

# theme: environmental objectives



## Planning for sustainable development

“Sustainable development” is a concept that incorporates not only ecological but also social and economic aspects. But what do we exactly mean - what does it imply in practice and how can we know whether we really are heading in the right direction? This is a summary from the idea and method development project SAMS (*Samhällsplanering med miljömål i Sverige* – Environmental objectives and indicators in spatial planning and SEA) about how we can use environmental objectives in community planning.

The Swedish Environmental Protection Agency and the National Board of Housing, Building and Planning.



### Sweden's 15 environmental objectives

1. Clean air
2. High-quality groundwater
3. Sustainable lakes and watercourses
4. Flourishing wetlands
5. A balanced marine environment, sustainable coastal areas and archipelagos
6. No eutrophication
7. Natural acidification only
8. Sustainable forests
9. A varied agricultural landscape
10. A magnificent mountain landscape
11. A good urban environment
12. A non-toxic environment
13. A safe radiation environment
14. A protective ozone layer
15. Limited influence on climate change

# Community planning is needed in environmental work!

“Emissions threaten fungi and berries!” “Polluted drinking water!” “Air pollution from traffic shortens your life!” We meet such alarming headlines more and more frequently in the media. We realise that environmental problems are considerable and difficult to solve. But they are most often presented in isolation without being placed in a wider context.

When the issue concerns conditions for animal and plant life in our forests and watercourses, the problem is rarely associated with the size and shape of our land and water areas.

When discussing renewable energy, local opinion concerning, for instance, the planting of energy forests or the location of a wind power facility are often mentioned. We seldom hear about the available options in planning, however, and their impact on the environment.

How does the shape of urban areas, the location of housing, workplaces and services affect our travel, our living environment and the spread of noise and air pollution and, consequently, our health? These are issues occupying the time of researchers, but this discussion rarely reaches the general public. The ecological and social consequences of the extensive trade and entertainment centres mushrooming along our motorways have not been examined closely enough. But we can already see that city centres are being depleted and our green areas encroached upon.



How can biological diversity be preserved and developed by means of physical planning with foresight? Aerial photo of the National Urban Park in Stockholm. Photo: Klaus Lukkonen, Bildmedia

Wrongly located road and rail routes also create barriers between housing and recreational areas.

This catalogue of environmental issues important for the survival of man, animal and plant life, for our health and well being, represents only a few examples. It illustrates that the physical planning of urban areas, the infrastructure, land and water, plays an important role in placing these issues in a wider context.

All our activities are conducted in spaces – rooms in a house, an area, a town or a region. This is so obvious we often overlook it.

Sweden has 15 environmental quality objectives which provide guidance for community planning and the implementation of the Environmental Code. The objectives are listed on the first page of this publication. The SAMS project (*Samhällsplanering med miljömål i Sverige* – Environmental objectives and indicators in spatial planning and SEA) has examined these issues.

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The Swedish Environmental Protection Agency (SEPA) in conjunction with other agencies presents examples of how local and regional environmental objectives can be formed in the series “Theme: environmental objectives”. This edition deals with community planning using environmental objectives. Draft manuscript: SWECO: Ulf Ranhagen. Editing committee: Boverket (National Board of Housing, Building and Planning); Claes-Göran Guinchard, Ylva Rönning (projekt leader), Karin Slättberg (project secretary), SEPA: Katrin Ottosson (project leader), Kristina Wassén (information officer), Ulrik Westman (project secretary).

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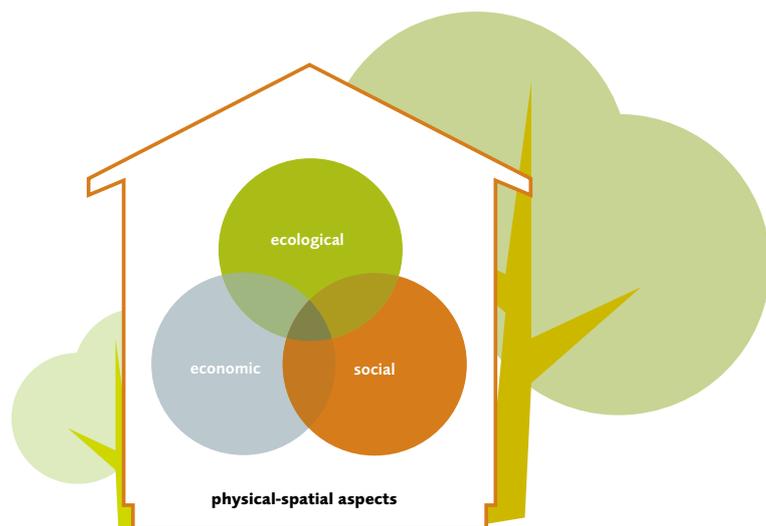
# Experience from north to south

How can physical planning be used in the achievement of environmental objectives? How can we enhance the dialogue between the people involved in planning – planners, environmentalists, politicians and the public?

The National Board of Housing, Building and Planning and SEPA were commissioned by the Government to develop methods and tools for the integration of environmental objectives in community planning. This work has been conducted in cooperation with several municipalities and regional authorities within the SAMS project. A fundamental concept in the project was to create close cooperation between environmentalists and planners throughout the planning process. Practical trials were carried out to examine the implications of environmental aspects in sustainable development in comprehensive physical planning.

Widely differing environmental and planning situations have been examined within everything from a very sparsely populated municipality (Storuman) to the most densely populated regions in Sweden (the Stockholm and the Skåne regions).

Two studies concerning similar issues have been carried out by the National Board of Housing, Building and Planning and SEPA in conjunction with the



The achievement of sustainable development requires the interaction of ecological, social and economic aspects within a physical-spatial framework. The overlap between the circles represents objectives which incorporate all four dimensions. If we only achieve environmental objectives, or economic or social targets in isolation, this could mean that the other goals are neglected.

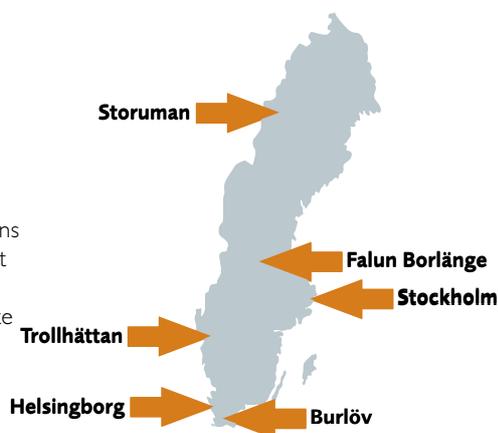
towns of Kimberley and Port Elizabeth in South Africa.

The SAMS project was co-financed by the EU Environmental Fund Life and by Sida (Swedish International Development Cooperation Agency). The project was concluded in September 2000.

## The core of the project consisted of eight case studies.

Here are the municipalities who took part and their key issues:

- *Storuman*: Scenarios future images for sustainable development in a sparsely populated municipality.
- *Trollhättan*: Local adaptation of the national environmental objective "A good urban environment".
- *Helsingborg*: Improved conditions for bicycle and public transport in order to counter the environmental impact of private motoring.



- *Falun-Borlänge*: Environmental objectives adapted to planning and indicators for agriculture and forestry.
- *Stockholm 1*: Biological diversity in the national urban park
- *Stockholm 2*: Assessment of environmental impact during more in-depth comprehensive planning.
- The regional planning level was represented by: *The Office of Regional Planning and Urban Transportation in Stockholm*: Strategic environmental assessment in regional planning.
- *Burlöv*: A sound living environment through a reduction in the environmental impact of traffic.

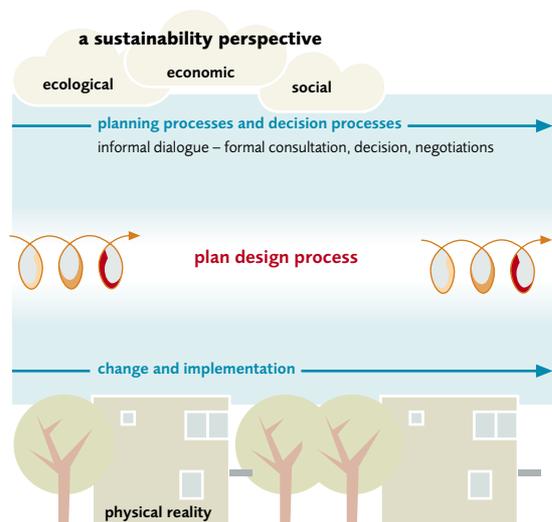
# Some valuable lessons

There are plenty of tools and methods that can be used in comprehensive planning where environmental issues are given the same weight as social and economic issues. Some methods and tools have been developed on a theoretical level and have therefore not been used in practical planning. These are now available.

Expertise and experience from different environmental sectors as well as from basic research are formulated in a number of different ways. This can make it hard to understand and compare them. One way of translating environmental objectives is to formulate indicators – one of the tools developed in the SAMS project.

The large quantities of information required in physical planning are difficult to handle and interpret. Manual methods easily take a great deal of time as well as being awkward when we want to look at statistical details in geographical terms. It is becoming increasingly common to use advanced computer tools.

This is a brief outline of the conclusions reached in the SAMS project. We will be presenting these in more detail on the following pages.



The common frame of reference for the planning process in the SAMS project.

