Selection criteria of environmental indicators – the European experience

2nd EXPERT GROUP MEETING ON THE REVISION OF THE FRAMEWORK FOR THE DEVELOPMENT OF ENVIRONMENT STATISTICS (FDES)

New York, 4-6 May 2011
STATISTICS DIVISION - UNITED NATIONS

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Content

- Indicator streamlining, progress report

- European (environmental) indicator sets

- Selection processes

- Link to FDES and the core set of environment statistics

Environmental indicator sets:

- **Core Set of Indicators - CSI** (EEA)

- **Sustainable Development Indicators** (EC)

- Various **thematic** sets: SEBI, TERM, AEI, …)

- **EUROPE 2020** Indicators (EC)

- **GDP** and **beyond** (EC), upcoming

Indicator streamlining, progress report

Progress since November 2010 meeting

– **Workshop with European indicator producers**

(22-23 February 2011):

- **Presentation of practical implementation for 3 test themes (biodiversity, municipal waste, greenhouse gas emissions) = *methodology approved***

Indicator streamlining - implementation

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Streamlining proposal for biodiversity related EEA and Eurostat indicators

- Table 1: List of 17 biodi

Cluster	Indicator title	Code
28	Species of European interest	CSI 7
28	Species diversity	CSI 9
28	Abundance and distribution of selected species	SEBI 1
28	Red List Index for European species	SEBI 2
28	Species of European interest	SEBI 3
28	Livestock genetic diversity	SEBI 6
28	Invasive alien species in Europe	SEBI 10
28	Common bird index	tsdnr100
28	Farmland bird index	tsien170
29	Designated areas	CSI 8
29	Nationally designated protected areas	SEBI 7
29	Sites designated under the EU Habitats and Birds Directives	SEBI 8
29	Sufficiency of sites designated under the EU habitats directive	tsdnr210
29	Sufficiency of sites designated under the EU habitats directive	tsien160
30	Ecosystem coverage	SEBI 4
30	Habitats of European interest	SEBI 5
31	Fragmentation of natural and semi-natural areas	SEBI 13

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Cluster 29 "protected areas"

High potentials for streamlining:

- CSI 008 Designated areas

- SEBI 008 Sites designated under the EU Habitats and Birds Directives

- Eurostat tsdnr210 Sufficiency of sites designated under the EU Habitats Directive

- Eurostat tsien160 Sufficiency of sites designated under the EU Habitats Directive

→ All 4 indicators are expressed in a **sufficiency index** which provides a measure of progress in the implementation of the **Habitats Directives.**

→ SEBI 008 focuses also on the Birds Directive whereas CSI 008 focuses on all areas designated by international and national instruments.

→ Suggestion to streamline based on SEBI 008 with title: **Sufficiency of sites designated under the EU Habitats _and_ Birds Directives**.

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Indicator streamlining - implementation

MW generation: Proposals for streamlining

ARGUS

Indicators (current names)	Proposed changes
Municipal waste generation (SDI tsdpc210)	
Municipal waste generation (SI tsien120)	
Municipal waste generation (CSI 016)	

Streamlining of European Environmental Indicators - Workshop with indicator owners and users
Eurostat – Luxembourg, 22-23 February 2011

EEA
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European Env...

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Current work on indicators at EEA (2/2)

- First results:

1. Streamlining of the EEA indicators: 747 -> 278 indicators, 26 -> 14 themes

2. Identification and definition of the requirements for upgrading the IMS:
   - IMS v.3: http://www.eea.europa.eu/data-and-maps/indicators#c7=all&c5=&c0=10
   - User guide: https://svn.eionet.europa.eu/projects/Zope/wiki/IndicatorsUserGuide
   - New listing: http://www.eea.europa.eu/0maintenance/simile/demos/indicators/
   - Indicator page: http://intranet/Projects/IndicatorManagement/default.aspx

3. Creation of the Indicator Management Group:
   - Group of IMS Expert Users (22 'content managers' from 9 thematic groups)
   - IMS   Support   Team
     (https://svn.eionet.europa.eu/proects/Zope/wiki/IndicatorsUserGuide/People)

4. Acceleration of work on indicators
   - 70 indicators updated in 2010
   - 24 indicators already updated in January 2011

-> Indicators are back to being a topic of discussion among the actors involved

European Environment Agency

Indicator streamlining, progress report

Progress since November 2010 meeting

- Workshop with European indicator producers (Feb. 2011):

  - Presentation of practical implementation for 3 test themes (biodiversity, municipal waste, greenhouse gas emissions) = *methodology approved*

  - Although similar indicators are maintained by key players, parallel reporting structures exist (e.g. to EU, OECD,...)

