

International Seminar. Environmental Indicators

Belo Horizonte, Brazil, 19 – 21 June 2006

Indicators for monitoring Sweden's Environmental Quality Objectives

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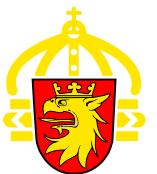
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More info: www.miljomal.nu



contents

- Sweden
- Sweden's Environmental Quality Objectives
- System of Indicators for monitoring the environmental objectives
- General comments on indicators



Map of Europe and EU, the European Union



SWEDEN general facts

- 9 million inhabitants
- Area: 450 000 km²
- 7.5 % Agricultural land
- 49 % Forest

Average life expectancy : men 77 years, women 82.4 years

- Capital: Stockholm
- Language: Swedish
- Member of EU since 1995
- 454 cars per 1000 inh



From Environmental Threats to Quality Objectives

A new systematic approach

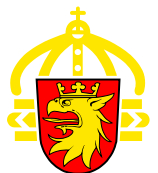
- Better structure
- Better involvement
- Long term vision
- Clear aims and timetable
- Clear responsibilities

Management by objectives

Monitoring system a necessary component

Adaptation to the development

Coordination

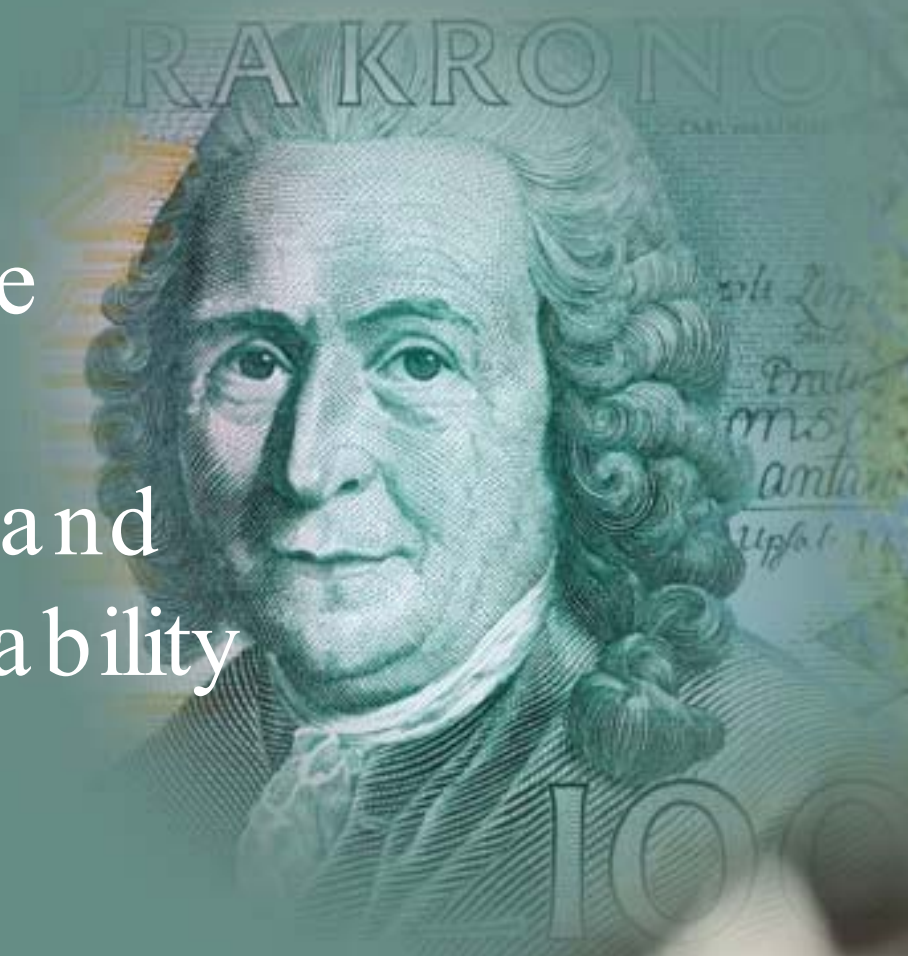


»The overall aim is to hand over to the next generation a society in which the major environmental problems have been solved.«