## OBJECTIVES

- The 15 national environmental quality objectives are of use in formulating local environmental objectives and indicators.
- Don't allow the environmental objectives to obscure social and socio-economic goals!

## PHYSICAL STRUCTURE

- The physical structure of a place, i.e. the way in which building areas, traffic routes, green areas and supply routes are located, carries considerable importance in assessing which of the environmental objectives are achievable.

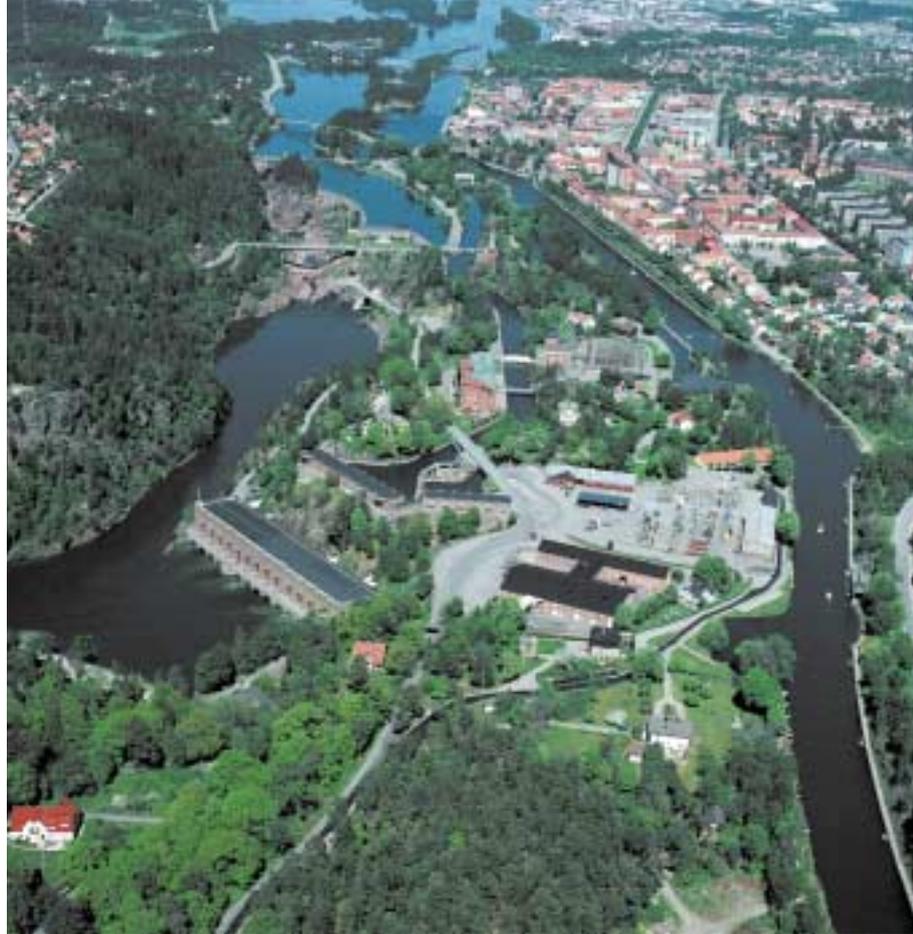
## ENCOUNTERS BETWEEN ACTORS

- The common frame of reference “Community planning with environmental objectives” bridges gaps between planners, environmentalists, researchers and those who work with practical applications. Within the SAMS project, municipalities with widely differing prerequisites in terms of size, situation and resources, were able to exchange experience and expertise. This provided a stimulating comparison.
- Start with dialogues – these provide ideas for new methods of cooperation between politicians, the public, planners, environmentalists and other groups of experts!

## METHODS AND TOOLS

- The methods and tools applied have contributed to inspire planning and integrate environmental issues.
- Visions, scenarios and future images inspire local discussions.
- Strategic Environmental Assessment (SEA) is important for selecting the right path.
- Geographical Information Systems (GIS) provide new opportunities although competence and the collection of data have to be improved.

The Trollhättan case study focused on local adaptation of the national objective "A good urban environment". They worked to involve many different interest groups. Photo: Metria.



#### INDICATORS

- The use of indicators is a good way of stimulating dialogue. This acts as an alarm clock and generates comparison between environmental objectives.
- The misuse of indicators can lead to oversimplification and hasty conclusions.

#### INTERESTING AND STIMULATING

- The issues and working methods aroused international interest.
- It is stimulating to work with environmental objectives and indicators.

The form of planning can be renewed through systematic work with environmental objectives and indicators with the aid of a broad range of tools, methods and processes. The case studies illustrate a great deal of involvement and impressive creativity from many different actors in the development of physical planning, rendering it a much more forceful instrument in the work towards sustainable development.

#### RESEARCH AND DEVELOPMENT

- Different theories of planning have been used within the SAMS project. Further research and practical development are needed in many issues such as:
  - The interaction between national, regional and local objectives.
  - The significance of physical planning in relation to other control instruments.
  - The evaluation of planning and environmental dialogues for generating ideas for developing forms of cooperation between different types of parties.
  - Methodological approaches, impulses and tools in practical applications.
  - Strategic consequence analyses where alternatives are evaluated on the basis of environmental, social and economic goals.
  - Indicators which can be presented in geographical information systems.
  - A system of indicators to enable comparison between municipalities and regions.

# Sustainable use of land and water

Should we solve traffic problems by building new traffic routes or should we introduce road tolls? This is a current example from the debate about the link between physical structures and sustainability.

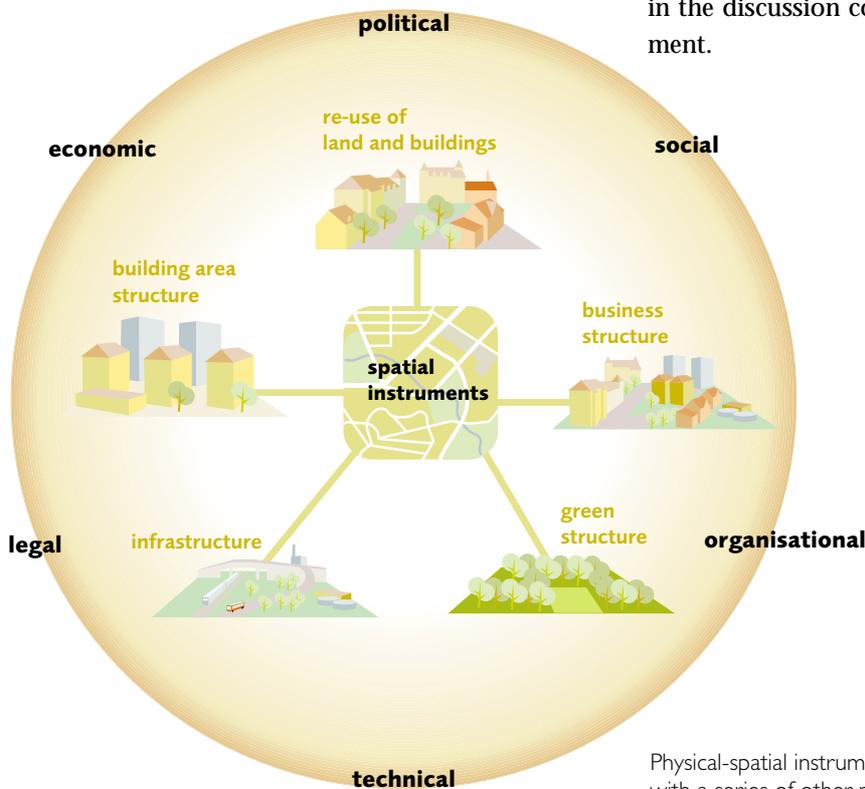
The physical structure, or how building areas, traffic routes, green areas and supply routes are located, is a key issue in the work towards achieving sustainability. Other issues such as politics, economics, the law, organisation, technical solutions and living patterns are also decisive in our achievement of the objectives.

The link between the physical structure and sustainability has been highlighted by European

Commission's Expert Group on the Urban Environment at the which comments as follows:

*"Planning which considers the load bearing capacity of the environment requires the setting of the maximum level of exploitation a local environment (a town, city, region) can tolerate in infinity, at the same time as both the critical and constant natural capital generated by man in the environment is preserved."*

Sweden is characterised, like many other countries in Europe and the rest of the world, by the accelerating growth of the cities and university towns. At the same time, the majority of the population in Sweden, just over 60 per cent, lives in small and medium sized urban areas with between 200 and 100,000 inhabitants. In spite of such a sparse population distribution, the access to extended and faster communications has created larger and larger regions for housing, work and services. The "region" concept has thereby gained in significance in the discussion concerning sustainable development.



Physical-spatial instruments have to be combined with a series of other means in order to improve the environment in the long term.

### An ecological landscape zone in urban areas



Core area with dispersion and buffer zone

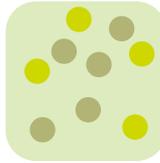


Core area with a buffer zone



Core area surrounded by barriers

### Fragment



An illustration of the principle of different stages of fragmentation in an urban area

### DENSE OR SPARSE?

Which patterns of buildings or traffic routes create the best conditions for sustainable town development? There are contradictory views about this. Some people believe that a compact town is necessary while others feel that towns should be more spread out. In practical planning, a good balance has to be found between densely and sparsely constructed towns.

Several suburbs at some distance from a larger town could reduce pressure since many people could both live and work in the smaller urban centres.