    = coordination of work and intensified, regular dialogue among indicator producers is proposed

  - More transparent presentation and exchange of meta-data and quality information is needed

    = website and use of a common meta-data management tool

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Indicator streamlining - implementation

Indicator streamlining, progress report

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  - Indicator selection criteria should be (better) described
    = towards application of systematic selection criteria ?

Indicator selection, criteria

The **M-D-I-A-K** reporting chain

helps to specify and distinguish between the different types of information needed:

K   What do we need to **K**now?

A   What **A**ssessments are needed?

I   What **I**ndicators are needed?

D   What **D**ata is needed?

M   What **M**onitoring is needed to deliver the required data?

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Indicator selection, criteria

The **D-P-S-I-R** framework

is a causal chain framework that helps to structure our thinking about indicators in terms of causality and effect:

D   Driving force (indirect, e.g. social and economic)

P   Pressures (e.g. emissions)

S   State (changes of the environment, media, pollutants)

I   Impact (on human health, ecosystems and their services)

R   Responses (by society)

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Indicator development, selection criteria

Selection criteria are important:

- indicators influence conclusions on whether environmental problems are serious or not,

- whether improvement or degradation is taking place, and in which direction causes and solutions need to be sought.

However, in practice ...

Indicator development, selection criteria

- frameworks (often) not used as formal part in selection process, they are used mainly for presenting the indicators

- Expert panels select with focus on individual indicators, not on criteria that relate indicators to one another

- policy relevance is a main criteria

- sometimes different bodies select different indicators from the same statistics to describe the same phenomenon

= risk of subjective, non systematic selection of indicators

Selection criteria, example CSI (EEA):

- – address EU policy priorities

- – six environmental themes (air pollution and ozone depletion, climate change, waste, water, biodiversity and terrestrial environment)

- – four sectors (agriculture, energy, transport and fisheries)

- – positioned in the DPSIR framework

- – indicator types (descriptive, performance, eco-efficiency, policy effectiveness, total welfare indicators)

CSI: 4 policy related selection criteria:

Policy relevance

This criterion is checked against identified objectives in EU and other international policy documents and reviewed in consultation with countries. EU priority issues should also frame the core set as a whole, be the basis for balance across the core set and support its regular review.

Progress towards policy targets

This criterion becomes relevant where quantitative or qualitative targets linked to objectives have been set in policy documents.

Understandability of indicators

This criterion focuses on clear definition of the indicator and appropriate assessment and presentation. Contradictory messages should not occur (crosschecking across the core set ensures this); if any do occur, they should be explained.

Part of EU policy issues

This criterion is applied to ensure that indicators map to priorities for policy and in the EEA management plan. The priority issues should also frame the core set as a whole, be the basis for balance across the core set and support its regular review.

CSI: 4 data related selection criteria:

Available and routinely collected data

This criterion is based on the extent to which data requirements are supported by reporting obligations signed up to by countries. Both legal and non-legal obligations are taken into account. This criterion also supports streamlining of data flows and ensures that the indicator can be updated regularly.

Spatial- and
temporal coverage

These criteria are based on the actual coverage of reported data compared with the target coverage. The EEA aims to cover all of its member countries, unless the focus of the indicator is different (for example, where indicators are based on the implementation of directives by the EU-27). The aim is also to have time trends available as far back as possible.

National scale and representativeness of data

This criterion enables benchmarking of countries' performances. The EEA therefore works with countries to obtain common understanding on the data sources used for calculating indicators and on methodologies used for benchmarking.

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CSI: Scientific / statistical selection criteria

Methodologically well founded

This criterion can be met through a clear description of the methodology and formulae used, with appropriate scientific references. This criterion is more likely to be satisfied if a similar indicator is also being used in other indicator initiatives at the international level.

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Selection criteria, SDI:

- **10 themes** (socio-economic development, **sustainable consumption and production**, social inclusion, demographic changes, public health, **climate change and energy**, **sustainable transport, natural resources**, global partnership, good governance)

- Shall monitor progress in the 10 themes, reflecting the **seven key challenges of the strategy,** as well as the key objective of economic prosperity, and guiding principles related to good governance.

- Themes are further divided into **sub-themes** to organise the set in a way that reflects the operational objectives and actions of the sustainable development strategy.

