About Indicators

Not everything that can be counted counts, and not everything that counts can be counted.

– Albert Einstein

Sections:

The Concept

The indicators in this report provide information that enables people to assess aspects of forest management. A meaningful assessment usually requires more than one indicator.

Definition

An indicator is defined in this report as follows, based on the definition used in the Montréal Process:

> *A quantitative or qualitative variable used to describe a state or condition. When observed periodically, it shows a trend. It provides information that is factual, usually for a specific time and place.*

Indicators of Sustainable Forest Management

Indicators are central to any report on the state of forests. They are used at all strategic and operational levels of forest management – global, national, provincial or state, forest management unit, and specific plot of land – to describe the state of forests and human interactions with forests.

They are used to:

- help explain the context or background situation;
- clarify management goals (by the choice of performance indicators);
- check for compliance with regulations and policies;
- check the implementation of plans;

- assess overall outcomes and effectiveness of management efforts; and
- improve understanding of how forests and societies function.

Tracking an indicator over time is called monitoring. The above uses of indicators are referred to, respectively, as background monitoring, performance monitoring, compliance monitoring, implementation monitoring, effectiveness monitoring and improvement monitoring. The last includes validation monitoring – checking the validity of assumptions and models used in management.

These different types of monitoring are most helpful when used in combination. For example, monitoring that confirms full compliance with laws is reassuring to a certain extent, but more meaningful when combined with effectiveness monitoring that confirms compliance is achieving desired outcomes.

Sustainable forest management requires continual improvement and adjustment based on the monitoring of indicators. Reports on the state of forests may draw from several types of monitoring, but typically emphasize the assessment of overall outcomes to assist decision-making about future directions.

Types of Indicators

The indicators in this and other similar reports can be grouped into several complementary types:

- *Quantitative, qualitative* – Of the two, quantitative indicators are generally preferred. However, qualitative (descriptive) indicators are sometimes all that is available. This report mostly uses quantitative indicators.
- *Input, process, output, outcome* – Inputs and processes are used in management systems to achieve desired outputs and outcomes. For example, inputs of money, workers and time are applied to activities (processes) such as planting and tending trees. This results in outputs of areas planted with different species and, over time, outcomes such as habitat for animals and economic activities related to timber harvesting and milling. Indicators are used to track all of these stages. This report emphasizes outcome indicators, with output indicators used as surrogates where necessary. Input and process indicators may also be used to monitor activities that support sustainability.
- *Pressure, state, response* – Problem management can be informed by knowledge about a problem's cause or driving force (pressure), its

effect (state) and the actions undertaken to address both cause and effect (response). For example, growing human populations (pressure) tend to cause loss of wildlife habitat and reduced wildlife populations (state), leading to the need for corrective measures such as protection of critical habitat (response). Trends of all three types of indicators help to show if a problem is being resolved. In this report, the relationships between indicators are described in terms of pressure, state and response.

- *Environmental, economic, social, institutional* – Environmental, economic, social and institutional indicators must be considered together, in a balanced way. Overemphasis or omission of one or more of these types of indicators is likely to lead to a lack of sustainability. In this report, the more descriptive phrase "governance and support" is used in place of "institutional."

Selection of Indicators

Given the complexity of sustainable forest management, selecting a list of indicators that is sufficiently comprehensive for the topic, yet also limited to a useable number that readers can comprehend, is challenging.

The selection of indicators for this report was guided by the attributes of good indicators used for the development of the CCFM's 2003 criteria and indicators (Background Information on the CCFM C&I Review, scroll down and click on "Description of TWG Review Process"). A good indicator is one that:

- is relevant,
- is measurable,
- is understandable,
- can be forecast, and
- has reference values.

An indicator must be relevant to an important aspect of sustainable forest management, sensitive to changes in the environment and human activities, and appropriate for the spatial scale being assessed. It should be a variable that is necessary (and, if possible, sufficient) to illustrate that aspect of forest management and to inform decisions.

A measurable indicator is one for which it is technically and financially feasible to obtain timely, reliable data and, ideally, for which there is sufficient historical information to provide meaningful trends. Qualitative indicators must be sufficiently precise in their descriptions to permit meaningful comparisons over time.

Intended audiences must readily understand the information conveyed by an indicator, and be able to use it to form their own assessments.

Indicators that can be forecast using science-based predictions of the effects of management choices and other factors are particularly useful for assessing future sustainability.

Reference values – for instance, historical baselines, technical or scientific thresholds and desired targets – provide a context for assessment of states and trends.

The indicators selected for this report satisfied the above five attributes more completely than did other candidate indicators. While keeping the same indicators over a long period enables assessment of trends, experience in the use of the indicators and changes in scientific knowledge over time make rethinking the list of indicators periodically necessary.