### WHICH GEOGRAPHICAL SHAPE IS SUSTAINABLE?

During the history of town planning, different models for the development of building areas have been outlined: more compact towns often provide good conditions for efficient public transport and centralised systems for heating, water supply and sewage treatment. Even linear, star-shaped and finger-shaped towns provide, if large and dense enough, the conditions for good public transport at the same time as maintaining proximity to the countryside.

### INTEGRATED OR DIVIDED INTO ZONES?

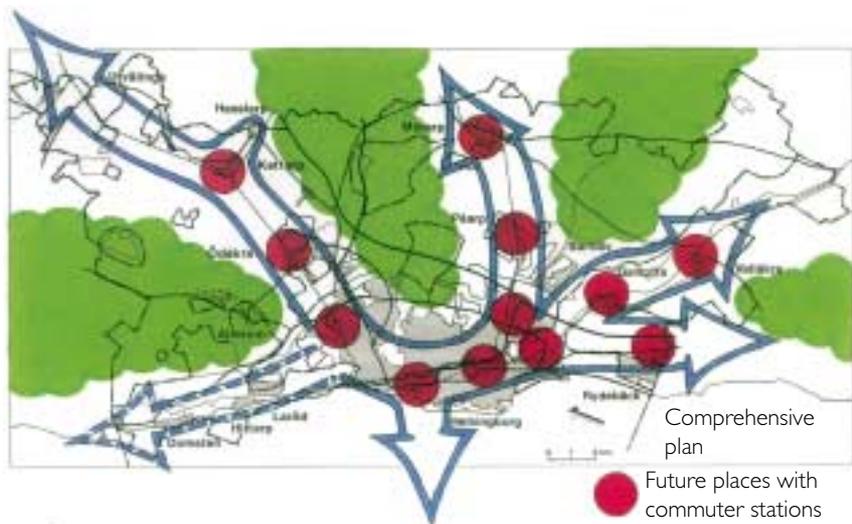
During the whole of the 1900's, the functions of a town have been divided up and increasingly specialised. Workplaces, housing, entertainment and commerce have had their own zones. But during the past decade, a significant change in attitudes has taken place. Activities in the town have been combined instead of being separated or divided up into zones. The social and cultural advantages are manifold.

However, there are always environmentally harmful operations which cannot be integrated. The integrated town can aggravate traffic problems such as noise and exhaust fumes.

### RE-USE OF LAND AND PREMISES

Closures and changes within industry, the armed forces and the health care system have meant that land and buildings have become available for re-use. Such developments have reduced the requirement for new construction on virgin land. Centrally located areas can be made denser which can lead to a decrease in transportation. Since such land is often attractive for housing and workplaces, there are often financial incentives to remediate contaminated land.

The Helsingborg case study highlighted the scope for increasing the proportion of people commuting by bicycle and public transport by extending the clear finger structure and pearl necklace of commuter stations and changeover points proposed in CP-97.



## GREEN AREAS AND WATER AREAS

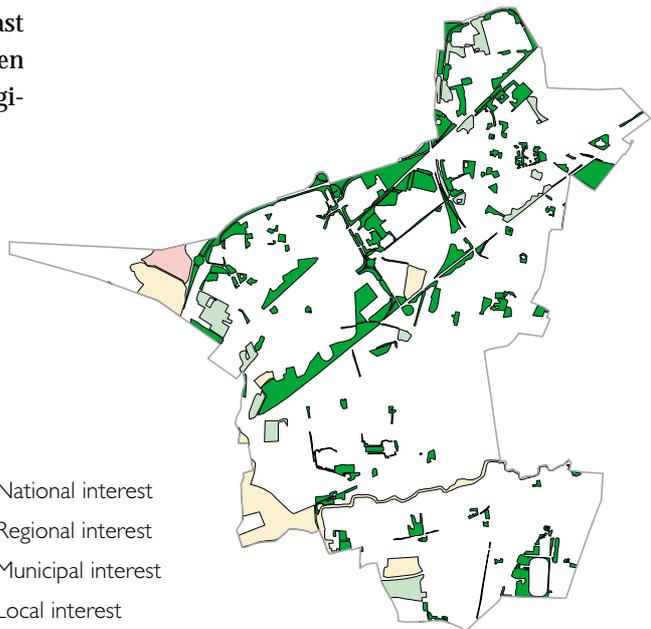
*"...one wonders if our children  
will have the things we had:  
If there is work, if there is food,  
If they live somewhere decent,  
Are there sheep and cows and water and air?..."*  
(AB Svenska Ord 1970)

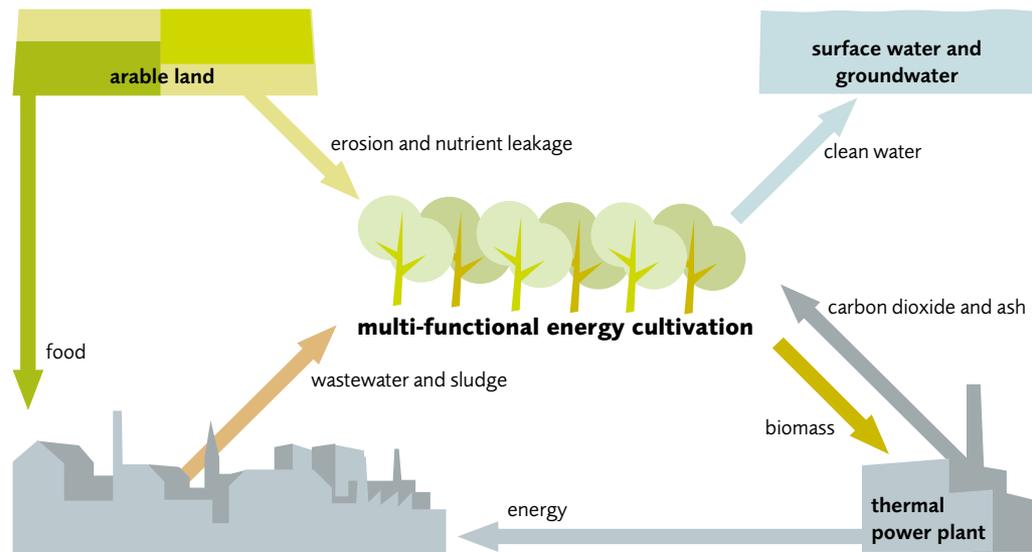
Characteristic of many Swedish towns is the green web of large and smaller parks and areas of natural beauty which surround building areas in the places where people live. The various functions of green structures in a sustainable perspective – their ecological, social and cultural functions – have become increasingly more significant. It is good for the health to be able to get out into the countryside. But in recent decades, the proportion of undeveloped land in towns and urban areas has decreased as a result of increased density and changes in land use. Access to uninterrupted green spaces has also been reduced. The large infrastructure projects of the past decade have contributed to fragmenting the green spaces. It is not as easy as it once was to get to fungi-rich forests.

Access to clean fresh water will become one of the central issues of the 21<sup>st</sup> century. The efficient management of water resources near towns, factories and residential areas will present a considerable challenge if sustainable development is to be achieved. Access to drinking water is decisive for economic development and a safe supply of food products. The water suitable for drinking is unevenly distributed throughout Sweden.

Several studies show how our well-being and our health are linked to the access we have to green spaces. In the Burlöv case study, the convenience of access to green areas for the general public was examined. On the right we can see the green areas within Burlöv Municipality according to type of interest. Below we can see a view of Burlöv with combined building areas, green areas and a rail network. Photo: Inger Sellers.

- Class 1 National interest
- Class 2 Regional interest
- Class 3 Municipal interest
- Class 4 Local interest





An example of how multi-functional energy crop cultivation can provide various environmental benefits has been illustrated in the in-depth SAMS study on the interaction between town and countryside.

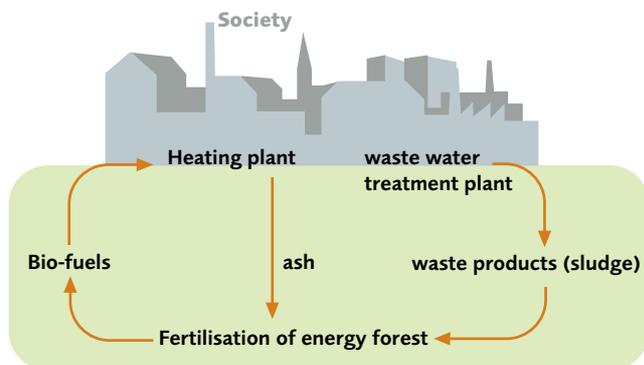
## THE INTERACTION BETWEEN TOWN AND COUNTRYSIDE

One energy unit on our dinner plates necessitates the use of almost ten energy units of fossil fuels, such as oil, in each phase of food production. Of the total energy consumption for a household, 50 per cent is used on food – including transportation, trade, conservation and packaging – while 30 per cent is used for the family’s transport needs and 20 per cent for heating.

This example indicates the need to plan for a better interaction between urban areas and the surrounding countryside. Sustainable development requires that society’s supplies are based on renewable resources and that the input of water, energy and material is adapted to the ecocycle.

Reduced emissions of carbon dioxide, for instance, have been stimulated in Sweden by a carbon dioxide tax levied on fossil fuels. In addition to the use of bio-fuels bringing environmental benefits, their production can also provide environmental gains.