The Swedish Parliament (Riksdagen) 1999



The basic principle
is to integrate
ecological, social and
economic sustainability



Ecologically sustainable development is :

- Promoting human health
- Safeguarding biological diversity and the natural environment
- Protecting cultural heritage
- Preserving the long-term productive capacity of the ecosystems
- Ensuring proper management of natural resources



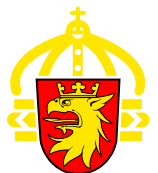
16 Environmental Quality Objectives

- 1 Reduced Climate Impact
- 2 Clean Air
- 3 Natural Acidification Only
- 4 A Non-Toxic Environment
- 5 A Protective Ozone Layer
- 6 A Safe Radiation Environment
- 7 Zero Eutrophication
- 8 Flourishing Lakes and Streams
- 9 Good-Quality Groundwater
- 10 A Balanced Marine Environment,
Flourishing Coastal Areas and
Archipelagos
- 11 Thriving Wetlands
- 12 Sustainable Forests
- 13 A Varied Agricultural Landscape
- 14 A Magnificent Mountain Landscape
- 15 A Good Built Environment
- 16 A Rich Diversity of Plant and Animal Life



1999 Decision by the Parliament

- **15 National Environmental Objectives**

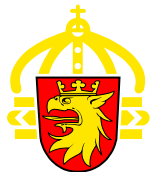


2001 Decision by the Parliament

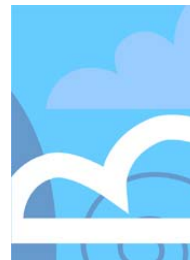
(prepared by a commission)

Details of the system

- **Interim targets (ab. 70)**
- **Responsibilities**
- **Annual progress reports**
- **In depth evaluation every fourth year**
(2004, 2008, 2012, ...)



2 Clean Air



The air must be clean enough not to represent a risk to human health or to animals, plants or cultural assets.



Clean air, interim targets



- **Interim target 1, 2005**

A level of sulphur dioxide of 5 $\mu\text{g}/\text{m}^3$ as an annual mean achieved in all municipalities by 2005.

- **Interim target 2, 2010**

Levels of nitrogen dioxide of 20 $\mu\text{g}/\text{m}^3$ as an annual mean and 100 $\mu\text{g}/\text{m}^3$ as an hourly mean achieved in most places by 2010.

- **Interim target 3, 2010**

By 2010 concentrations of ground-level ozone will not exceed 120 $\mu\text{g}/\text{m}^3$ as an 8-hour mean.

- **Interim target 4, 2010**

By 2010 emissions in Sweden of volatile organic compounds (VOCs), excluding methane, reduced to 241,000 tonnes.



12 Sustainable Forests



The value of forests and forest land for biological production must be protected, at the same time as biological diversity and cultural heritage and recreational assets are safeguarded.



Sustainable Forests, interim targets



• **Interim target 1, 2010** A further 900,000 hectares of forest land of high conservation value will be excluded from forest production by the year 2010.

• **Interim target 2, 2010** By 2010 the amount of dead wood, the area of mature forest with a large deciduous element and the area of old forest will be maintained and increased by:

- *increasing the quantity of hard dead wood by at least 40% throughout the country and considerably more in areas where biological diversity is particularly at risk;*
- *increasing the area of mature forest with a large deciduous element by at least 10%;*
- *increasing the area of old forest by at least 5%;*
- *increasing the area regenerated with deciduous forest.*

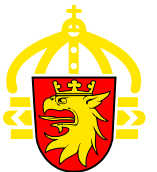
• **Interim target 3, 2010** By 2010 forest land will be managed in such a way as to avoid damage to ancient monuments and to ensure that damage to other known valuable cultural remains is negligible.

• **Interim target 4, 2005** By 2005 action programmes will have been prepared and introduced for threatened species that are in need of targeted measures.



