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15th Global Meeting of the Regional Seas
Conventions and Action Plans
Montego Bay, Jamaica 30th September - 1st October 2013

Indicator Report

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Review of ecosystem-based Indicators and indices on the State of Regional Seas

Introduction

1. UNEP initiated a study of indicator/index systems employed for regular regional state of the marine environment reporting and associated ecosystem-based instruments to measure progress. An overview of such systems in various parts of the world including already agreed sets of indicators should inform any proposal on a set of indicators from which each of the Regional Seas Conventions and Action Plans could associate their own respective sets of indicators associated with ecosystem-based management.
2. The study process was started in May 2013. A questionnaire was sent to individual regional sea entities including all the Regional Seas Conventions and Action Plans during the period May-June 2013. Feedback from the Regional Seas Programme will lead to subsequent drafting with the intention of publishing the report as a UNEP Regional Seas Report and Study.
3. Analyses of responses and information drawn from publically available sources demonstrates the significant efforts that regional entities have dedicated to this work and the variety of indicators in place or proposed. Anticipating future development of the World Ocean Assessment process there is an opportunity for the Regional Seas Programme to provide effective support at the regional scale and input to more quantitative assessments in the future.
4. The report also make suggestions for possibly linkages of the regionally-based indicator systems with the ecosystem-based objectives and targets and monitoring of their associated achievements.
5. Presentation of a first draft of the report to this meeting seeks to initiate an initial strategic discussion on the interests of Regional Seas Conventions and Action Plans in working collectively on this topic.

Action requested

6. The 15th Global Meeting of Regional Seas Conventions and Action Plans is invited to:
 - a. Consider and comment on the draft report during and after the meeting;
 - b. Discuss in principle whether the Regional Seas Programme is collectively interested in a global 'coordinated set' of indicators to be used for contributing the global effort to establish and monitor the state of the marine environment and for communicating progress against agreed global and regional objectives and, wherever applicable, targets; Adoption of such a core set of indicators will lead to the development of global, regional seas based indicator monitoring programme on a regular basis, possibly supporting the World Ocean Assessment in the future;
 - c. Advise on the suggestion of the organization of a technical meeting in 2014 involving scientific and technical representatives of all Regional Seas and associated scientific institutions to review and agree on such a core set of indicators;
 - d. Debate the role of Regional Seas as the mechanism to discuss and determine regional objectives and targets, noting the linkage between targets and indicators as well as the contribution that measurement of parameters against agreed objectives can make to good governance.

Review of ecosystem-based indicators and indices on the state of the Regional Seas

[DRAFT REPORT]

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6 September 2013

Executive Summary

[to be added]

Draft

1. Introduction

This chapter sets out some fundamental definitions and an interpretation of concepts that underpin this report. Basic information is drawn from secondary sources in a body of literature reflecting ideas debated over the past decades. Although some aspects are the subject of on-going research, and different terms are used by different organisations and regions, it is generally accepted that these terms are in common use as defined in various inter-governmental forums.

What is an indicator?

Definitions of the term 'indicator' are drawn from the Latin verb '*indicare*', meaning to disclose or point out, to announce or make publically known, or to estimate or put a price on (Hammond *et al.*, 1995, p1). The intention is to simplify, quantify, standardize, and communicate. In other words, to rationally explain complex information as a contribution to assessing conditions (Figure 1). For a given issue information can be measured, weighted, aggregated and may be presented within a composite index over time. The result of such an exercise is generally a set of compressed data demonstrating any trend, with the objective/purpose of being understandable to and raising awareness among policymakers and civil society (UN, 2007).

