissions or natural resources use.
- EEA identifies two other indicator types whose use at national and international level is only just beginning. *Policy-effectiveness indicators* answer the question "what has been the effect of policy?" (in terms of, for example, air pollution emissions reduction). They can require, however, detailed numerical analysis of policy effects based on extensive monitoring and other data. Only a few countries, such as the Netherlands, have made serious use of these indicators. *Welfare* indicators are connected with the question: "and are we on the whole better off?" and ask for a balance between economic, social and environmental progress. These include approaches to integrate environmental

conditions and trends into economic accounting, such as the United Nations Statistical Division's work on satellite accounts.

The documents contained in this CD-ROM provide examples of indicator sets and describe key issues for indicator development in EECCA countries. Documents on indicators include:

- An overview of indicators currently used in EECCA SoE reports;
- Guidance on the further development in indicators in EECCA;
- A brief introduction to indicators developed at international level, in particular those of UNCSD and EEA;
- The list of indicators used in the *Kiev Assessment*, which covered EECCA countries;
- The core set of environmental indicators for EECCA developed in the Working Group on Environmental Monitoring and Assessment;
- A Trial Compendium, prepared using selected indicators from the core set; and
- A note on opportunities for remote-sensing indicators.