The environmentally sound cultivation of perennial energy crops – energy forest or energy grass – would mean that the environmental load imposed by agriculture in the form of nutrient leakage, erosion and greenhouse gases, could be reduced. Energy forests can also be used to reduce the amount of heavy metals in arable land. The cultivation of energy crops can also be used to purify wastewater and leachate as well as for treating waste products such as sludge.



The environmentally sound treatment of nitrogen is one way of reducing environmental load.

# Environmental objectives in comprehensive planning

Comprehensive physical planning was previously often associated with the expansion of our urban areas. Modern comprehensive planning incorporates the overall interaction between building areas, the infrastructure, land and water. Greater emphasis has been apportioned the management and development of our resources.

In recent years, the primary task of comprehensive planning has been to ensure that the changes made are consistent with a good living environment. Since the comprehensive plan acts as a guide – is not binding – the recommendations and proposals it contains have to be implemented with the aid of other instruments, such as area decisions and detailed plans. Other instruments are included, for example, in the Environmental Code, The Forest Protection Act and the Highways Act.

The comprehensive plan provides examples of good land and water use. It should also coordinate a large number of decision-makers outside the municipality. The comprehensive plan should in fact

be used as material on which decisions can be based by everyone applying the third and fourth chapter of the Environmental Code. These regulations cannot be applied without the support of interpretation and being rendered more concrete in a comprehensive plan (see also the National Board of Housing, Building and Planning's "Comprehensive Plan Book" part 1).

The SAMS project thematic study "Physical planning focusing on the environment" underlines the fact that each municipality is to decide how it will use the opportunities provided by the comprehensive plan – in the same way as it is task of each one of us to decide how active we wish to be concerning our future living environment and that of our children.

Physical planning provide considerable scope for use in environmental work, not least on the basis of the municipal comprehensive plan. Here is a selection of points from the thematic study:

- The comprehensive plan is developed continuously in transboundary, democratic processes. There is no better local forum for collective discussion about the future and the implications of sustainable development legislated for within any other area of society. Important issues can be brought up and examined at all stages. The process identifies conflicts and can contribute to development of a common view.
- The comprehensive plan evolves in the local context where people spend most of their time. The public, business entrepreneurs, interest groups and others can conduct a direct dialogue with the experts and decision-makers about how the physical structures should be formed which constitute the external framework of our living environment. Common expertise and insight into local environmental problems can develop during the course of this dialogue.

Well-formulated planning documentation is not sufficient for the comprehensive plan to be able to function as a forceful instrument for the integration of environmental objectives. The most important

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## Requirements for environmental consideration in the Planning and Building Act (PBL)

There is strong political support for the use of physical planning as an integrated part of a collective environmental policy. Through amendments to the Act in 1996 and 1998, the requirements for inclusion of environmental considerations in planning were increased. The Act emphasises that planning should promote purposeful physical structures:

*"Planning should, in observing natural and cultural values, promote purposeful structures and aesthetically attractive design regarding building areas, green areas, communications and other facilities. Furthermore, a good living environment from a social viewpoint, good environmental conditions in general, along with sound long-term conservation of land and water, energy and raw material resources should also be promoted." (PBL Chapter 2, paragraph 2)*

There were also requirements for a general impact assessment of the comprehensive plan:

*"The content and consequences of the comprehensive plan shall be clearly discernible." (PBL Chapter 4, paragraph 1)*

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What is the current situation? What do we need to do to ensure that positive conditions continue? The comprehensive plan highlights the scope for the physical structure to generate sustainable development. Photo: Staffan Arvegårdh



condition is to instigate a planning process based on open cooperation between the different interests involved under the leadership of the municipality. The planning then creates a forum for an exchange of views where expertise, the interest and local knowledge of the general public, and political intentions coincide. In the collection of examples from SAMS, "Comprehensive planning for sustainable development", the CP processes are presented in which environmental issues are central. The later stages of the planning process conducted in consultation and presentations are regulated in the Swedish Planning and Building Act (PBL).

An obstacle may be presented, for instance, by the different cultures within environmental protection and planning respectively. Environmentalists often claim to represent indispensable values which are defended with the support of legislation and

norms applied throughout the country. The attitude of planners is often one of attempting to mediate and bring together opposing interests through coordination or compromise between different values on the basis of the local situation. The risk is that the solution reached by the planners is short term. The strict approach of environmentalists might create problems in finding a solution of value to us who are involved at the present time.

Another aspect of the process concerns the potential for strengthening public influence in planning. A basic condition for positive daily life is our ability as citizens to become more involved in the decisions made which affect our own local community. The ability to influence the conditions close to home is of decisive significance for a sense of community and social unity.

Kungälv Municipality has co-ordinated Local Agenda 21 and the comprehensive plan (CP) and reached the following impact assessment.

|   | Formulation of the CP | CP objectives |               |
|---|-----------------------|---------------|---------------|
| <p><b>The first key:</b><br/>Non-renewable natural resources such as oil, coal and minerals should not be exhausted. The resulting waste products should not accumulate in the countryside.</p> | ?                     | ➤             | ➤ contributes |
| <p><b>The second key:</b><br/>Persistent products not found in the natural environment may not be spread in the countryside.</p>  | ➤                     | ➤             | ➤ contributes |
| <p><b>The third key:</b><br/>The physical space for the natural ecocycle – land and water – may not be threatened. Diversity of animal and plant species should be preserved.</p>               | ➤<br>➤                | ➤             | ➤ contributes |
| <p><b>The fourth key:</b><br/>The exploitation of renewable assets should not exceed the load capacity of the ecosystem.</p>  | ➤                     | ➤             | ➤ contributes |

# A creative dialogue

The SAMS project case studies show that it is feasible to develop new and informal ways of introducing a broad spectrum of views on the environment and other issues at an early stage. The case studies deal with the early stages of the work before a formal consultation version of the plan exists. First, the background material for the plan is worked on, general objectives are formulated and alternatives are developed. The forms for this work are not stipulated in any legislation – it is therefore possible to develop new working methods.

**Burlöv Municipality** chose to involve 15 members of the public interested in the environment and planning in roundtable discussions to identify important environmental objectives, to generate positive future images and to develop concrete measures and proposals. Nine meetings were held but the participants also ‘did their homework’ by familiarising themselves with various questions raised at the meetings. In addition, a larger meeting was held with one hundred or so inhabitants from the municipality to discuss environmental issues. The base for this work was the Picabue method developed at Leeds University, which focuses on the use of

environmental indicators. Other instruments applied during dialogues with the public included “mental maps” and GIS.

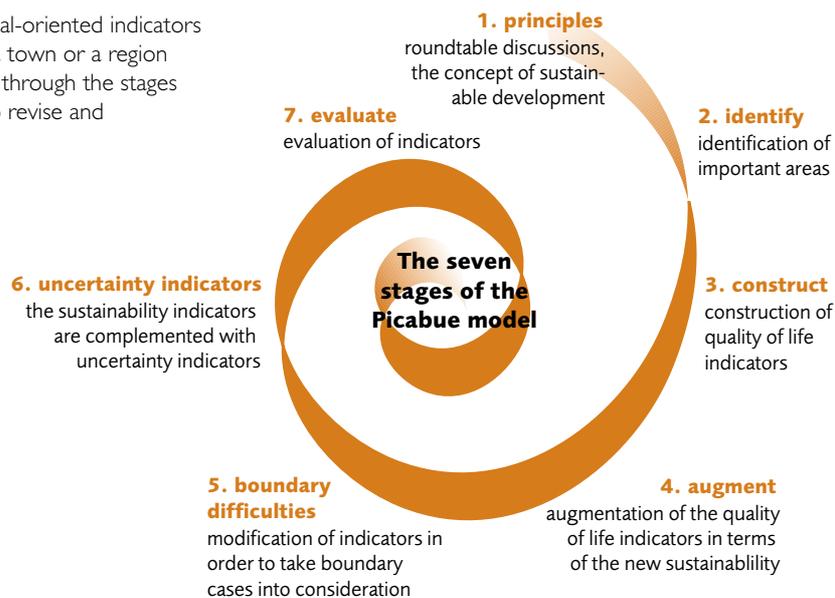
**Trollhättan Municipality** also chose to try roundtable discussions in their work to adapt environmental objectives to local conditions. The Picabue method was considered but was rejected since it proved difficult to discuss indicators without first formulating goals and targets. At the two first meetings general and detailed objectives were discussed. The material from these larger meetings was collated along with the personal impressions of the contact people and the proposals for targets from the National Board for Housing, Building and Planning.

**Storuman Municipality’s** case study represents yet another approach in involving the public in a dialogue on environmental objectives and comprehensive planning. An important base was provided by the SEPA study “Sweden 2021” with the future images known as ‘Taskminder’ and ‘Pathfinder’. A seminar group was formed with broad representation from the municipality’s business sector, associations and other social activities.



In Burlöv and Storuman the public were involved in dialogues about planning and the environment. Photo: Ulf Ranhagen.

The Picabue model aims to develop goal-oriented indicators which measure the progress made by a town or a region towards sustainability. The group works through the stages and can then work in several rounds to revise and complement the list of indicators.