Three action strategies

- A strategy for more efficient energy use and transport
- A strategy for non-toxic and resource-efficient cyclical systems
- A strategy for the management of land, water and the built environment



How the environmental objectives are structured

16 national
quality objectives

Interim targets for
every one of the 16

Regional objectives

Local objectives

A shared responsibility

National authorities

16 national
quality objectives

Interim targets for
every one of the 16

Regional authorities

Regional objectives

Local authorities

Local objectives

2005 Decision by the Parliament

Revision

- **A sixteenth objective added**
- **Interim targets added, revised, eliminated**
- **Activities initiated**

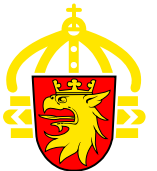


What you can't measure you can't manage

Monitoring the progress using indicators

DPSIR-system

Management tool. Management by Objectives.



ENVIRONMENTAL QUALITY OBJECTIVE

Will the objective be achieved?

Will the interim targets be achieved?

1 2 3 4 5 6 7 8 9 10

Environmental Quality Objective	Will the objective be achieved?	1	2	3	4	5	6	7	8	9	10
Reduced Climate Impact*	☹️	😐									
Clean Air	😐	😊	😐	😐	😊						
Natural Acidification Only	😐	😐	😊	😊	😐						
A Non-Toxic Environment	☹️	☹️	☹️	☹️	😐	😊	☹️				
A Protective Ozone Layer	😐	😐									
A Safe Radiation Environment	😐	😐	😐	😐							
Zero Eutrophication	☹️	😊	😐	😐	😊	😐					
Flourishing Lakes and Streams	😐	😐	😐	😐	😊	😐	😊				
Good-Quality Groundwater	😐	😐	😐	😐	😊						
A Balanced Marine Environment, Flourishing Coastal Areas and Archipelagos	😐	😐	😊	☹️	😐	☹️	😊	😊	😊		
Thriving Wetlands	😐	😊	😐	☹️	☹️	😊					
Sustainable Forests	☹️	☹️	😊	☹️	😊						
A Varied Agricultural Landscape	😐	😐	😊	😐	😐	😐	😊				
A Magnificent Mountain Landscape	😐	😐	☹️	😐	😐						
A Good Built Environment	😐	😐	☹️	☹️	😊	😐	😊	😊	☹️	😐	😐

😊
Current conditions, provided that they are maintained and decisions already taken are implemented in all essential respects, are sufficient to achieve the environmental quality objective/interim target within the defined time-frame.

😐
It will be possible to achieve the environmental quality objective/interim target to a sufficient degree/on a sufficient scale within the defined time-frame, but only if additional changes/measures are brought about.

☹️
It will be very difficult to achieve the environmental quality objective/interim target to a sufficient degree/on a sufficient scale within the defined time-frame.

* target year 2050, as a first step

Environmental Objectives Indicator System

- **Web-based**: The Environmental Objectives Portal the central information point. www.miljomal.nu
- **Target group**: Decision makers, professionals **but also** an interested public
- **Information**: General and easy to understand **and** more detailed. Information can be loaded down and used for different purposes. Links to further information.
- **Geographical levels**: National – Regional (normally county) – Local (normally municipality)
- **Uniformity** in presentations.
- The respective authorities **responsible** for the content, including supply of data.
- A **secretariat** for coordination.



Indicator presentation

- Diagram – development over time and relation to target
- Map – geographical differences, entry to regions
- Comment – explanation and assessment
- National, regional, and local presentations
- Method
- Data
- Administrative details
- More information



16 Sveriges miljömål
OFFICIELL PORTAL FÖR VÅRA 16 MILJÖMÅL

miljömålen När vi miljömålen? Vem gör vad? Läs mer!

Sök SÖK

INNEHÅLL


16 miljömål

Will the objectives be achieved?