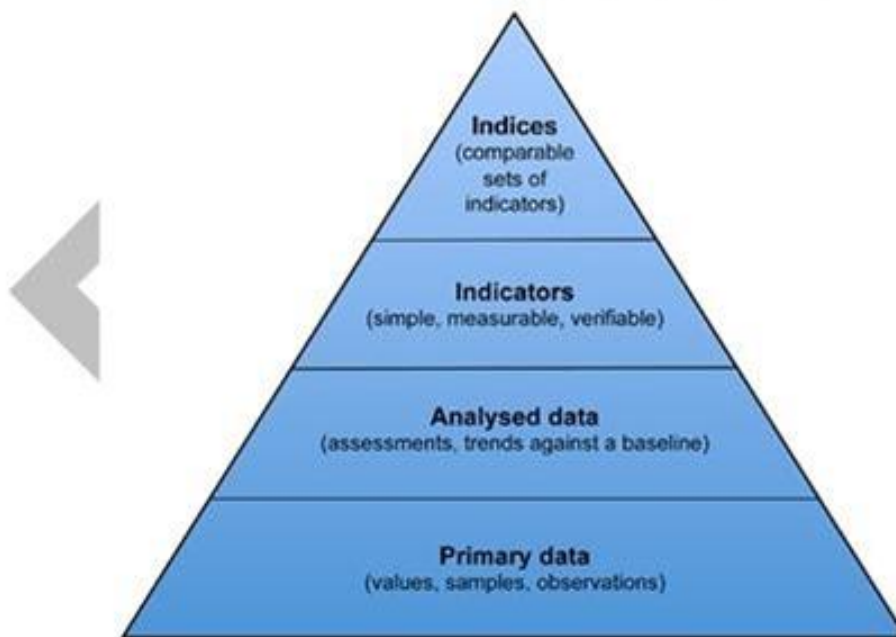


Figure 1: The information pyramid of environmental indicators

In 2010 the Biodiversity Indicators Partnership (UNEP-WCMC, 2010) set out the following definitions, amplified here from UNEP (2011a):

- **Measure:** a value that is quantified against a standard at a point in time;
- **Metric:** a set of measurements or data collected and used to underpin each indicator e.g. GDP per capita. Metrics usually have units;
- **Indicator:** a measure or metric based on verifiable data that conveys information about more than itself. It is information packaged to communicate something important to decision-makers. Generally a combination of two or more metrics (e.g. economic dependency on water resources). Indicators may or may not have units, depending on how they are formed;
- **Index:** a numerical scale used to compare variables with one another or with some reference number. A combination of two or more indicators (e.g. socioeconomic index). Indices are generally dimensionless and usually have normalized scores.

From a range of possible indicators, it is important to select the most relevant for each situation. Desirable characteristics are (Hammond *et al.*, 1995; IOC, 2006; Johnson, 2008; Vilares, 2010; Douvere and Ehler, 2011):

- political relevance (governance performance);
- data and information are readily available (i.e. cost-effectiveness);
- context sensitivity: sensitive to changes in aspects being monitored and allowing the detection of trends or impacts resulting from plan implementation (i.e. specific and responsive);
- comparability (in time and space allowing for interregional or international comparisons);
- robustness and scientific credibility;
- show trends over time (i.e. interpretable);
- scientifically sound (i.e. grounded in theory);
- concrete, and easily understood;
- measurable, specific, and capable of being updated regularly; and
- adapted to intended users, so that they answer the needs of their different target-groups.

Selected indicators should satisfy the greatest possible number of criteria, so as to contain costs and maximize resources and promote greater efficacy of the monitoring/evaluation system to be implemented (Diedrich *et al.*, 2010; Vilares, 2010). They should also contain consistent information to allow reporting at different scales (national, regional and international) and across different jurisdictions (Diedrich *et al.*, 2010). "While not all criteria are likely to be met on every occasion, the main themes or messages that emerge are that indicators have to be simple, measurable and responsive." (Gubbay, 2004, p.16).

In turn, these can be grouped in two main categories (MAOT, 2010b; Vilares, 2010):

- **Efficiency indicators**, measuring the performance of different programme components and the progress and quality of interventions and of the governance process itself; and,
- **Efficacy indicators** (ecological and socio-economic), reflecting tendencies in the state of the environment and in the state of the human component of coastal and marine ecosystems (economic activity). They help measure to what extent an instrument is contributing to manage human pressures in a way that results in an improved natural environment as well as in sustainable socio-economic benefits.