Common aspects which the dialogues conducted as part of the SAMS project include the following:

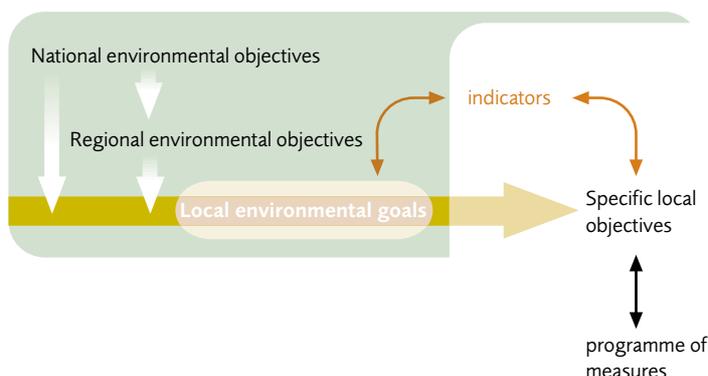
- Broad involvement from many actors – planners, environmentalists, business sector representatives, Agenda 21 groups and others.
- Work conducted in an interplay between a larger group and smaller working groups which study the specific issues in depth.
- Work in dialogue form in an initial phase of the comprehensive planning.
- Testing and further development of the methods in a way not previously attempted.

Some distinctions include:

- The three municipalities focused on different aspects:
  - the development of planning and field indicators on the basis of the main objective of a good living environment (Burlöv)

- the breaking down and local adaptation of a national environmental objective (Trollhättan)
- the development of future images on the basis of environmental objectives but also based on economic and social goals (Storuman).
- The three municipalities have tackled the issue of method in different ways:
  - to mainly employ one method with a number of precise working stages developed at a university for practical application (Burlöv)
  - to attempt to apply the working procedure developed within the SAMS project and to combine several methods and tools (Storuman)
  - to develop a new working model (Trollhättan).

In the report “Comprehensive planning for sustainable development”, other interesting examples are presented of the CP process in which a high degree of participation from the public is encouraged.



The national and regional environmental objectives are adapted to provide local general goals. These are made more precise and are linked to indicators and a programme of measures.

Source: Planning with environmental objectives! The Trollhättan case study, 'a good urban environment'.

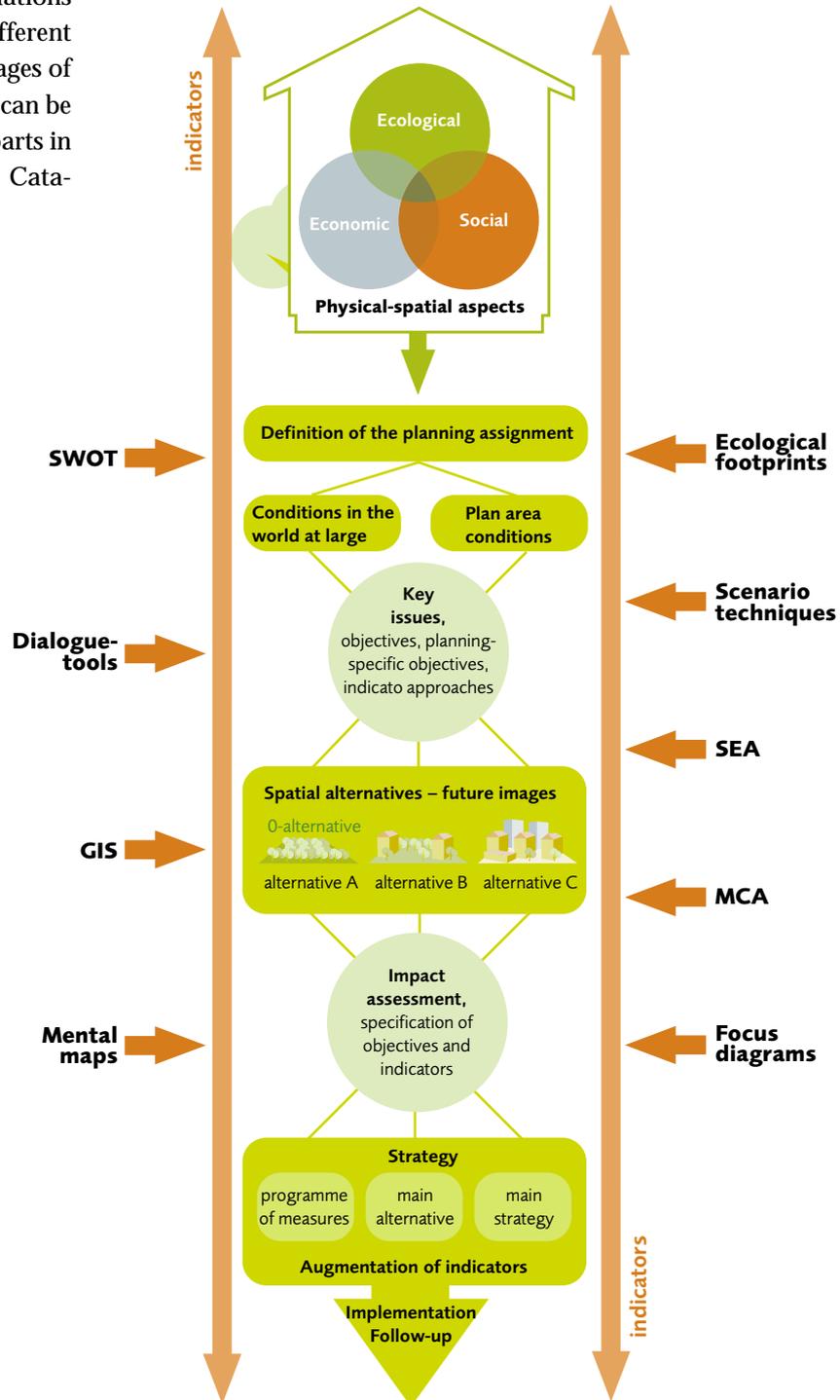
# Methods and tools

The toolbox can represent the whole system of methods and tools which have been developed further within SAMS. The toolbox is intended for use in a flexible way adaptable to specific situations in comprehensive planning. The tools have different functions and become relevant at different stages of the work. Read more about how the toolbox can be used and possible links between the various parts in “Planning with environmental objectives! A Catalogue of Ideas”.

## WORKING PROCEDURE

In planning with foresight, environmental issues should permeate every stage of planning and should be dealt with in conjunction with social and economic issues. There are advantages to working in recurring planning rounds in which the plan programme and consultation proposals are devised. Working in several rounds – or working on different stages parallel to each other – makes it easier to include all the different issues. If we introduce future images and alternatives at an early stage and make early impact assessments, important problems, conditions and goals are brought to the fore. These may perhaps not have been discovered or focused on as clearly if work had proceeded in a linear fashion whereby one stage is completed before the next is begun. An example: During work on a comprehensive plan, a very thorough inventory of all the environmental conditions was worked out before alternatives were considered. In the subsequent outline work, it turned out that an area of high natural value which was very well situated in relation to public transport had not been surveyed as a result of a distorted area demarcation. If the work had proceeded as a cycle, this would have been discovered at an earlier stage. The cyclic working procedure involves a preliminary inventory and preliminary outlines for alternatives being drawn up during the first round of planning.

SAMS working procedure and toolbox.



## THE TOOLBOX

No method can be used in every planning situation. Tools and methods should be selected according to local conditions.

*The scenario technique* with backcasting and future images includes methods for being able to conceive of alternative courses of action for the future.

*SEA* (Strategic environmental assessments) is a method for incorporating environmental aspects at an early stage in planning. Its main emphasis is on analysis of consequences but it requires values and goals to be made clear.

*GIS* (Geographical information systems) is not just a way of simplifying and improving graphic presentations of information on maps. It also allows us to link up geographical location-oriented objects with other types of information and methods of presentation other than on maps, such as tables, texts, pictures or video sequences.

A *SWOT analysis* can help identify the conditions of an area: strengths and weaknesses, threats and opportunities, and to formulate key issues. How great is the problem and how can we influence it? We can assess this with the aid of a *focus diagram*.

*Mental maps* are based on interviews and questionnaires where views and wishes are drawn onto maps.

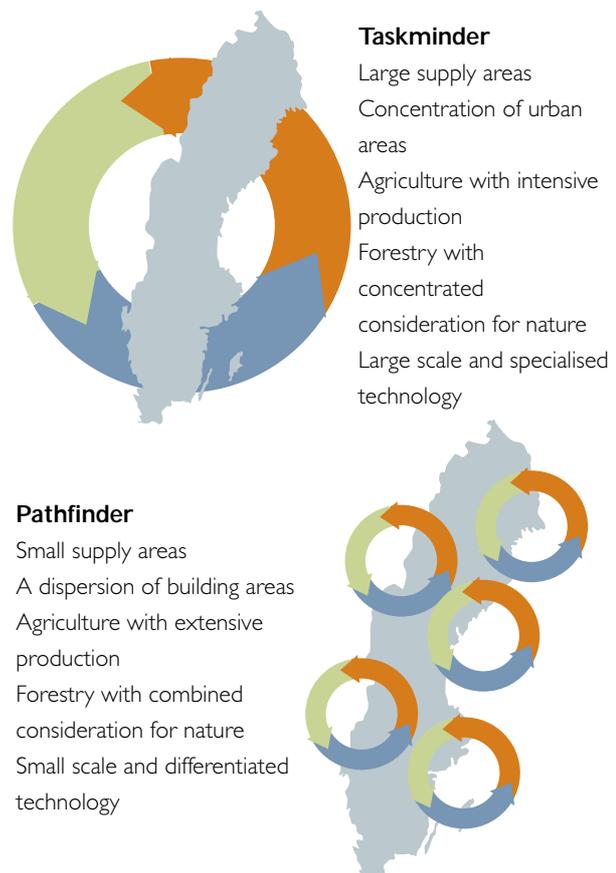
*Ecological footprints* are instructional images which illustrate sustainability. How much space does a population need for its subsistence?