Nyheter

- 14/6: [Ny kustnära järnväg positivt för flera miljö kvalitetsmål.](#)
- 13/6: [Läs mer om allt som händer om miljömålen i Östergötland.](#)
- 13/6: [Extrasatsning på landsbygden för att främja natur- och kulturvärden.](#)
- 13/6: [Så ska Örebro län hålla skogen levande.](#)
- 12/6: [Lokala miljömål på gång i Svalöv.](#)
- 7/6: [Miljömålsrådets årsrapport 2006; Miljömålen – miljömålen på köpet](#) överlämnas idag till miljöminister Lena Sommestad
- 7/6: **Nya regionala sidor**
Nu finns de regionala miljömålssidorna på Miljömålsportalen. [Läs mer](#)
- 7/6: **Mer krävs för att nå miljömålen!** Läs [debattartikeln](#)

När vi miljömålen i ditt län?
Klicka på kartan



(c) Lanträttern, M035023 & SLU, vt

Information in English

Will the objectives be achieved in your region?

Indikatorer visar riktningen mot målet. Naturvårdsverkets indikator [Antal nyuppförda byggnader inom 100 meter från sjö eller vattendrag](#) är ett

Illustrationer: Tobias Flygar

Miljömålsportalen informerar om Sveriges 16 miljömål och arbetet för att nå dem.

Om hur målen relaterar till [gräppande miljömålsfrågor](#).

[Miljömålen – miljömålen på köpet](#)
Miljömålsrådets årsrapport 2006.



Miljömålen – miljömålen på köpet

Miljömålsrådets årsrapport 2006.



ots intensivt arbete de senaste
cennierna har inte den negativa
enden för den biologiska mångfalden
nts. Åtgärderna behöver bli effektivare
h koordineras bättre, annars blir det
årt att nå det nya miljömålet *Ett rikt
xt- och djurliv*. Det skriver
ljömålsrådet i sin årsrapport som
erlämnas till regeringen idag.

Må insatser i vardagen bidrar till att vi kan nå miljömålen

ad du och jag gör hemma eller på
bbet har stor betydelse för om
iljömålen ska gå att uppfylla.

[Läs mer](#)

Nu finns de regionala miljömålssidorna på Miljömålsportalen.

[Läs mer](#)

7/6: Mer krävs för att nå miljömålen! Läs [debattartikeln av Bengt K Å Johansson](#) med utgångspunkt från Miljömålsrådets årsrapport.

ALLA NYHETER

Portalens nyhetsbrev

För att påbörja gratisprenumeration av nyhetsbrevet fyller du i **din e-postadress** i fältet nedan och klickar på "Påbörja".

[INFO](#)

[Nyhetsbrev nr 45](#)
[Nyhetsbrev nr 44](#)

Kalendarium

- 2006-07-02 [Livrädda Östersjön](#)
- 2006-09-12 [Miljöövervakning](#)
- 2006-09-16 [Trafikantveckan](#)
- 2006-10-26 [Miljöbalksdaqr](#)

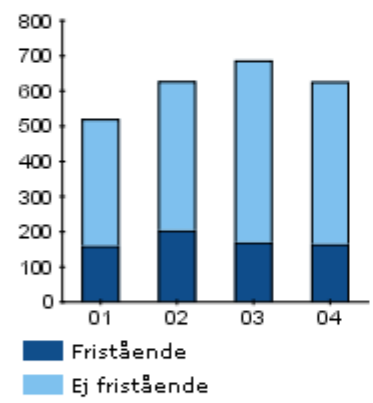
ALLA EVENEMANG

TIPSA

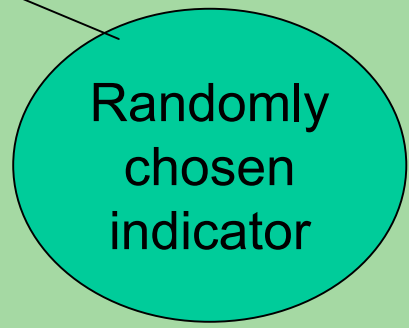
Indikatorer visar riktningen mot målet. Naturvårdsverkets indikator [Antal nyuppförda byggnader inom 100 meter från sjö eller vattendrag](#) är ett exempel.