Where do indicators stand in the planning/management cycle? A coordinated system of objectives, indicators, limits and targets

Indicators constitute the link between policy and operational objectives and action in management (FAO, 1999; Day, 2008; Ehler and Douvère, 2009; Government of Canada, 2007; IOC, 2006; Douvère and Ehler, 2011). As such, they are fundamental tools to monitor and evaluate plans, programmes and policies and to inform their adaptations and revisions (Degnbol, 2005), and, thus, should be clearly related with the specific issues that triggered each particular planning/management process (IOC, 2006). This link as part of a management strategy is illustrated below in Table 1.

Strategic goals	To phase out pollution in the marine environment
Ecological objectives	Reduce impact of contaminants
Operational objectives	Reduce contaminant levels in shellfish species x
Targets and limits	Concentration of contaminant = a (target) or < b (limit)

Table 1: Role of indicators in a management system (ICES, 2005)

So that changes in the “behaviour” of any given indicator are meaningful and interpretable for managers and decision-makers, **indicator specific reference points** need to be developed (Blanchard et al 2010; ICES, 2012; IOC 2006, Vilares, 2010). The definition of references “against which to measure the success or failure of management actions” is paramount to assist decisionmakers in designing better policies and instruments (Ecologic Institute and SERI, 2010).

Although there is some terminological confusion in the literature (with the same terms being used with different meanings), there are three main types of reference points/values:

- baseline value: the indicator’s value at time zero (keeping in mind that such values may be well below historic values) (Pauly, 1995; Roberts, 2007);
- target or optimum value: the desired value for the indicator over a given period of time; and
- limit or threshold value (to control negative tendencies). Threshold values correspond to tipping points “beyond which serious and/or irreversible - and usually negative or undesired - changes in environmental systems occur” (Ecologic Institute and SERI, 2010, p.13).

A further refinement on the definition of threshold levels might be the determination of an alert level or value, being “the critical value beyond which there is no safe distance from dangerous thresholds” and of danger zones as “the range of values outside the safe operating zone, which indicate a high probability and subsequently a high risk to reach the threshold levels (Ecologic Institute and SERI, 2010, p.7).

Transboundary indicators /indicators of transboundary effects

The establishment of transboundary or cross-border indicators is particularly challenging but their definition is extremely important as it promotes the establishment of a common understanding of transboundary ecosystem priorities for action (Wong et al., 2011, p.1) and monitoring. Such a common understanding is particularly pressing in times of scarcity of resources (including funding sources),

when it is especially important to establish and maintain sustained monitoring efforts of key management aspects that may have cross-border implications.

Across political borders and physical interfaces there will be different plans/policies relevant for marine governance, each with different goals and sets of objectives, and concurrently, proposing different sets of actions (management measures). “For an assessment to have impact, it needs to carry clear, high-level messages about the issues raised, and point towards interventions in governance that can help mediate the relationship between humans and the oceans, improving human well-being”(IOC-UNESCOc, 2011b, p.2).

Linking effects with causes

The selection of relevant indicators should be able to link measured metrics with specific activities (taking place in specific areas of the maritime space) or causes. Of course, the relation of top holistic indicators with causes of pressure or impact on marine ecosystems or their components may be blurred or difficult to pinpoint due to the fluid/dynamic nature of the marine environment and as a result of the interconnectedness of ecosystem components. This means that such top indicators must be based or be coupled to more detailed or underlying traceable indicators/data that may provide a more explicit link to causality.

It should be possible to establish common broad indicators that may be identically measured/monitored (comparable methodologies) within a given region and between regions. These broad indicators will hopefully allow for the detection of changes in the measured parameters, which, in turn, should elicit adapted management actions to respond to/correct the changes detected. Conversely, these management actions need not be identical since they will have to be adapted to the existing governance scheme on either side of the border/boundary.

Highlighting vital common management issues will help to assist in the selection of a reduced set of indicators. In turn, a reduced set of indicators is a key condition for the actual implementation of the monitoring efforts and it is a better way to draw attention to key issues, as, in order for an assessment to have impact “the number of key indicators and key messages has to be limited” (IOC-UNESCOc, 2011b, p.2).

To support management at the regional level and between regions hierarchies of indicators are desirable feeding into larger scale (pan-regional) reporting. For example this might consider the proportion of a region with 100% of habitat impacted < target %, as compared to the proportion of all habitat types impact < target % within an individual region.

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