Selection criteria, example SDI:

SDI theme	Headline indicator	EU-27 evaluation of change
Socioeconomic development	Growth of GDP per capita	☀
Climate change and energy		
Sustainable transport		
Sustainable consumption an		
Natural resources		
Public health		
Social inclusion		
Demographic changes		
Global partnership		
Good governance		

Level 1	Level 2	Level 3
Climate change		
Greenhouse gas emissions*	: Greenhouse gas emissions by sector	Greenhouse gas intensity of energy consumption
		: Global surface average temperature
Energy		
		Gross inland energy consumption
		Electricity generation from renewables
Consumption of renewables	Energy dependency	Consumption of biofuels in transport
		Combined heat and power**
		Implicit tax rate on energy

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Selection criteria, EUROPE 2020

A strategy for jobs and smart, sustainable and inclusive growth, is based on five EU headline targets which are currently measured by 8 headline indicators. *(of which 3 are environmental indicators)*

- Statistics is integral part of the Europe 2020 strategy. The headline indicators measure the progress made by the EU and the Member States towards achieving the 5 headline targets of the strategy. The additional indicators show in more detail the developments with regard to the main objectives and flagship initiatives of the strategy.

- Europe 2020 indicators are an input into the annual European Economic Policies Report by the Commission.

Selection criteria, EUROPE 2020

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Target:	Indicator:
Reduction of the greenhouse gas emissions by 20% compared to 1990	**Greenhouse gas emissions, base year 1990**
Increase in the share of renewable energy sources in final energy consumption to 20%	**Share of renewables in gross final energy consumption**
20% increase in energy efficiency	**Energy intensity of the economy** *(proxy indicator for energy savings, under development)*

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Selection criteria, applied for EUROPE 2020

Feasibility

by looking at timeliness and coverage: The indicator has to be available in time for Member States, Candidate Countries and as far as possible the United States and Japan. Time series beginning in 1990 are provided as much as possible to allow for a dynamic analysis.

Technical soundness

comprising overall accuracy, comparability (over time and across countries), is assessed on the basis of existing quality information in the domain. The indicator should stem from reliable sources meeting high standards and involving statistical expertise as regards the technique and methodology applied. The indicator should be comparable between Member States, Candidate Countries as well as with the United States and Japan. The indicator has to be comparable from one year to another.

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Selection criteria, applied for EUROPE 2020

For each of these components a brief **overall assessment** is provided, substantiated by further qualitative information, if considered useful.

The **quality profile** discusses the relevance which is considered here to comprise the content and suitability of the indicator to measure appropriately the phenomenon considered. Moreover, room is provided to describe other characteristics which may lead to restricting the use of the indicator, relating e.g. to its own complexity, a lack of an unambiguous scientific basis or to the coherence with other existing indicators, lack of comprehensive metadata etc.

The European Statistical System (ESS) has defined the following **quality criteria** to be applied to statistical data:

Relevance, Accessibility and Clarity, Timeliness and Punctuality, Coherence, Comparability and Accuracy.

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Quality criteria for statistical data

Relevance refers to the extent to which the statistical data satisfy the needs of the users.

Accessibility refers to the physical conditions under which users can obtain the statistical data.

Clarity refers to the availability of appropriate documentation linked to the statistical data and to the additional assistance which producers supply to users.

Timeliness of statistical data is the length of time between their availability and the moment at which the phenomena they describe occurred.

Punctuality refers to any time lag between the release and the target date by which the data should have been delivered.

Coherence aims to measure the reliability of the statistical data if combined with other statistics in different ways and for other uses.

Comparability tries to measure the effect of the differences in the applied statistical concepts and measurement procedures when the statistical data are compared between geographic areas, over time or between different domains.

Accuracy, in a statistical sense, refers to the closeness of the statistical data to the (in general) unknown true or exact value of the measured phenomena. Usually this closeness can be measured by using statistical indicators such as bias and variability of the statistical data.

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Conclusions (... on indicator selection)

- The selection process and criteria should be described in the meta-data *(not the case for most indicators)*

- Should the selection process be more systematic and transparent?

- Should the selection criteria consider inter- relations among indicators in a set, and not only focus on individual indicators?

- Coordination of work during indicator selection and development, as well as a good user – producer dialogue is important *(Should FDES address producers and users?)*

- Should critiques on current procedures and proposals for improvements be considered for the revision of the FDES?

  e.g.   Peter Bartelmus (2008) http://www.springer.com/economics/environmental/book/978-1-4020-6965-9
  David Niemeijer and Rudolf S. de Groot (2008)
  http://kfrserver.natur.cuni.cz/gztu/pdf/NIEMEIJER_environmental_indicators_.pdf

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Thank you for your attention

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