(Ny indikator varje vecka)

Antal nyuppförda byggnader inom 100 m från inlandsvatten (st)



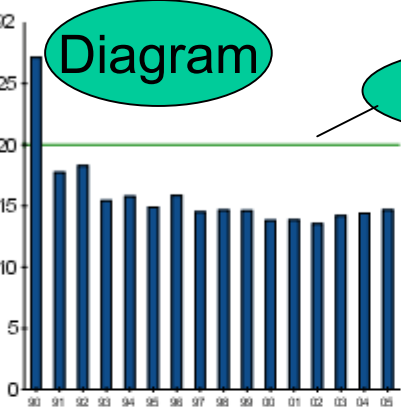
ALLA INDIKATORER



Kvävedioxid i luft

Nitrogen dioxide in air

Kvävedioxidhalt ($\mu\text{g}/\text{m}^3$)



Diagram

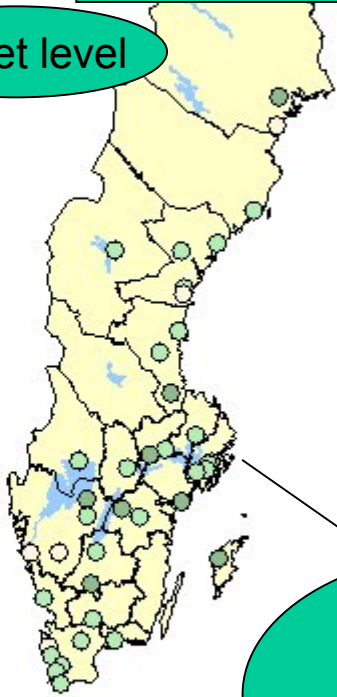
Target level

National page

Indikatorn följer upp följande miljömål:

Frisk luft och delmålet [Halter av kvävedioxid \(2010\)](#)

Quality objective and interim target



(c) Lantmäteriet, M035023 & SLU, vt - 2005

Map
Geographical differences and entry to regions

0 - 10 $\mu\text{g}/\text{m}^3$
 10 - 20 $\mu\text{g}/\text{m}^3$
 20 - 30 $\mu\text{g}/\text{m}^3$
 Kvävedioxidhalten i tätorter 2005.

Välj område här eller klicka på kartan

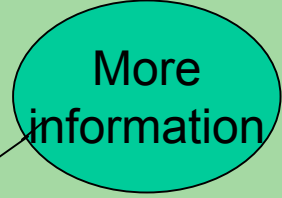
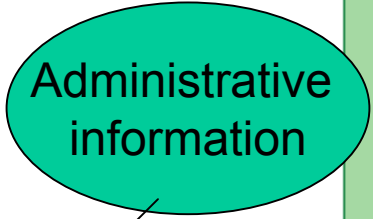
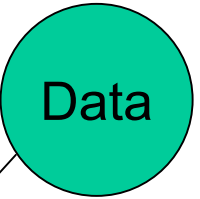
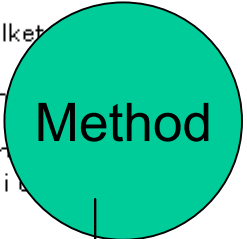
Comment

Kvävedioxidhalt (mikrogram per kubikmeter) som årsmedelvärde i grundsluft i en svensk medeltätort jämfört med delmålet. I de fall mätningar inte gjorts under hela året har en korrigerad årsmedelvärde använts, se Metod.

Kvävedioxid bildas vid förbränning. Trafiken är den största källa till kvävedioxid i de flesta tätorter. Brist på energi, energiproduktion, maskiner och sjöfart kan också ge betydande bidrag. Halten av kvävedioxid i luft är en god indikator för utsläpp av luftföroreningar från trafiken.

Halten av kvävedioxid som finns i...