*MCA* (Multi-criteria analysis) is used to evaluate the total quality of a plan alternative with the aid of certain factors or indicators.

Different variations of *planning and environmental dialogues* exist to develop indicators in round-table discussions. ("Picabue" is such a method). Here are a few examples of how some of these tools have been used in the SAMS project:

## THINKING IN THE LONG TERM!

If we imagine how our town will function in 2021, we have created a vision. The formulation of visions, scenarios, future images and alternatives can help us to develop community planning in a sustainable direction. Our methods and tools can, however, be made even more efficient if we make use of experience gained in work conducted into future studies in a more systematic way. One method used more and more in working with scenarios is 'backcasting'. This means that we place ourselves in a context in the future from which we, for example, imagine, construct, a sustainable social structure. This is done without preconditions and without being inhibited by the obstacles which exist today



Future images can be used to outline lines of development of interest from an environmental perspective. The basic principle for Taskminder and Pathfinder (from Sweden 2021 – the road towards a sustainable society, SEPA 1998).

## STRATEGIC ENVIRONMENTAL ASSESSMENT – HOW TO GET IT RIGHT FROM THE START!

A strategic environmental assessment should highlight how the choices made in comprehensive planning affect the environment and the scope for fulfilling environmental objectives. Should we build a road or not? For the assessment to be as meaningful as possible, it should be done as early as possible to allow the direction of the planning to be modified on the basis of the results obtained. The assessment contributes to indicating important choices and reveals conflicts between objectives as well as discovering synergies between objectives. When objective fulfilment is evaluated, several positions are adopted:

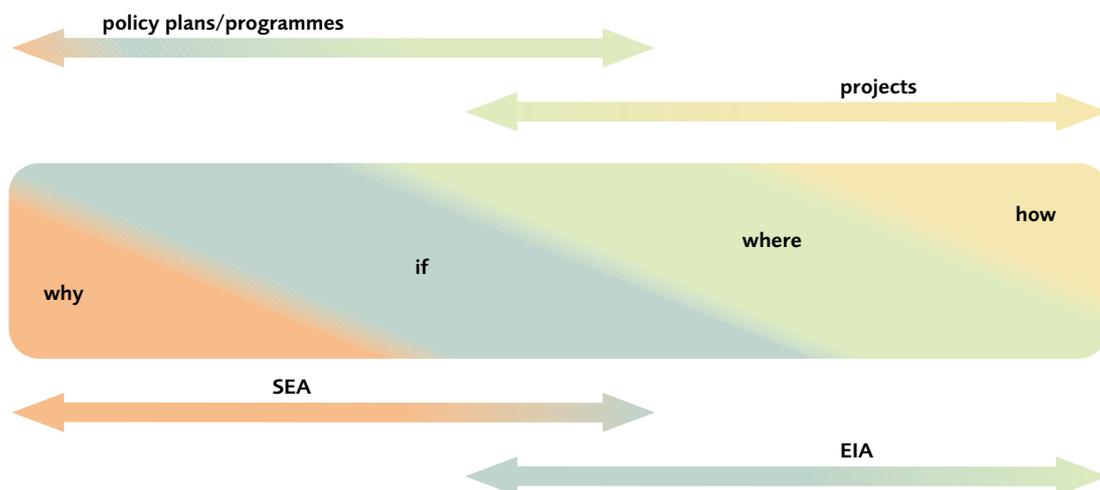
- *Possible effects* – objectively measurable, physical, social or economic changes as a result of the plan.
- *Consequences* evaluated on the basis of their significance for the people affected by the planning.

SEAs are conducted at different levels both within inter-sectoral community planning and within sectoral planning. The process and document consist of different contents depending on where in

the chain of decisions we find ourselves. The work should be conducted in an interplay so that issues which become relevant at municipal level can also be passed on to the regional level. This includes for example the question on the encroachment into natural areas by traffic routes, studies at municipal level might lead to the reconsideration of a route which has been discussed at regional level.

Some advice when working with SEAs:

- *Select the approach* and place considerable emphasis on the establishment of objectives, that environmental issues are clearly distinguishable, and on the interaction between analysis and synthesis. Conduct qualitative assessments rather than quantitative ones if objectives can then be treated more equally. There is a risk that the quantification of an objective results in disproportionate effect in relation to other objectives.
- *Form the process* so that it becomes constructive, communicative and continual.
- *Involve the actors* with expertise, experience and interest.



An environmental impact assessment (EIA) of a new road, for example, deals with what environmental consequences we can expect from a certain choice of route or a certain alternative stretch of road along with what we could do to reduce negative environmental impact. A SEA discusses, on the other hand, whether the new road is really necessary and what environmental consequences would

result from having a road or not. SEA also takes up the issues of environmental impact at an earlier stage. SEA focuses on the strategic level where the questions WHY, IF and WHERE are of primary interest. At project level, where EIA is relevant, the assessment deals primarily with HOW an area or an object should be designed in order to fulfill environmental objectives and requirements.

## COMPUTER TOOLS IMPROVE QUALITY, EFFICIENCY AND PARTICIPATION!

GIS is a computerised system for collating, analysing and presenting geographical or location-based information. GIS incorporates both software, hardware, data and the organisation required as well as the users.

But GIS is not only a way of simplifying and improving graphical presentation of information on maps. It is also a tool which allows us to link geographical location-oriented objects with other types of information and methods of presentation other than maps such as tables, texts, pictures or video sequences. Here are some of the conclusions from the work with GIS in the SAMS project.

### INVEST IN ENHANCING COMPETENCE!

Better GIS competence is decisive if this technique is to gain greater currency in the work of integrating environmental objectives in physical planning.

### IMPROVE QUALITY AND THE EXCHANGE OF INPUT DATA AND METADATA!

High demands are placed on the input data used for various indicator analyses for environmental objectives. Very specific meta-data is often required for each theme in a calculation.

### PLAN INTERACTIVELY WITH GIS!

By introducing the GIS tool early in the process, the intentions of the different parties and political positions can be recorded and analysed in greater detail throughout the course of the planning process than would have been feasible using manual methods. Qualitative assessments can be built into the system backed up by VR technique (Virtual Reality) and animations.

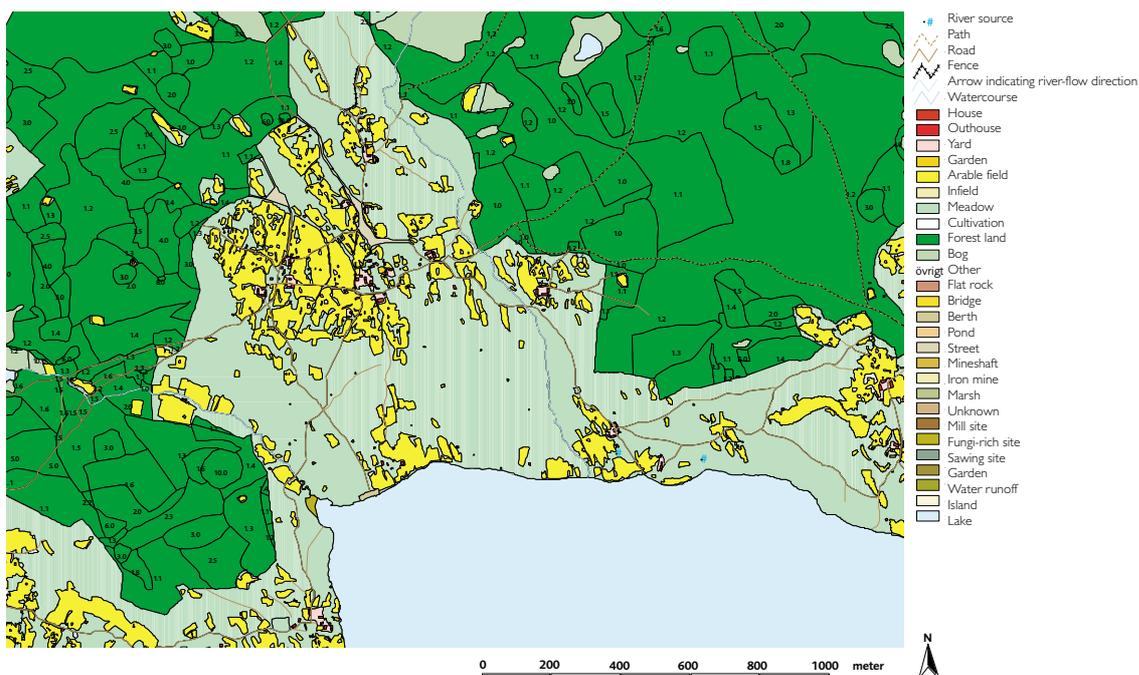
### USE GIS TO CALCULATE INDICATORS!

GIS can function as an aid in the calculation of indicators linked to work on environmental objectives and environmental quality norms in comprehensive planning for example.