...orsaker nedläggning av
kvävedioxid förurning och
ergödning. Kvävedioxid är även en
kelfaktor för bildning av marknära
n.
kvävedioxidhalterna i luft i svenska
orter minskade fram till slutet av
0-talet (se diagram), framför allt
om bilarnas bättre avgasrening.
er senare år har dock ingen
gång skett för tätortsluften, vilket
instone delvis kan hänga ihop
d bildningen av marknära ozon
n syns av diagrammet och kan
medelhalterna av kvävedioxid i
ta svenska tätorter lägre än
målet för årsmedelvärdet. Flera
orter klarar dock inte delmålet i
kt trafikerade gator där halterna
vara flera gånger högre än
omsnittet för tätorten.
ökvalitetsnormen för år med tanke
hälsa (40 mikrogram per
ikmeter) klaras förmodligen av
svenska tätorter. Däremot kan
vara omkring en femtedel av alla
nmuner som inte klarar normerna
dygn eller timme i starkt
ikerade gator.



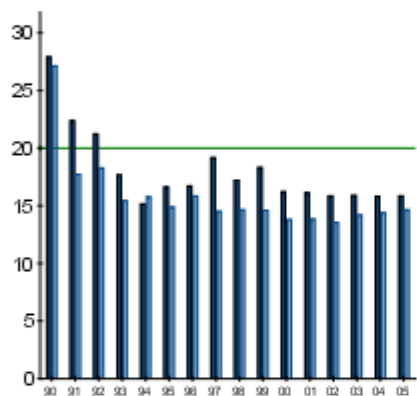
Kvävedioxid i luft

Skåne län
Skåne County

Regional page

Indikatorn följer upp följande miljömål:
Frisk luft och delmålet
[Halter av kvävedioxid \(2010\)](#)

Kvävedioxidhalt ($\mu\text{g}/\text{m}^3$)



■ Kvävedioxidhalt - Skåne län
■ Kvävedioxidhalt - Sverige
— Miljömål



■ 0 - 10 mikrogram/kubikmeter
■ 10 - 20 mikrogram/kubikmeter
■ 20 - 30 mikrogram/kubikmeter

Tätorter där mätningar av kvävedioxid år 2005 redovisas. För de orter som har mätningar ett eller flera år under 1990 - 2005 finns diagram. Välj ort i rullistan.

Välj område här eller klicka på kartan

Alternativen minskar inte längre

Kvävedioxid bildas vid förbränning. Biltrafiken är den största utsläppskällan i de största tätorter. Energiproduktion, arbetsmaskiner och sjöfart kan också ge betydande bidrag. En stor del av kvävedioxiden har transporterats till Skåne från kontinenten, men Skånes egen utsläpp är också stora och Skåne

Comment

När vi miljömålen / Uppföljning med indikatorer / [Alla indikatorer](#)

Kvävedioxid i luft

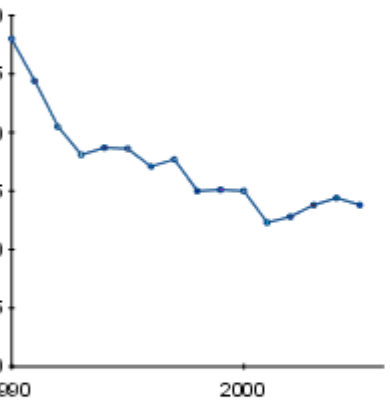
Local page

Lund

City of Lund

Indikatorn följer upp följande miljömål:
Frisk luft och delmålet
[Halter av kvävedioxid \(2010\)](#)

Kvävedioxidhalt ($\mu\text{g}/\text{m}^3$)



Kvävedioxidhalt (mikrogram per kubikmeter) som årsmedelvärde i bakgrundsluft i aktuell tätort. För orter där data finns endast för vinterhalvår är korrigering till årsmedelvärde för denna ort, se Metod.

Diagrammet visas årsmedelvärden av kvävedioxid i luft för de år sådana finns för denna ort. För mer information se länssidan eller nationella sidan för denna indikator.

Comment

Example Nitrogen dioxide Skåne (translated)

Concentrations have stopped to decrease

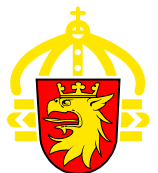
Headline

Nitrogen dioxide is formed in combustion processes. Car traffic is the main source in most towns. Significant contributions also come from energy production, other combustion engines and sea transport. In Skåne a large share of the nitrogen dioxide is transported in the air from the continent, but emissions in Skåne are also important and are further transported to other parts of Sweden.

Sources

The present concentrations of nitrogen dioxide in towns in Skåne can worsen the situation for people with asthma or lung problems. Deposition of nitrogen dioxide contributes to acidification and eutrophication. Nitrogen dioxide is also a key factor in the formation of ground-level ozone.

Environmental and health effects



Comment continued.

Example Nitrogen dioxide Skåne (translated)

The highest concentrations of nitrogen dioxide are found in the streets of the towns. Concentrations have decreased up to the end of the 1990-ties due to cleaner emissions from cars. For some years now no further reduction has taken place, which can depend on the fact that formation of nitrogen dioxide is affected by the ozone concentration. The values shown here represent urban background and therefore also what people normally are exposed to. In Skåne there are annual means from five towns in 2005.

Situation and development described and explained

The interim target will probably be reached for background concentrations. The interim target and the quality standards may however be difficult to achieve in busy streets. Environmental Quality Standards are based on health effects. The standards for hourly and daily means will be difficult while the annual mean of 40 mikrogramms per cubic meter will be easier to achieve. In Skåne action programmes are being established for the towns of Helsingborg and Malmö to comply with the environmental quality standard.

Assessment and actions



Environmental Objectives Indicator System

Status:

- Totally ab 95 indicators are shown, ab 70 on regional level
- Presentations renewed annually (normally)
- The responsible authority decides on indicators and makes the presentation, but coordination with others required
- Special guide for making the presentations
- Support, coordination and approval from secretariat
- Regional coordination by a special group



Environmental Objectives Indicator System

Future:

- Technical improvements
- Continuous improvement of texts, diagrams, data quality etc
- Further indicators
- Coordination of indicators and data supply
- Local level better represented
- English version?



Why indicators?

Target group?

- For whom are you making the system?
- What do different target groups need?

Purpose?

- Once or continuously?
- Progress towards objectives?
- To find interactions, show links, cause-effect chain?
- Management tool?



Three important parts of a monitoring system using indicators

1. Indicators

How many, type, etc?

Criteria for selection:

- Related to targets – if possible direct measure
- Show important aspects
- Can be influenced by actions
- Easy to communicate
- Data are accessible



Indicator dilemma

You want: Few but **good** indicators

Easy to communicate

You need: Many indicators

- Many objectives and targets
- Complex reality

A good analysis requires much information

Cause-effect chain (DPSIR-system?)

But more difficult to communicate many indicators

Solution(?):

Good structure and overview. Make it easy to find the indicator.

Choose for your special need from a larger set of indicators

Smiley, Index, "Headline indicators" etc



Three important parts of a monitoring system using indicators

2. Data

Reasonable cost and quality.

3. Presentation

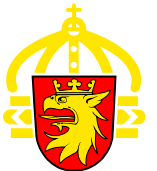
Includes explanation and assessment

+ Organisation, financing, and cooperation



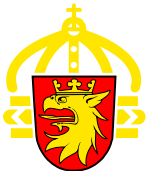
Benefits

- Communications tool
- Structured facts and info
- Requires you to make and present an analysis to others than experts
- Improves the analysis – better conclusions and actions
- Improves the overview – geographically and thematically
- Improves cooperation and understanding



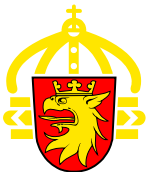
How to make it work

- The art of the possible (do not expect too much too quickly)
- Many details
- Stepwise development
- Continuous improvement
- Make certain to keep it alive
- Cooperation and coordination



Indicators do not tell the whole truth and nothing but the truth. They help you to tell a story.

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LÄNSSTYRELSEN