### MAKE A THOROUGH INVENTORY OF NEEDS BEFORE BUILDING UP A GIS SYSTEM!

Rule number one in all GIS work in an organisation is to conduct a thorough inventory incorporating the current situation and the result.

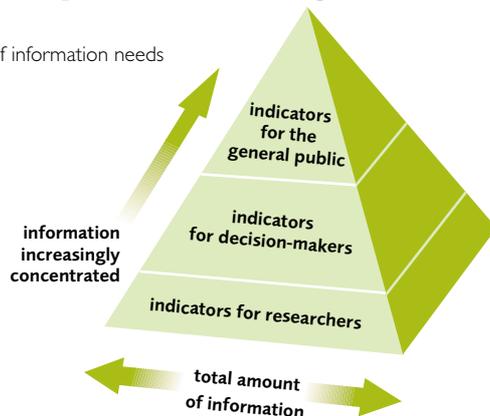
Excerpt from a cultural survey in GIS of the village of Rog as a basis for the formulation of indicators. The survey shows land use at the start of the 1800's and can therefore act as background material in planning for cultural environmental values. This example shows that a historical perspective is valuable and necessary in planning. From the Falun-Borlänge case study.



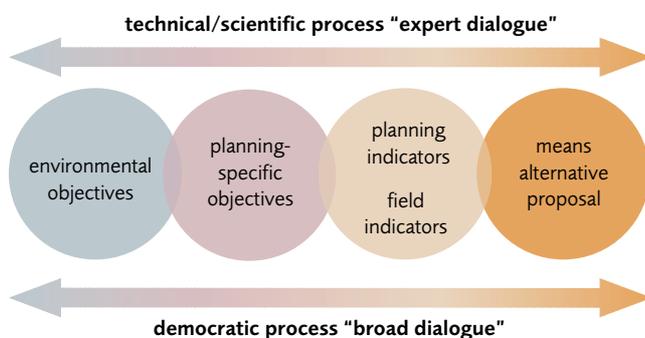
## INDICATORS – A LOT OF SCOPE AND A FEW PITFALLS

Environmental quality, the level of education, electoral participation, the standard of housing and many other measurements are indicators of how well society functions. An indicator is a phenomenon that illustrates or discloses another phenomenon. Indicators express a phenomenon in a simplified way and help us to understand and form an overview of conditions and events which are difficult to describe. Indicators are used in this case to express a measurement or ratio. It then becomes easier to evaluate and follow up environmental changes.

Pyramid of information needs



Different target groups need to know different amounts of information. Researchers, environmentalists and professional planners may need detailed information that can be traced back to raw data and statistics. Decision-makers and the media may need more concentrated information. Indicators for the general public may need to be expressed in a simplified and pedagogical way.



Planning indicators can be seen as a bridge between objectives and physical-spatial means, proposals or alternatives.

After consultations with other government agencies, SEPA has proposed a follow-up system for the national environmental objectives associated to what is known as the DPSIR model. The proposed indicators are divided into the following groups:

- Social needs or driving forces affecting environmental conditions (Driving forces).
- Factors directly affecting the environment (Pressure)
- The development of the state of the environment (State).
- The impact of environmental changes (Impact).
- Measures taken by society to counteract one or more of the above mentioned aspects in a chain of effects (Response).

By using DPSIR indicators we are able to establish the situation at the present time and how the situation was in the world at large as well as in the planning area. The task of planning is, however, based on the creation of better contingencies and to look for sustainable alternatives for the future. In the SAMS project, the term planning indicator describes a type of indicator which can make it easier to interpret environmental impact in physical-spatial plans. This should be apparent in the planning documentation or from the analyses of this, for example, using GIS or other types of computer simulations.

In our case studies we have formulated and tested planning indicators with links to environmental objectives and physical-spatial means in planning. Important criteria to ensure that planning indicators are effective planning tools include:

- *Future criteria* – it should be possible to discern the indicator from the plan alternative which presents ideas or assumptions concerning the future physical structure.
- *Spatial criteria* – the indicator should be able to show us changes implicit in the plan alternatives in relation to the current situation and preferably also to a historical situation. It should be feasible to express past, present and future environmental conditions using the same measurements.
- *Objective criteria* – it should be possible to relate the properties of the plan illustrated by the indicators in a credible way to environmental objectives and other goals.

## GENERALLY APPLICABLE PLANNING INDICATORS

The SAMS project has developed almost 300 indicators of various kinds. Most of these can be formulated so that they can be used both as planning indicators and field indicators i.e. both for planning and to describe the current situation.

Twelve main groups of planning indicators have been selected which can function for all munici-

palities. In each main group, there are several planning indicators which are more specifically formulated. The main groups of indicators are presented below. They are presented in more detail in “Planning with environmental objectives! A guide” and “Planning with environmental objectives! A catalogue of ideas”.



1. Access to public transport



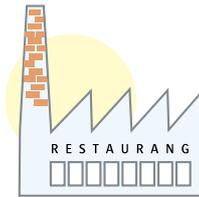
2. Accessibility by bicycle and on foot



3. Access to recreational areas



4. Noise disturbance in building areas and green areas



5. Reuse of exploited land



6. Building areas with a sustainable energy supply



7. Access to parkland



8. Access to forest, field and wetlands



9. Protected green areas



10. Biological diversity



11. Exploited coastlines and shorelines



12. Protected areas for long-term water supplies

# Working in networks

The government commission entrusted to the National Board of Housing, Planning and Building and SEPA was to develop a methodology which would contribute to the achievement of the national environmental objectives. This was motivated as follows:

- Expertise within the different environmental sectors was not easily accessible as a basis for physical planning.
- Tools and methods for the integration of environmental issues in physical planning were not available.
- It was difficult to visualise environmental information to facilitate an overview.

Many people have been involved in this work. The accumulation of expertise and experience has been conducted through studies of the literature and through contacts with researchers and those working with practical applications in other projects, as well as through participation in various seminars and conferences.

After three years work the results are now available which we hope will be of use. The results from the SAMS project are presented in several books and reports. "Planning with environmental objectives! A guide" is a book which selects the important results and examples from the thematic and case studies in an easily accessible way. In the book "Planning with environmental objectives! A catalogue of ideas" more detailed accounts are given of practical examples from municipal and regional case studies. In addition to these books, the reports from the case studies and thematic studies along with reviews of expertise and a collection of examples have been published.

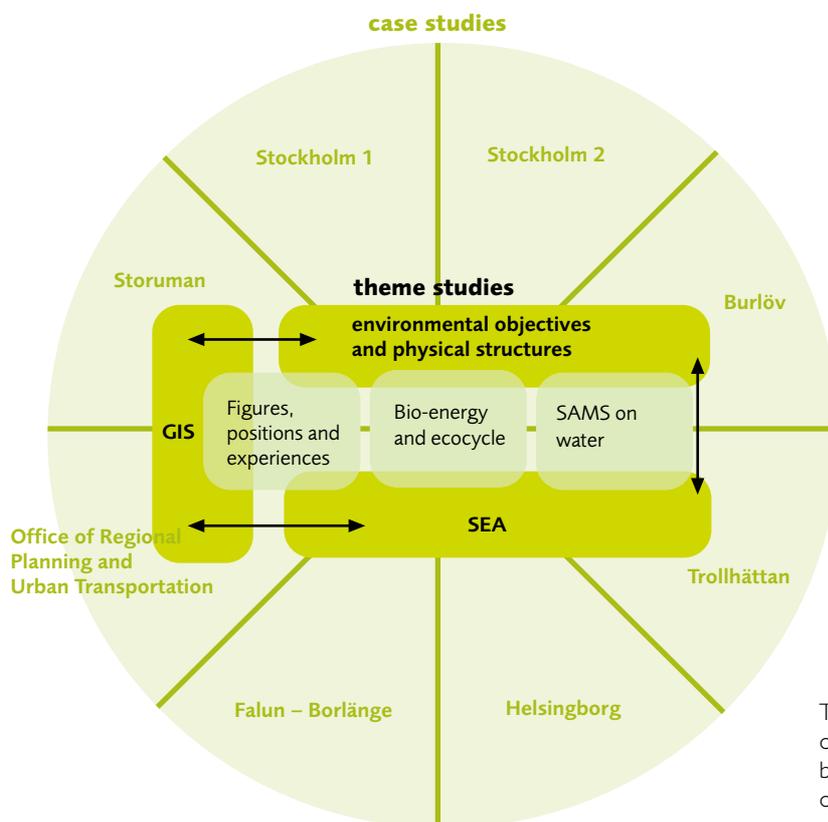
SAMS has provided many parties with good experience of working in networks which is often a central element in planning and environmental work.

## Further reading

The Environmental Objectives Bill (SOU: 1997/98).

The Comprehensive Plan Book (Boverket – National Board of Housing, Planning and Building 1996). Sweden in the year 2021 – the road towards a sustainable society (report 4858, 1998 from Naturvårdsverket – SEPA).

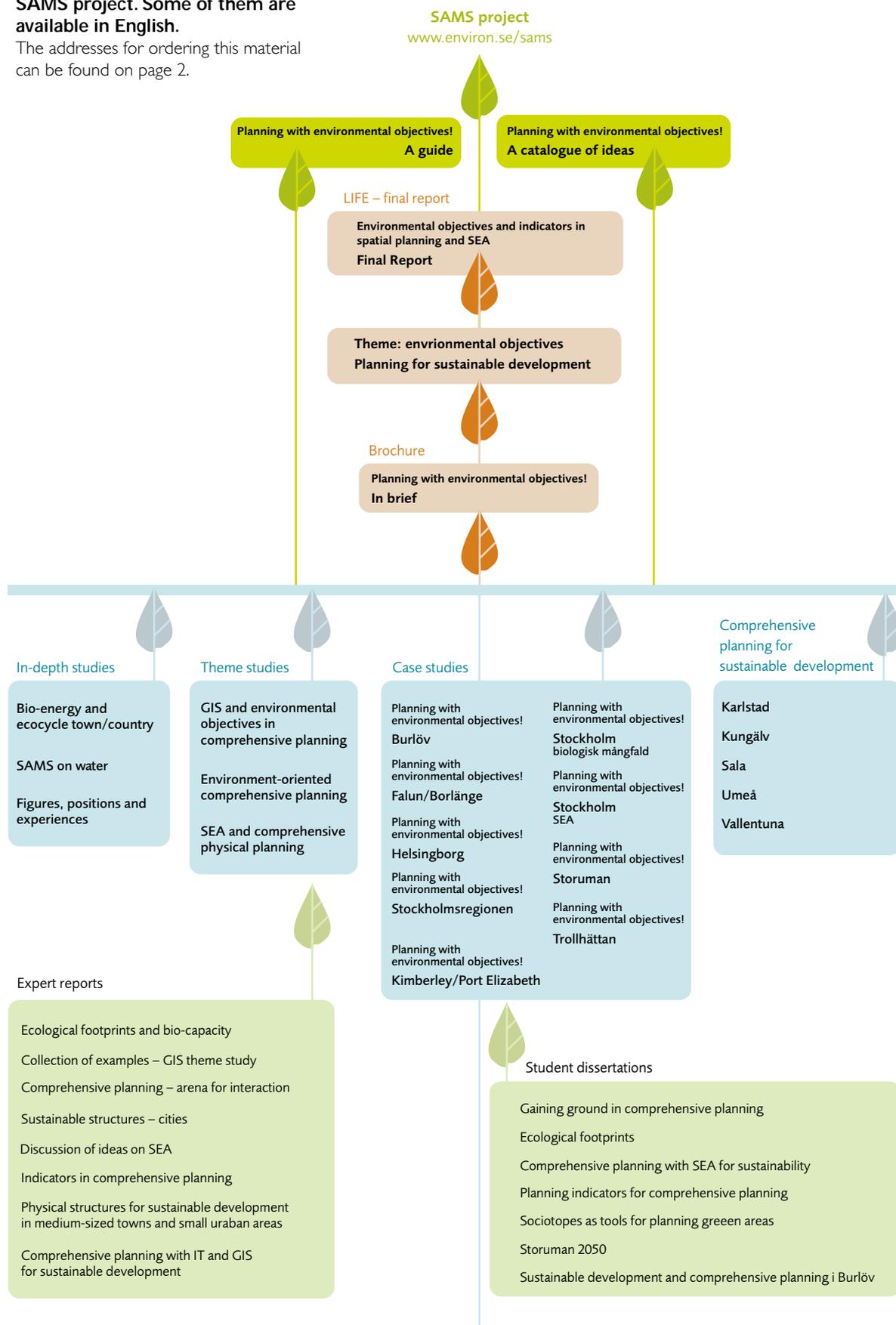
The environment of the future – everyone's responsibility (SOU 2000:52).



This is how the SAMS project was organised. A list of all the participants can be found in "Planning with environmental objectives! A guide".

Here are the books and reports which present the results from the SAMS project. Some of them are available in English.

The addresses for ordering this material can be found on page 2.



# Who does what?

Several government authorities are working with community planning in cooperation with private and public interests. Here are some comments on the roles of some of the important actors:

**The municipalities** have a key role to play through the municipal planning monopoly in comprehensive and detailed physical planning. The requirement that all municipalities should have a comprehensive plan encompassing their entire area was introduced in the Building and Planning Act (PBL) in 1987. Amendments to PBL in 1996 and 1998 increased the requirement for environmental considerations to be integral in planning. Since that time the authorities responsible for planning and building (planning, town planning and architecture offices), environmental divisions and technical units have been co-operating with each other.

**The county administrative boards** take charge of and coordinate state interests presented by the traffic agencies, the Central Board of National Antiquities and other authorities in planning, as well as monitoring to ensure that the municipalities respect each others' interests. The formulation and application of regional environmental objectives is an important function. This requires dialogues both with central agencies and with municipalities and other counties involved. In some counties, trials are underway to institute autonomous regional bodies which have assignments linked to planning.

**The National Board of Housing, Building and Planning** is a central administrative agency for issues concerning the urban environment and the conservation of land and water areas, physical planning, building and housing. The Board is the main body responsible for the objective "A good urban environment". The Board is also responsible, in conjunction with SEPA, for the SAMS project.

**The Swedish Environmental Protection Agency (SEPA)** is generally responsible for many of the environmental issues in society. The Agency co-ordinates the work on environmental objectives and is responsible for the greater part of the national environmental quality objectives as well as the SAMS project.

In addition, there are over 20 authorities with "specific sectoral responsibilities" for ecologically sustainable development, in other words, they are responsible for ensuring that all actors active within a social sector, in public administration as well as the business sector, work with sustainable development as a guiding principle. SEPA, the National Chemicals Inspectorate, The National Board of Housing, Building and Planning, The Central Board of National Antiquities and the Institute for Radiation Protection are required to coordinate environmental and conservation issues in all sectors. The National Board of Health and Welfare has the equivalent task in relation to the environment and health.



It is difficult to see the wood for the trees. This is also the case when expertise is made accessible for physical planning. Photo: P O Eriksson, Naturfotografarna.

# Start now – raise the tempo!

## National environmental quality objectives

On 28 April 1999 the Riksdag adopted 15 national environmental quality objectives. The objectives are a development of earlier environmental goals and describe what is required for the achievement of sustainable development (Bill 1997/98:145).

The EPA coordinates the work on environmental quality objectives conducted by the agencies and authorities and shares the responsibility for development, information and follow-up with several authorities.

## Targets

The targets describe what should be achieved within a specific area by a certain date. They are used as a point of departure when a course of action is decided on for the achievement of a specific environmental quality objective. The targets are established by the Riksdag.

## Sector goals

Sector goals are formed by the agencies, organisations and companies active within a common social sector. The aim of sector goals is to render the changes each sector ought to achieve within a certain time frame more tangible.

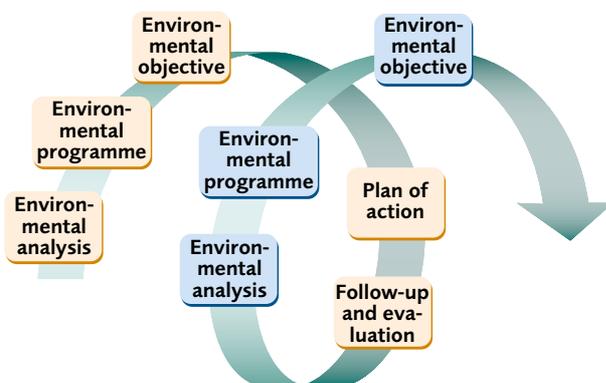
## Regional and local objectives

All the county boards have formulated strategies for regional environments (STRAM) based on earlier environmental goals.

The Government has commissioned the county boards to revise their strategies on the basis of the new national environmental quality objectives. An adaptation of the national and regional objectives to local environmental objectives is under way in many municipalities.

## Following up the objectives

It is important to follow the objectives up at every level since this indicates the rate at which we are approaching the objectives. It also shows whether the measures need to be modified or if the objectives have to be reviewed.



## Overview of the structure of objectives



## The objectives and the Code

The environmental quality objectives allow us to assess what is necessary for the achievement of sustainable development. In the application of the Environmental Code, the environmental quality objectives provide guidance. In order to be able to assess individual operation, the objectives have to be adapted both geographically and for the various sectors.

The Environmental Code coordinates traditional environmental regulations with legislation concerning land use and the conservation of resources. In this way, the scope for making a collective assessment of the environmental objectives is improved. In addition to general regulations such as the principle of caution, the ecocycle principle and choice of product principle, the Code offers new instruments such as environmental quality norms. The norms should be followed in planning, in granting licenses and in monitoring. The norms render environmental quality more tangible for different areas.

The work on regional environmental quality objectives conducted by the county boards includes, according to the government commission, the following tasks:

- To coordinate the formulation of objectives both across county boundaries and in conjunction with sectors and municipalities.
- To formulate environmental objectives so that they can be used in the application of the Environmental Code.
- To coordinate environmental objective work with environmental monitoring. The follow-up and evaluation of the regional environmental objectives should be done continuously. The follow-up should provide the basis for revision of the regional objectives.



A cooperation  
between  
Naturvårdsverket  
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The Swedish Environmental Protection Agency (SEPA) has chief responsibility for the work environmental objectives conducted by government agencies. SEPA is also Sweden's largest producer of environmental expertise which is spread via our publishers, press service, training programmes, the Internet, magazines and our library. **Customer Service**, Tel +46 8 698 12 00 fax+46 8 698 15 15. E-mail: kundtjanst@environ.se **Bookshop** www.miljobokhandeln.com  
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